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U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

DRAFT FINAL

EXPANDED SITE INSPECTION
EIGHT MODERATELY LOW PRIORITY AOCs
SEADs 5, 9, 12(A AND B), (43, 56, 69), 44(A AND B), 50, 58, AND 59

VOLUME 1 OF 2

DECEMBER 1995

EXPANDED SITE INSPECTION REPORT
EIGHT MODERATELY LOW PRIORITY AREAS OF CONCERN
SENECA ARMY DEPOT
ROMULUS, NEW YORK

Prepared For:

Seneca Army Depot
Romulus, New York

Prepared By:

Parsons Engineering Science, Inc.
Prudential Center
Boston, Massachusetts

720519

December 1995

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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
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
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
IAG	Interagency Agreement
ICF	ICF Technology, Incorporated
Koc	Organic carbon coefficient
lb	pound
L/min	Liters per minute
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
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

LIST OF ACRONYMS
(Cont'd)

Std.	Test methods
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
TOC	Total Organic Carbon
TOX	Total Organic Halogens
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

LIST OF ACRONYMS

(Cont'd)

VLF-EM	Very Low Frequency Electromagnetic
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
Vs	Volt Second
Zn	Zinc

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1.0 INTRODUCTION

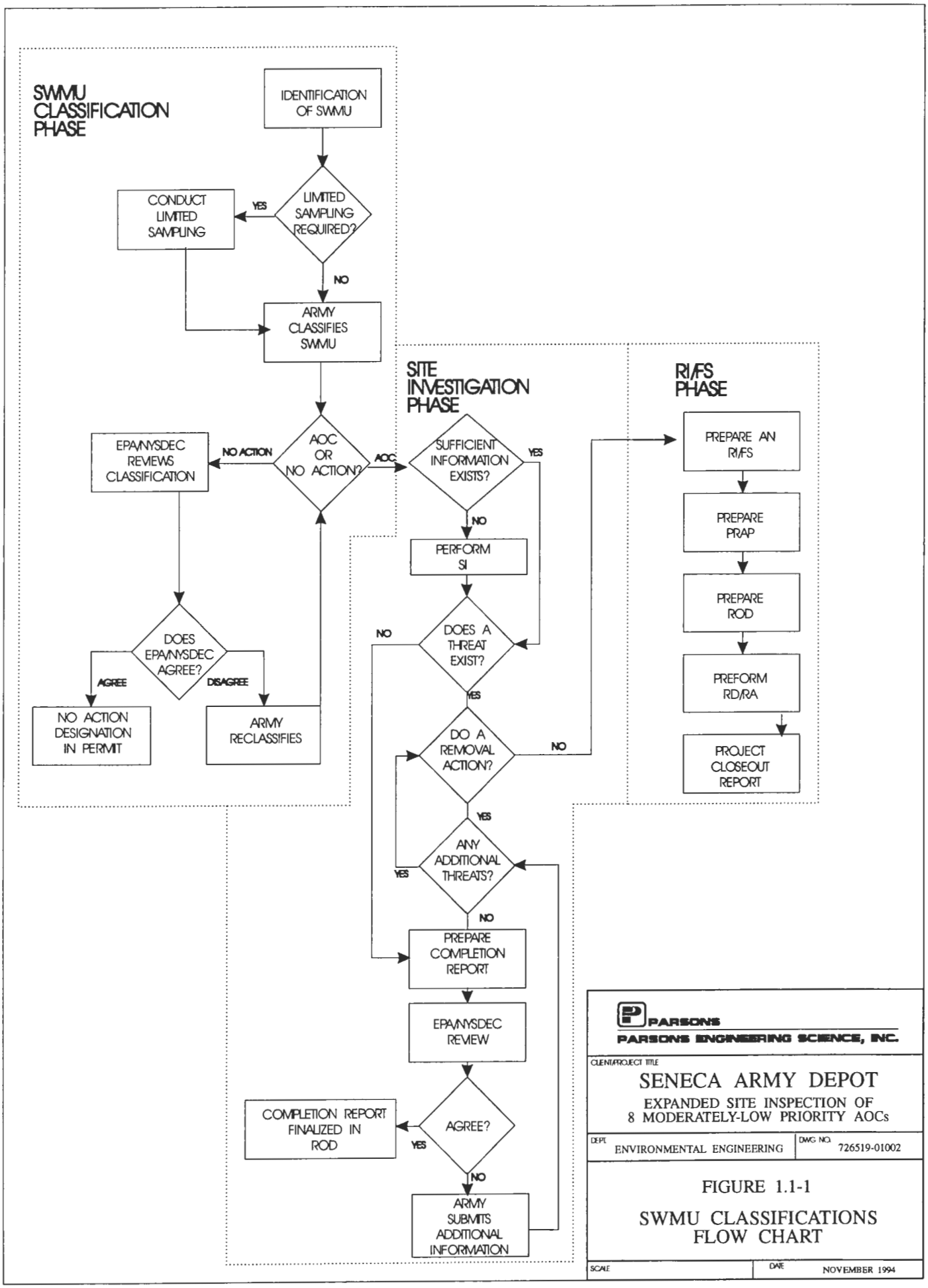
Parsons Engineering Science, Inc. (Parsons ES) has been retained by the U.S. Army Corps of Engineers (USACOE) to conduct Expanded Site Inspections (ESI) at Solid Waste Management Units (SWMUs) that have been designated as Areas of Concern (AOC) within the Seneca Army Depot (SEDA). This report describes the ESI activities at the following eight (8) moderately low priority AOCs:

- SEAD-5 - Sewage Sludge Waste Piles
- SEAD-9 - Old Scrap Wood Site
- SEAD-12A - Radioactive Waste Burial Sites
- SEAD-12B - Radioactive Waste Burial Sites
- SEAD-43 - Building 606-Old Missile Propellant Test Laboratory (refer to SEAD-56)
- SEAD-56 - Building 606-Herbicide and Pesticide Storage (refer to SEAD-43)
- SEAD-69 - Building 606-Disposal Area
- SEAD-44A - Quality Assurance Test Laboratory (West of Building 616)
- SEAD-44B - Quality Assurance Test Laboratory (Brady Road)
- SEAD-50 - Tank Farm
- SEAD-58 - Debris Area Near Booster Station 2131
- SEAD-59 - Fill Area West of Building 135

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 eight (8) AOCs.

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



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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726519-01002

FIGURE 1.1-1

SWMU CLASSIFICATIONS
FLOW CHART

SCALE	DATE
	NOVEMBER 1994

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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 or no 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.

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 paragraph 10.9 of the IAG.

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

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FIGURE 1.1-2

LOCATION MAP

SCALE	DATE
1"= 8 MILES APPROX.	NOVEMBER 1994

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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.

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 Parsons 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.

A total of 69 SWMUs and AOCs were originally identified in the ERCE SWMU Classification Report. Following the completion of the ERCE report, three additional SWMUs were added by the Army, bringing the total number of SWMUs at SEDA to 72. The total number of SWMUs and AOCs to be investigated has been finalized between the Army and NYSDEC/EPA and includes 24 No-Action SWMUs and 48 sites declared as AOCs. From these 48 AOCs eight (8) moderately low priority sites were investigated as part of this work scope. These eight AOCs are presented in Table 1.1-1.

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 eight moderately low priority AOCs which are the focus of this report. The classification of all remaining SWMUs has 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, Parsons ES 1994). The Army is proceeding on a worst first basis. This report presents the findings of the investigations performed at the eight AOCs that have been classified as moderately low priority units.

1.1.1 General Description

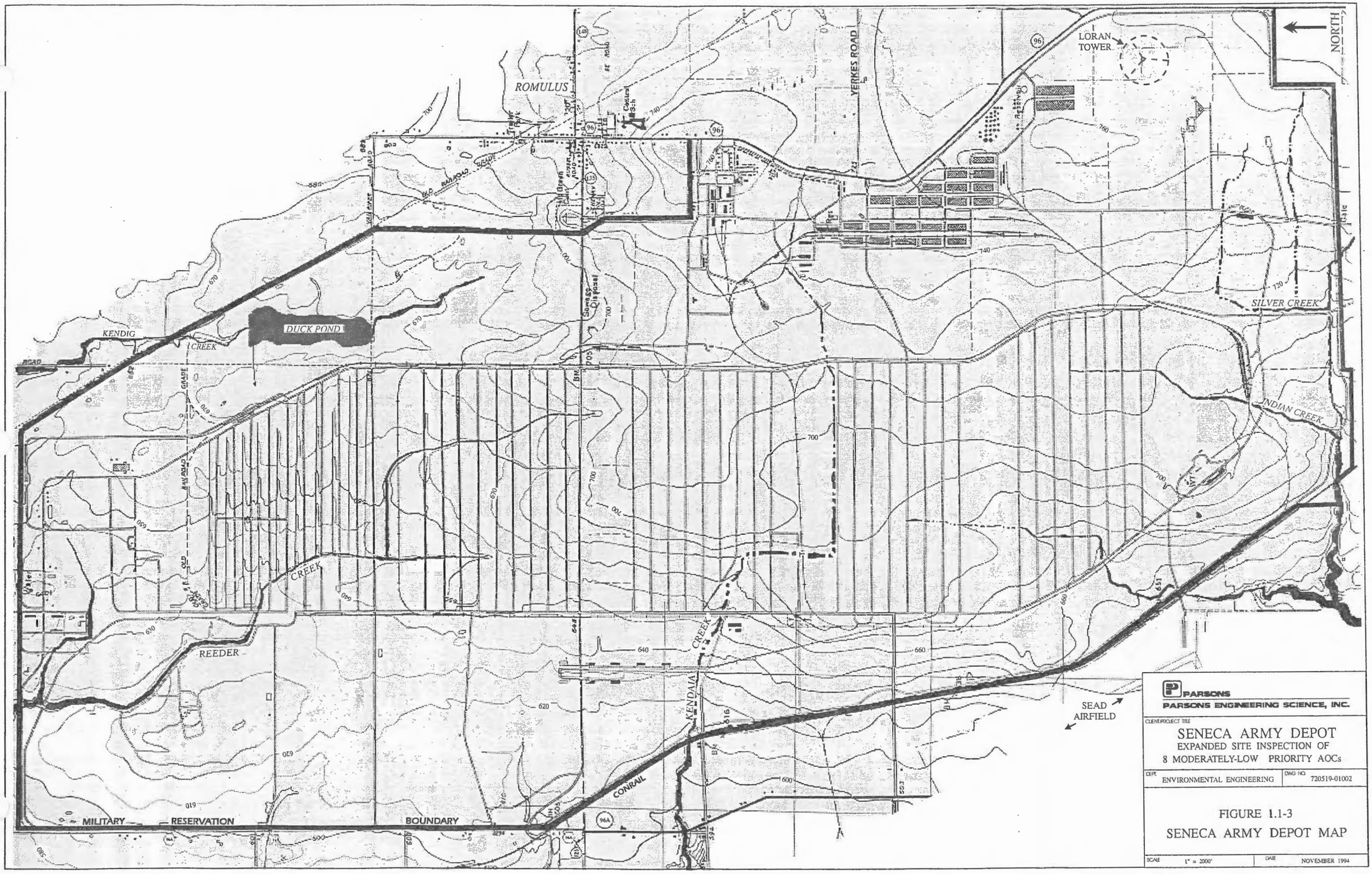
SEDA is an active military facility constructed in 1941. The site is located approximately 40 miles south of Lake Ontario, near Romulus, New York (Figure 1.1-2). The facility is located in an uplands area, at an elevation of approximately 600 feet Mean Sea Level (MSL), that forms a divide separating two of the New York Finger Lakes, Cayuga Lake on the east 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 foreseeable 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 tectronically 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 (Figure 1.1-5). 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 Arcadian 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 1.1-6 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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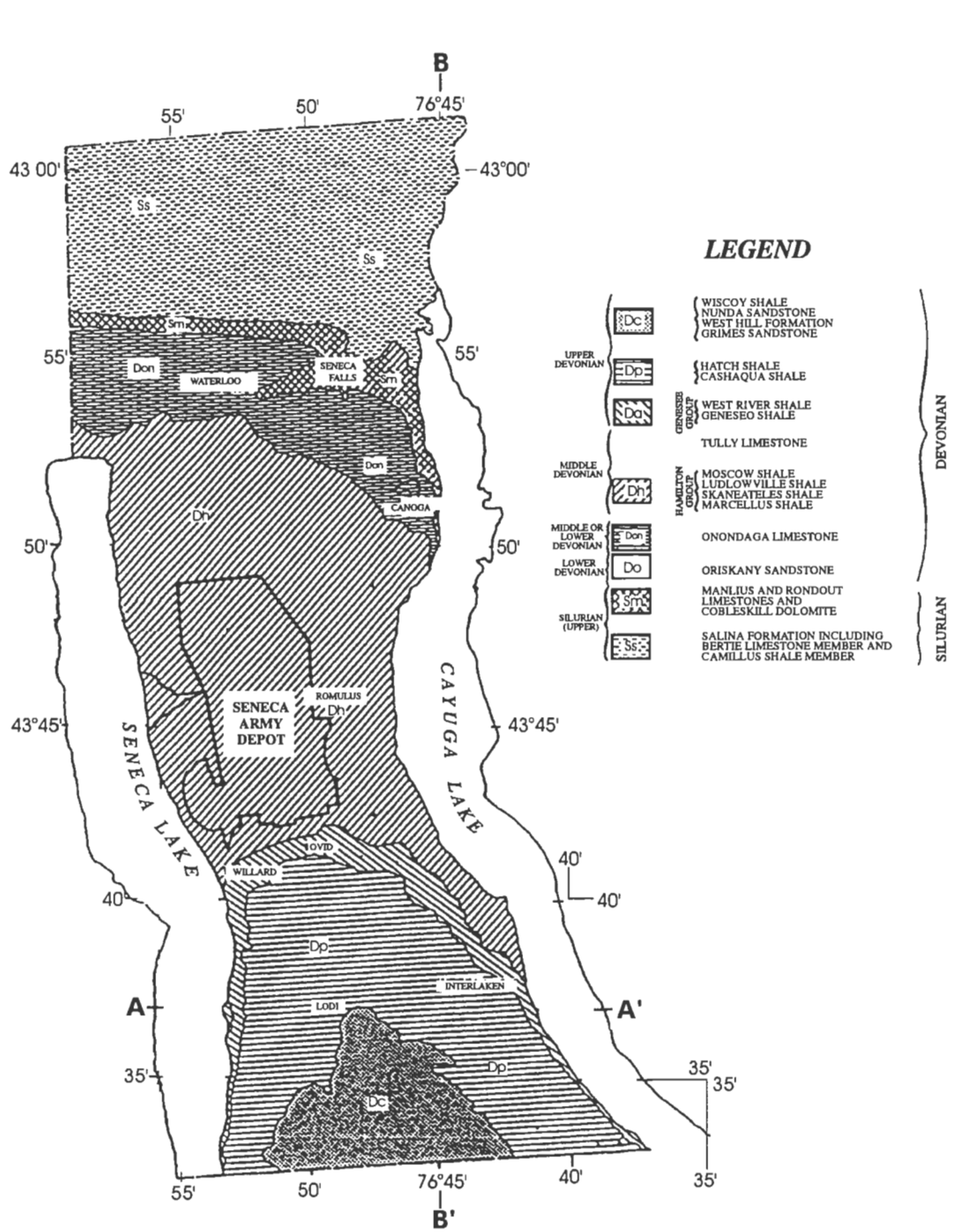
DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-01002

FIGURE 1.1-3
SENECA ARMY DEPOT MAP

SCALE 1" = 2000' | DATE NOVEMBER 1994



SOURCE: MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

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FIGURE 1.1-4

GEOLOGIC MAP OF SENECA COUNTY

SCALE	DATE
1" = 5 MILES	NOVEMBER 1994

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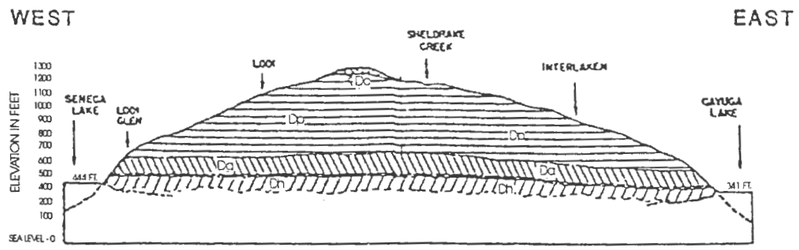
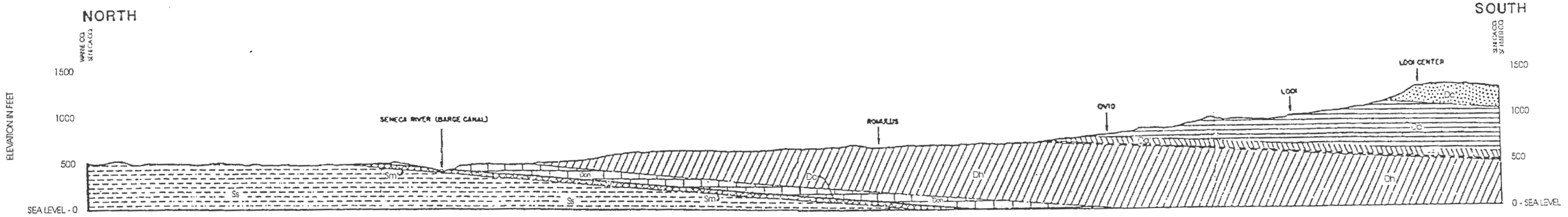
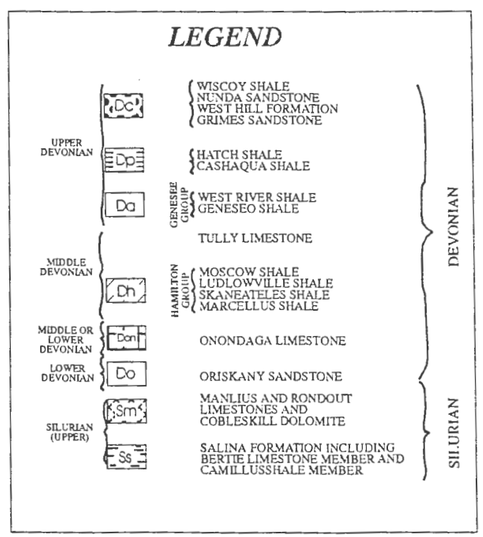


EAST-WEST SECTION ALONG A- A'



NORTH-SOUTH SECTION ALONG 76°50' (B-B')



SCALE
1 0 1 2 3 MILES

SOURCE:MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

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FIGURE 1.1-5

REGIONAL GEOLOGIC CROSS SECTIONS

SCALE 1" = 12,000 MILES APPROXIMATE | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\GEOXSEC.CDR(CVM)

MESOZOIC

Lower Cretaceous

MESOZOIC INTRUSIVES

Kimberlite and alnoite dikes and diatremes

PALEOZOIC

Upper Devonian

CONNEAUT GROUP
500-1000 ft. (180-300 m.)

Germania Formation—shale, sandstone; Whitesville Formation—shale, sandstone; Hinsdale Sandstone; Wellsville Formation—shale, sandstone; Cuba Sandstone.

CANADAWAY GROUP
800-1200 ft. (240-370 m.)

Machias Formation—shale, siltstone; Rushford Sandstone; Canadaway, Canisteo, and Hume Shales; Canaseraga Sandstone; South Wales and Dunkirk Shales; in Pennsylvania: Towanda Formation—shale, sandstone.

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; Rorlcks 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; Rorlcks 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.

Middle Devonian

Onesota Formation—shale, sandstone.

Unadilla Formation—shale, siltstone.

Tully Limestone.

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, Moltville 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.

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.

Upper Silurian

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.
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—sandstone, shale; Oneida Conglomerate.

Lower Silurian

MEDINA GROUP AND QUEENSTON FORMATION
0-900 ft. (0-270 m.)

Medina Group: Grimsby Formation—sandstone, shale.
Queenston Formation—shale, siltstone.
Undifferentiated Medina Group and Queenston Formation.

Upper Ordovician

LORRAINE GROUP
700-900 ft. (210-270 m.)

Oswego Sandstone.
Pulaski and Whetstone Gulf Formations—siltstone, shale

Middle Ordovician

TRENTON GROUP
100-300 ft. (30-90 m.)

Utica Shale

Hamilton group Moscow shale	140±	Lower two-thirds of section is a fossiliferous, soft gray calcareous shales; 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	140±	Lower beds are thinly laminated, light-colored, fossiliferous, shaly passage beds; overlain by hard calcareous block 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 8 to 30 centimeters apart, well developed but tight.
Skaneateles shale	185±	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	50	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.

SOURCE: MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

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PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726519-01002

FIGURE 1.1-6
BEDROCK STRATIGRAPHIC COLUMN

SCALE | DATE NOVEMBER 1994

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 1.1-7, the physiography of Seneca County, presents an overview of the subsurface sediments present in the area. The site is shown on Figure 1.1-7 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. The thickness of the glacial till deposits at SEDA generally ranges from 1 to 15 feet.

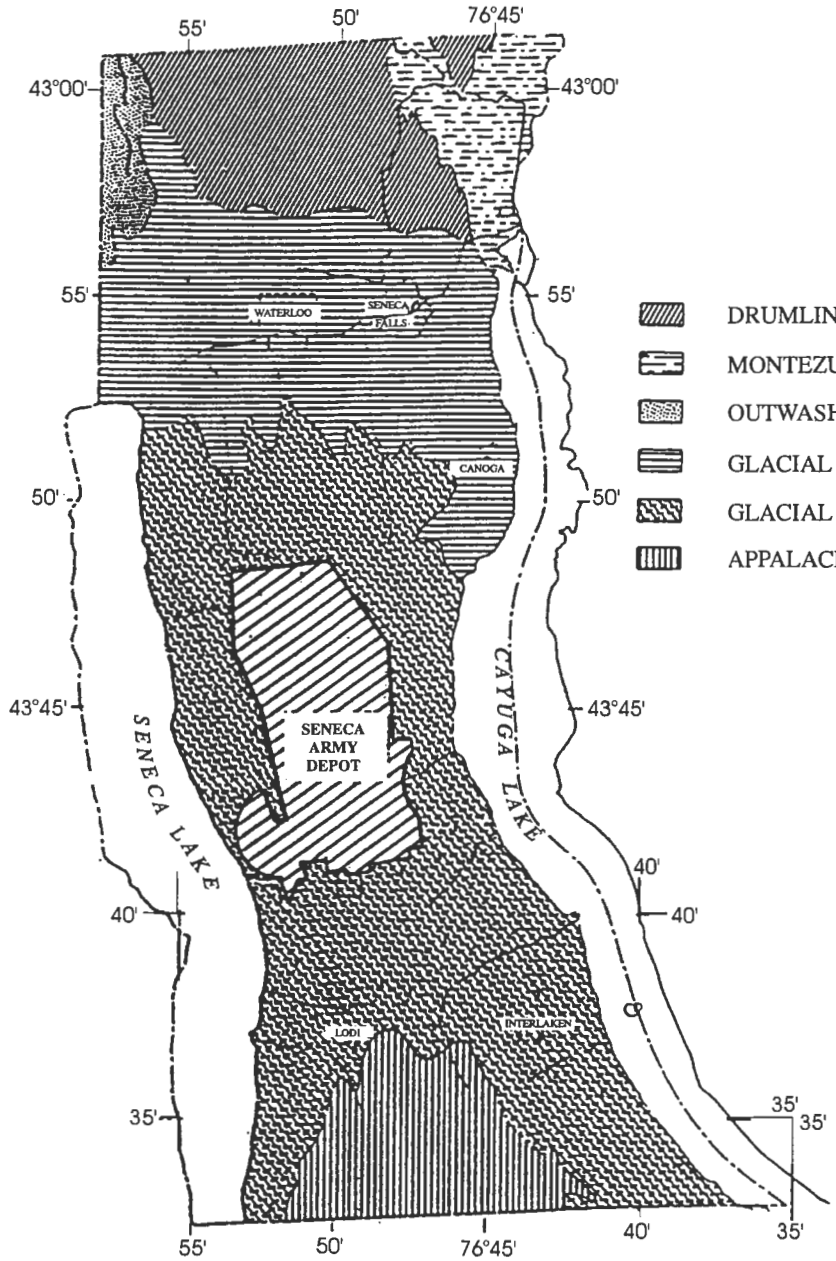
Darien silt-loam soils, 0 to 18 inches thick, have developed over Wisconsin age glacial tills. These soils are developed on glacial till where they overlie the shale. In general, the topographic relief associated with these soils is from 3 to 8 percent. Figure 1.1-8 presents the U.S. Department of Agriculture (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) (Mozola, A.J., 1951). About five percent of the wells in the county are used for commercial, industrial, or municipal purposes. Seneca Falls and Waterloo, the two largest



SOURCE:MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726519-01002

FIGURE 1.1-7

PHYSIOGRAPHIC MAP OF SENECA COUNTY

SCALE	DATE
1" = 5 MILES	NOVEMBER 1994

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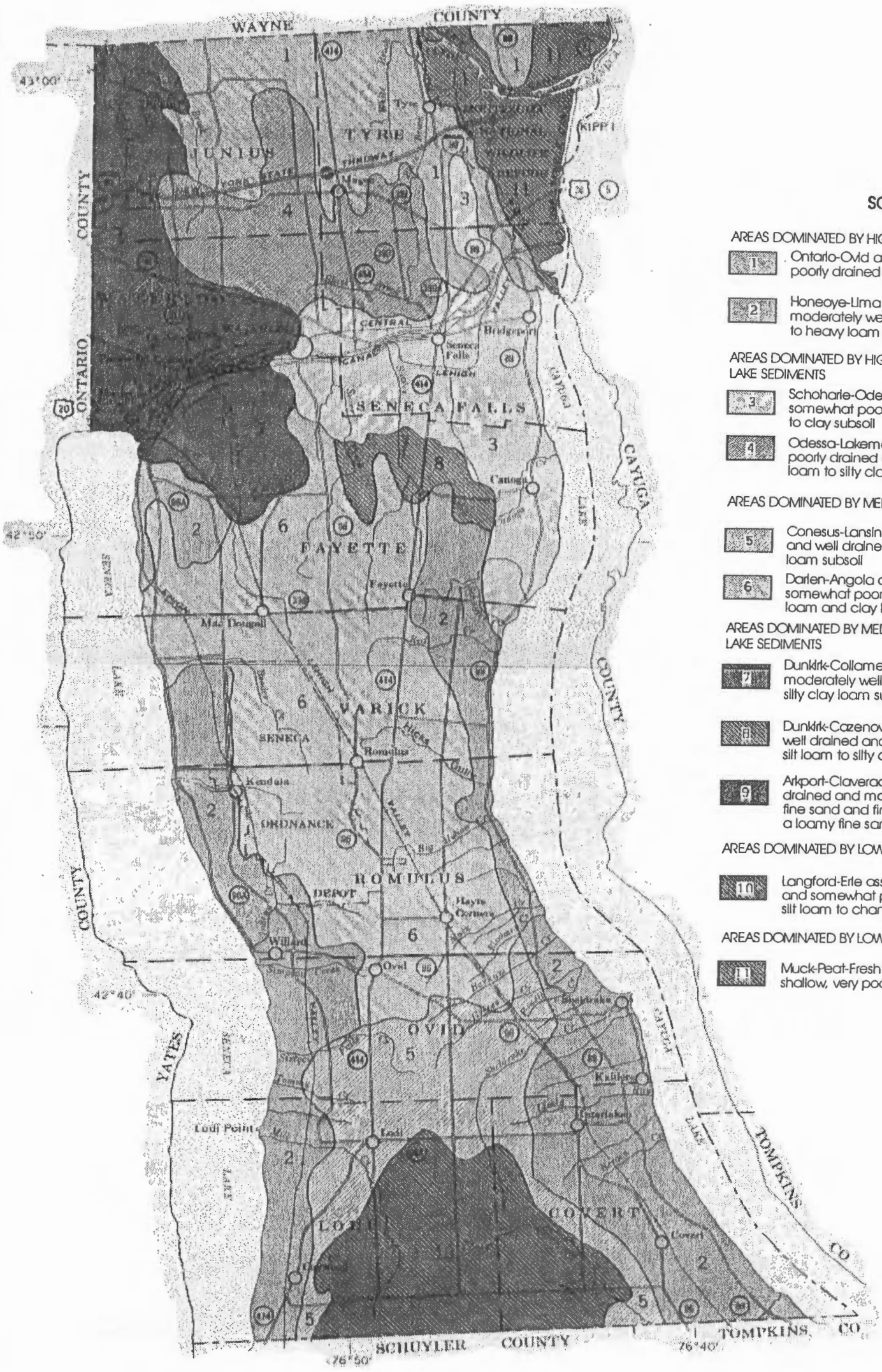
1 0 1 2 3 4
SCALE IN MILES
1:190,080



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 LOW-LIME SOILS DEVELOPED IN ORGANIC MATERIAL

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

FEBRUARY 1971

SOURCE: U.S. DEPARTMENT OF ARGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726519-01002

FIGURE 1.1-8

GENERAL SOIL MAP
SENECA COUNTY, NEW YORK

SCALE 1" = 2000' | DATE NOVEMBER 1994

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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
8 MODERATELY LOW PRIORITY AOCs EXPANDED SITE INSPECTION

ELEMENT	CONCENTRATION RANGE (mg/kg)	GEOGRAPHIC LOCATION
Aluminum	7,000 - 100,000 1,000 - 25,000	Eastern U.S. (2) Albany Area (1)
Arsenic	< 0.1 - 73 3 - 12 < 0.1 - 6.5	Eastern U.S. (2) New York State (1) Albany Area (1)
Barium	10 - 1,500 15 - 600 250 -350	Eastern U.S. (2) New York State (1) Albany Area (1)
Beryllium	1 - 7 0 - 1.75 0 - 0.9	Eastern U.S. (2) New York State (1) Albany Area (1)
Cadmium	Not Available 0.0001 - 1.0	Eastern U.S. (2) No Region Specified (1)
Calcium	100 - 280,000 130 - 35,000 150 - 5,000 2,900 - 6,500	Eastern U.S. (2) New York State (1) Albany Area (1) Albany Area (1)
Chromium	1 - 1,000 1.5 - 40 1.5 - 25	Eastern U.S. (2) New York State (1) Albany Area (1)
Cobalt	< 0.3 - 70 2.5 - 60 2.5 - 6	Eastern U.S. (2) New York State (1) Albany Area (1)
Copper	< 1 - 700 < 1 - 15	Eastern U.S. (2) Albany Area (1)
Iron	100 - 100,000 17,000 - 25,000	Eastern U.S. (2) Albany Area (1)
Lead	> 10 - 300 1 - 12.5	Eastern U.S. (2) Albany Area (1)
Magnesium	50 - 50,000 2,500 - 6,000 1,700 - 4,000	Eastern U.S. (2) New York State (1) Albany Area (1)
Manganese	> 2 - 7,000 50 - 5,000 400 - 600	Eastern U.S. (2) New York State (1) Albany Area (1)
Mercury	0.01 - 3.4 0.042 - 0.066	Eastern U.S. (2) Albany Area (1)

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
8 MODERATELY LOW PRIORITY AOCs EXPANDED SITE INSPECTION

ELEMENT	CONCENTRATION RANGE (mg/kg)	GEOGRAPHIC LOCATION
Nickel	< 5 - 700 19.5 (mean)	Eastern U.S. (2) New York State (1) (no range available)
Potassium	50 - 37,000 47.5 - 117.5	Eastern U.S. (2) New York State (1)
Selenium	> 0.1 - 3.9 Not Available	Eastern U.S. (2) No New York State Data Given (1)
Sodium	500 - 50,000 Not Available	Eastern U.S. (2) No New York State Data Given (1)
Vanadium	> 7 - 300 Not Available	Eastern U.S. (2) No New York State Data Given (1)
Zinc	> 5 - 2,900 37 - 60	Eastern U.S. (2) Albany Area (1)

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.

communities 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 located approximately 1,000 feet from the center of the village. Ovid is located approximately 5 miles south of SEDA. Interlaken has one well located 1-1/2 miles northeast of the center of the village from which to obtain its public water supply. Two wells are used as a backup water supply and are located approximately 1-1/2 miles southwest of the village. Interlaken is located approximately 11 miles south of SEDA.

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 primarily westward toward Seneca Lake.

A substantial amount of information concerning the hydrogeology of 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) an overburden 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 SEDA. 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 overburden aquifer, and one used the deep limestone as a source of water.

For the six wells that utilized groundwater extracted from the overburden, 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 overburden 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.

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 at SEDA show a wide distribution of grain sizes. The glacial 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. These 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 from 3 to 8%.

A zone of gray weathered shale of variable thickness is present 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 soil samples collected at the Ash Landfill site, the Open Burning Grounds site, at ten (10) AOCs investigated prior to this effort.

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	MINIMUM SOILS	MAXIMUM SOILS	AVERAGE SOILS	STANDARD DEVIATION SOILS	95TH UCL SOILS	ASH B8-91 0-2 SOIL	ASH B8-91 2-4 SOIL	ASH B8-91 2-4 SOIL	ASH B8-91 6-8 SOIL
Aluminum	5560.00	21200	13610.00	4510.79	14592.84	19200	20500	17700	12700
Antimony	0.08	17.1	2.95	2.90	3.59	5.15	4.4	4.1	4.2
Arsenic	2.70	21.5	5.51	2.75	6.13	5.1	6.1	6	4.2
Barium	33.90	159	82.14	26.92	88.01	136	98.9	86.7	56.2
Beryllium	0.27	1.4	0.67	0.25	0.73	1.4	1.2	1	0.78
Cadmium	0.01	2.9	0.58	0.72	0.83	2.6	2.9	2.4	1.9
Calcium	1370.00	293000	46203.33	49677.73	101903.83	5390	4870	3560	85900
Chromium	10.30	35.8	20.73	6.42	22.13	27.4	30.1	26.9	19.8
Cobalt	5.20	29.1	11.28	4.31	12.22	13.8	18.4	14	14.2
Copper	9.70	62.8	22.23	8.76	24.14	22.3	27.6	26	16.2
Iron	8770.00	42500	24992.46	7500.25	26626.65	37200	36100	32500	27400
Lead	5.40	269	22.35	48.97	21.86	14.5	11.4	13.6	10.1
Magnesium	2830.00	34900	10734.39	6826.46	12221.77	5850	7300	6490	6720
Manganese	207.00	2380	593.64	335.21	669.38	1130	956	832	926
Mercury	0.01	0.5	0.05	0.07	0.07	0.09	0.06	0.06	0.05
Nickel	12.30	62.3	31.21	11.05	33.62	42.3	48.7	44.4	30.4
Potassium	628.00	3460	1630.86	599.51	1761.48	1910	2110	1760	1430
Selenium	0.05	2.1	0.40	0.44	0.53	0.085	0.105	0.1	0.305
Silver	0.04	0.87	0.35	0.26	0.40	0.8	0.65	0.6	0.65
Sodium	8.45	269	91.50	56.16	103.74	39.6	33.75	31.3	75.3
Thallium	0.08	0.8	0.24	0.17	0.28	0.235	0.29	0.285	0.17
Vanadium	11.50	36.9	22.43	6.83	23.92	32.2	25.4	26.4	15.7
Zinc	36.20	219	76.15	28.37	82.50	85.1	94.2	85	75
Cyanide	0.22	0.41	0.29	0.04	0.30	0.3	0.315	0.335	0.29

Notes:
1) All soil results are expressed in mg/kg.
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 collected 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.
5) "R" qualifier indicates datum rejected during data validation.

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	ASH B9-91 0-2 SOIL	ASH B9-91 2-4 SOIL	ASH B9-91 6-8 SOIL	ASH BK-1 0-2 SOIL	ASH BK-2 0-2 SOIL	OB MW-34 0-2 SOIL	OB GB35-1 0-2 SOIL	OB GB35-2 2-4 SOIL	OB GB35-6 0-2 SOIL	OB GB36-1 0-2 SOIL	OB GB36-2 2-4 SOIL	SEAD-4 SB4-1.1 0-2 SOIL
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 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-4 SB4-1.1 DUP SOIL	SEAD-4 SB4-1.3 4-6 SOIL	SEAD-4 SB4-1.6 8-10 SOIL	SEAD-11 SB11-3.1 0-2 SOIL	SEAD-11 SB11-3.2 4-6 SOIL	SEAD-11 SB11-3.6 10-12 SOIL	SEAD-13 SB13-1.1 0-2 SOIL	SEAD-13 SB13-1.3 6-8 SOIL	SEAD-13 SB13-1.4 8-10 SOIL	SEAD-13 SB13-4.1 0-2 SOIL	SEAD-13 SB13-4.2 2-4 SOIL
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

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-13 SB13-4.3 4-6 SOIL	SEAD-16 SS16-1 0-0.2 SOIL	SEAD-17 SB17-1.1 0-2 SOIL	SEAD-17 SB17-1.2 2-4 SOIL	SEAD-17 SB17-1.3 4-6 SOIL	SEAD-24 SB24-5.1 0-2 SOIL	SEAD-24 SB24-5.3 4-6 SOIL	SEAD-24 SB24-5.5 8-10 SOIL	SEAD-25 SB25-6.1 0-2 SOIL	SEAD-25 SB25-6.2 2-4 SOIL	SEAD-26 SB26-1.1 0-2 SOIL	SEAD-26 SB26-1.2 2-4 SOIL
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	47300
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

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-12 MW12A-1-00 0-0.2 SOIL	SEAD-12 MW12A-1-03 4-6 SOIL	SEAD-12 MW12A-1-05 8-9.5 SOIL	SEAD-12 MW12B-1-00 0-0.2 SOIL	SEAD-12 MW12B-1-03 4-6 SOIL	SEAD-12 MW12B-1-07 12-13.5 SOIL	SEAD-64 MW64A-1.00 0-0.2 SOIL	SEAD-64 MW64A-1.02 2-4 SOIL	SEAD-64 MW64A-1.03 4-6 SOIL	SEAD-64 MW64B-1-00 0-0.2 SOIL
Aluminum	18700	11000	12400	10800	8060	5940	16100	19800	12600	13400
Antimony	0.11	0.12	0.1	0.115	0.1	0.13	0.23	0.1	0.1	0.3
Arsenic	5.2	3.5	3.6	6.6	4.6	2.9	7.1	8.2	5	5.5
Barium	125	82.8	78.3	102	89.1	43.8	83.7	91.2	62.3	75.5
Beryllium	0.8	0.46	0.58	0.53	0.4	0.27	0.68	0.74	0.53	0.56
Cadmium	0.86	0.52	0.85	0.63	0.52	0.32	0.11	0.01	0.12	0.63
Calcium	3370	71200	70300	45900	79400	51100	7210	4300	72400	5530
Chromium	23.1	15.3	19.7	16	12.7	12	23	25	19	17.5
Cobalt	10.9	10.1	10.8	9.2	8.6	5.2	11.8	11.3	9.1	7.2
Copper	19.1	20.6	29.6	30.4	22.5	17.3	25.5	21	23.7	18.9
Iron	23500	17400	22600	23400	17200	13500	28500	28000	22600	20900
Lead	21.6	7.6	10.8	17.1	10.3	7.3	21.6	13.6	15.4	21.4
Magnesium	3880	19200	12000	11400	16300	8320	5480	5010	14800	3720
Manganese	939	414	409	418	388	244	558	604	402	207
Mercury	0.06	0.02	0.03	0.04	0.5	0.03	0.05	0.03	0.02	0.05
Nickel	25.7	23.7	35.5	28	23.6	19	32.2	28.6	26.7	19.8
Potassium	2660	3460	2910	1870	1660	1040	2590	2260	2700	1700
Selenium	1.2	0.25	0.205	1.3	0.72	2.1	0.96	1.7	0.17	0.99
Silver	0.045	0.045	0.04	0.045	0.04	0.05	0.06	0.07	0.07	0.08
Sodium	8.45	79.9	136	76.2	135	77.3	13.75	15.9	92.1	17.95
Thallium	0.16	0.175	0.145	0.41	0.64	0.39	0.42	0.16	0.16	0.41
Vanadium	33.1	21.7	20.2	20.9	13.8	11.5	27.6	32.2	22.8	23.3
Zinc	77.8	41.4	82.1	62.7	50.5	36.2	104	87.1	64.9	72.2
Cyanide	0.3	0.265	0.215	0.25	0.235	0.235	0.33	0.28	0.275	0.3

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-64 MW64B-1-03 4-6 SOIL	SEAD-64 MW64B-1-04 6-8 SOIL	SEAD-67 MW67-2.00 0-0.2 SOIL	SEAD-67 MW67-2.02 2-4 SOIL	SEAD-67 MW67-2.03 4-5 SOIL	SEAD-70 MW70-1.00 0-0.2 SOIL	SEAD-70 MW70-1.02 2-4 SOIL	SEAD-70 MW70-1.03 4-6 SOIL
Aluminum	8870	7620	16700	14900	9460	12200	9480	11000
Antimony	0.075	0.075	0.27	0.22	0.1	0.115	0.105	0.095
Arsenic	4.3	5.5	4.4	4.5	4.2	5.4	4.1	5.7
Barium	70.8	76.7	114	105	80.8	67.5	56.6	79.9
Beryllium	0.43	0.37	0.67	0.61	0.4	0.44	0.41	0.54
Cadmium	0.64	0.54	0.2	0.11	0.12	0.57	0.43	0.8
Calcium	70000	75900	3580	79000	77800	3600	51600	48600
Chromium	14.1	13.5	19.5	22.5	14.8	13.7	14.7	17.8
Cobalt	10	7.4	7.5	10.4	9.7	5.5	7.1	21
Copper	20.2	17.6	16.5	20.3	20.5	12.4	19.7	33.5
Iron	18400	17100	20500	24400	18700	17700	16000	26400
Lead	8.8	8.3	17.5	9.3	8.5	20.7	9.1	13.6
Magnesium	18900	21500	3590	15600	20900	2830	13600	7980
Manganese	434	389	438	528	411	233	470	1040
Mercury	0.02	0.005	0.04	0.01	0.02	0.1	0.03	0.02
Nickel	28.2	22.6	18.7	32.3	25.9	12.3	17.6	52.4
Potassium	1630	1650	1780	3160	1970	982	1590	1350
Selenium	0.13	0.57	0.81	0.18	0.17	1	0.64	0.16
Silver	0.065	0.065	0.065	0.075	0.07	0.08	0.07	0.07
Sodium	96.8	79.6	12.55	112	107	18.2	126	165
Thallium	0.12	0.12	0.48	0.17	0.16	0.185	0.165	0.155
Vanadium	14.8	14.2	28.2	24.8	16.5	23.3	17.2	17.6
Zinc	59	45.6	64.8	62	60.1	55.4	42.4	116
Cyanide	0.25	0.24	0.32	0.25	0.27	0.32	0.295	0.24

1.1.1.4 Local Hydrology/Hydrogeology

Surface drainage from SEDA flows to four creeks. 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 Kendaia 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 overburden 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 3.53×10^{-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, 1.9×10^{-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 during portions of the year. Based upon a review of two years of data, the variations of the water table elevations are likely a seasonal phenomenon. The overburden 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 variations in the aquifer thickness appears to be consistent with what would be expected based upon an understanding of the hydrologic cycle. Although precipitation 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 $5.0x10^{-1}$ ft/day ($1.8x10^{-4}$ cm/sec). The hydraulic conductivities ranged from 2.02×10^{-2} ft/day ($7.06x10^{-6}$ cm/sec) to 1.47 ft/day ($5.19x10^{-4}$ 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 $2.8x10^{-1}$ ft/day ($9.9x10^{-5}$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 (Freeze and Cherry, 1979).

A groundwater investigation, which was part of a RI for the OB grounds at SEDA, was conducted to evaluate certain hydrologic characteristics including the possibility that the till and the weathered shale are separate aquifers. Ten overburden monitoring wells and 12 weathered shale monitoring wells were installed as part of this investigation. Six rounds of depth to groundwater measurements were made for the RI. Water table elevations for the overburden monitoring wells screened within the glacial till as measured in January 1992 and April 1993 were evaluated. The January data indicated a horizontal gradient of 0.011 feet/feet. The April 1993 data indicated a very similar gradient for the majority of the site. Groundwater elevations for the monitoring wells screened within the weathered shale as measured in January 1992 and April 1993 were also evaluated and a horizontal gradient of 0.013 feet/feet was calculated for the weathered shale unit. This horizontal gradient is quite similar to the value determined for the glacial till unit suggesting similar groundwater flow conditions exist within the two geologic units. This data support the presence of only one aquifer, the till/weathered shale aquifer.

Soils samples were collected during the 1984 U.S. Army Environmental Hygiene Agency (USAEHA) Phase IV investigation of the Open Burning Grounds 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 $1.01x10^{-3}$ ft/day ($3.56x10^{-7}$ cm/sec). The typical range for glacial tills, described by Freeze and Cherry (1979), is between $3x10^{-1}$ ft/day ($1x10^{-4}$ cm/sec) and $3x10^{-7}$ ft/day ($1x10^{-10}$ 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 (Cornell 1967). This report classifies in further detail land uses and environments of this region. Agricultural land use is categorized as inactive and active use. Inactive agricultural land consists of land committed to eventual forest regeneration, land 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 1.1-10). 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 shooting range at the air 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

SENECA ARMY DEPOT

SCHOOL

SEAD-71

SEAD-64A

SEAD -62

SEAD -64C

SEAD-60

SEAD-67

SEAD-64B

SEAD-63

SEAD-70

SENECA ARMY AIRFIELD

STATE HOSPITAL

SAMPSON STATE PARK

GOVERNMENT HOUSING

SENECA LAKE

1/2 0 1

SCALE IN MILES

N

LEGEND

Active

Ac Cropland/cropland pasture
Ap Permanent pasture

Inactive

Al 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

r:\graphics\seneca\basemap\zoning\landuse.cdr(cvm)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

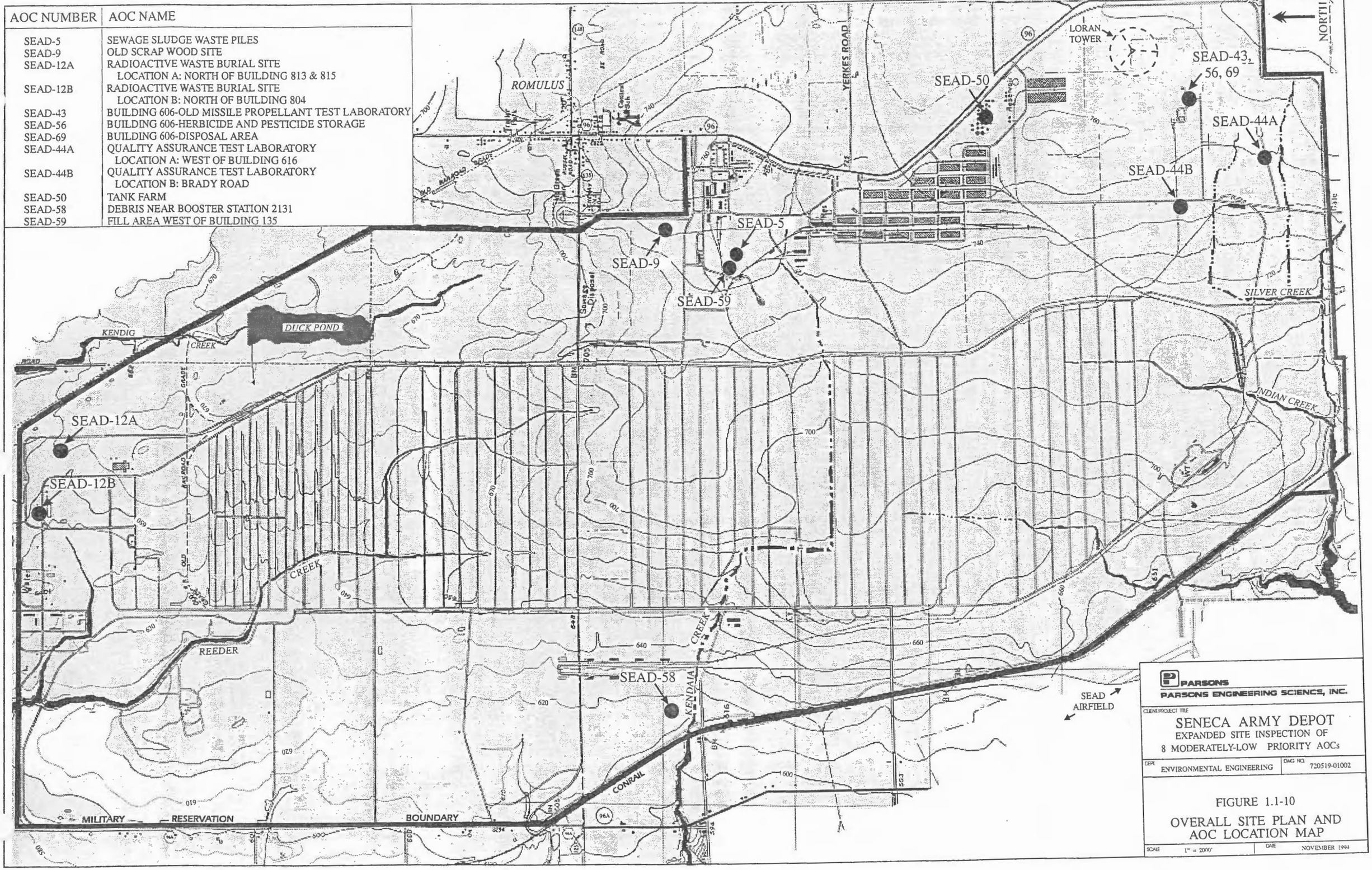
DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726518-01002

FIGURE 1.1-9

REGIONAL/LOCAL LAND USE MAP

SCALE 1" = 2000' | DATE NOVEMBER 1994

AOC NUMBER	AOC NAME
SEAD-5	SEWAGE SLUDGE WASTE PILES
SEAD-9	OLD SCRAP WOOD SITE
SEAD-12A	RADIOACTIVE WASTE BURIAL SITE LOCATION A: NORTH OF BUILDING 813 & 815
SEAD-12B	RADIOACTIVE WASTE BURIAL SITE LOCATION B: NORTH OF BUILDING 804
SEAD-43	BUILDING 606-OLD MISSILE PROPELLANT TEST LABORATORY
SEAD-56	BUILDING 606-HERBICIDE AND PESTICIDE STORAGE
SEAD-69	BUILDING 606-DISPOSAL AREA
SEAD-44A	QUALITY ASSURANCE TEST LABORATORY LOCATION A: WEST OF BUILDING 616
SEAD-44B	QUALITY ASSURANCE TEST LABORATORY LOCATION B: BRADY ROAD
SEAD-50	TANK FARM
SEAD-58	DEBRIS NEAR BOOSTER STATION 2131
SEAD-59	FILL AREA WEST OF BUILDING 135



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PARSONS ENGINEERING SCIENCS, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-01002

FIGURE 1.1-10
OVERALL SITE PLAN AND
AOC LOCATION MAP

SCALE 1" = 2000' | DATE NOVEMBER 1994

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 eight 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, Sections 120 (h)(1),(2), and (3) require that the 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 1.1-10 provides the location of the moderately low priority AOCs investigated for this report. The Sewage Sludge Waste Piles (SEAD-5), the Old Scrap Wood Site (SEAD-9), and the Fill Area west of the Building 135 (SEAD-59) are all situated in the central eastern perimeter of SEDA near Post #1. Land use adjacent to this area consists of a sparse to slightly populated region of Central Romulus. Onsite considerations place these areas within 1,500 feet of administration buildings and less than 1,700 feet apart from one another.

The area around building 606 incorporates the Old Missile Test Laboratory (SEAD 43), the Herbicide and Pesticide Storage Area (SEAD 56), and the Disposal Area (SEAD 69). Located approximately 2,500 feet from the southeastern corner of the base, this AOC triad resides in a very sparsely populated region of Romulus and Ovid. Area farmland approaches the SEDA southern perimeter fences approximately 1,500 feet to the south.

The Radioactive Waste Burial Sites (SEAD 12A & 12B), are situated in the northwest corner of SEDA. The SEDA property boundary is approximately 750 feet from 12A and 500 feet from 12B. Civilian land adjacent to the northwestern corner of SEDA consists of sparse residential areas with some farmland along Yale Farm Road.

SEAD 50, the tank farm, is adjacent to East Patrol Road and 100 feet off of Route 96. This easternmost section of SEDA is very sparsely populated with a few farms. The highway (96), which runs north south is the only source of continuous use this area receives.

SEAD 58, the Debris Area near Booster Station 2131, is accessed by two dirt roads, one from the east and one from the west. The area is about 600 feet off of West Patrol Road and 500 feet from Kendaia Creek at the closest point. Offsite land use is via route 96A which runs north-south and nearby Sampson State Park is about a mile from the area.

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.

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.

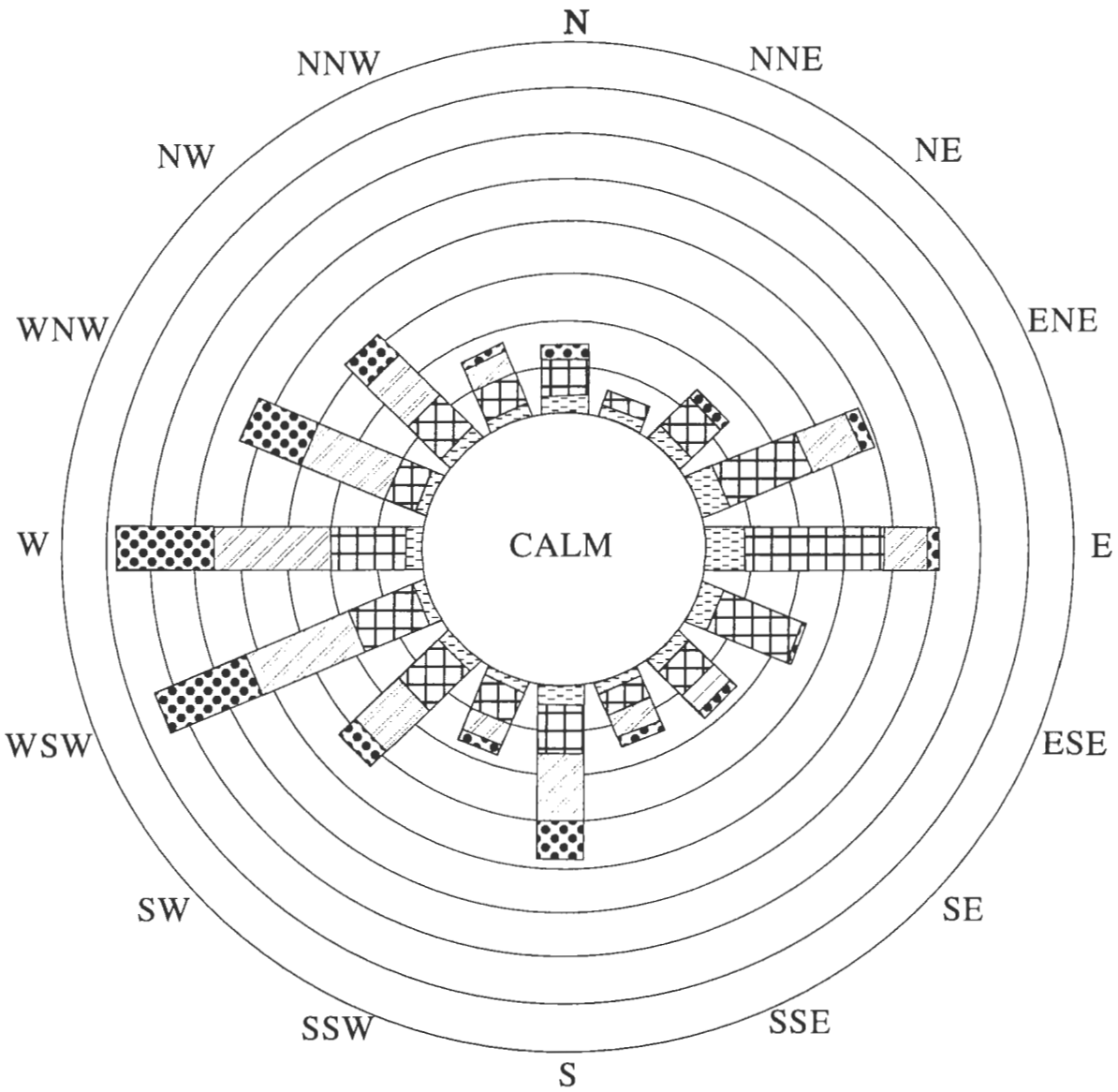
[4] Climate of New York Climatography of the United States No. 60. National Oceanic and Atmospheric Administration, June 1982. Data for Syracuse, NY.

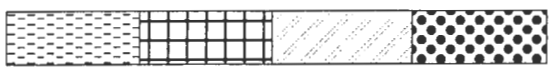
Only precipitation and temperature measurements are available from this location. The other data reported in Table 1.1-4 were taken either from isopleth drawings from a climatic atlas, or from data collected at Syracuse, New York, which is 40 miles northeast of SEDA. Meteorological data collected from 1965 to 1974 at Hancock International Airport in Syracuse, New York, were used to prepare the wind rose presented in Figure 1.1-11.

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 average annual 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 have been summarized and tabulated for the period of 1957 to 1991. The average monthly precipitation during this 35-year period of record is summarized in Figure 1.1-12. The maximum 24-hour precipitation measured at this station during this period was 3.9 inches 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





0-3 4-7 8-12 >12 KNOTS

NOTE: EACH DIVISION IS 2% OF TOTAL TIME

INSTALLATION: SENECA ARMY DEPOT
LOCATION OF DATA: SYRACUSE, NEW YORK
SOURCE: MODIFIED FROM:
US ARMY ENVIRONMENTAL
HYGIENE AGENCY

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

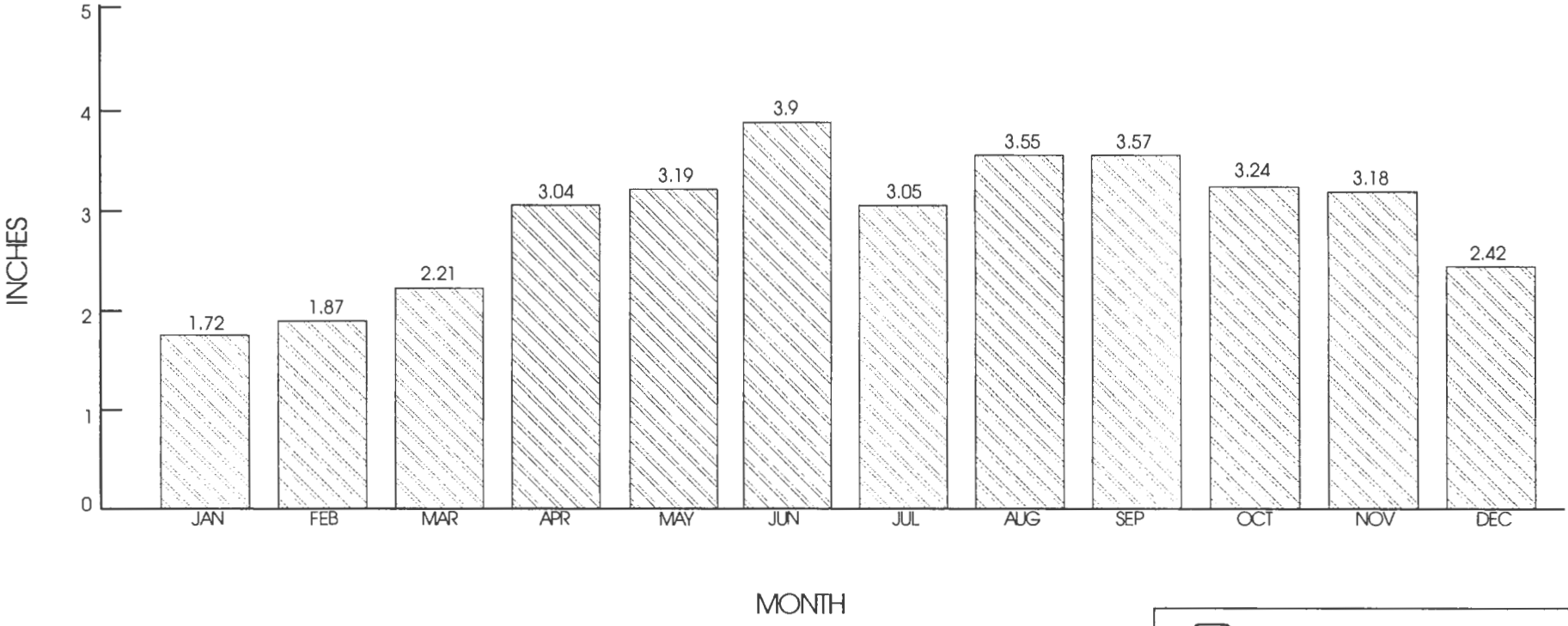
DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726519-01002

FIGURE 1.1-11

WIND ROSE,
SYRACUSE, NEW YORK

SCALE 1" = 2000' | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\WINDROSE.CDR(CVM)



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
8 MODERATELY-LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726519-01002

FIGURE 1.1-12

AVERAGE MONTHLY PRECIPITATION IN PROXIMITY OF SENECA ARMY DEPOT
(1958-1991)

SCALE	DATE
	NOVEMBER 1994

R:\GRAPHICS\SENECA\HISTO.CDR(CVM)

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.

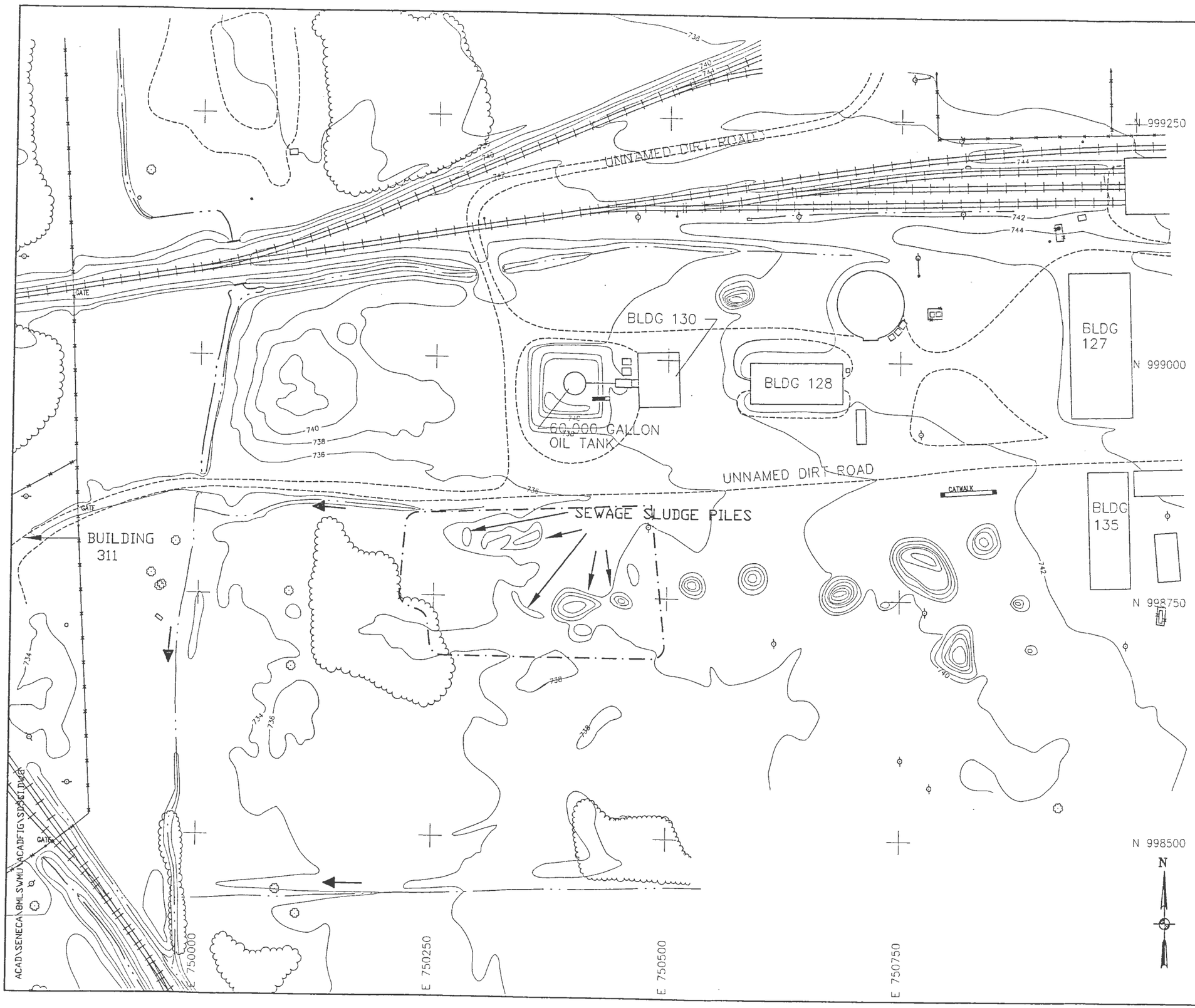
1.1.2 Physical Site Setting and History

SEDA was constructed in 1941 and is owned by the United States Government. The site was operated by the Department of the Army and the AEC until the early 1960's at which time the Department of the Army assumed control of all depot activities. Prior to construction of the depot, the site was used for farming. The following sections describe the physical site setting for the eight (8) moderately low priority AOCs. ~~Figure 1.1-13 presents the map legend which describes the symbology utilized in presenting the topological features of SEDA~~.

1.1.2.1 SEAD-5 Sewage Sludge Waste Piles

1.1.2.1.1 Physical Site Setting

SEAD-5 is located in the east-central portion of SEDA. The site is composed of approximately five to six sewage sludge piles derived from two onsite sewage treatment plants. Located about 600 feet due west of Building 135, the sewage sludge piles range from 5 to 10 feet in height and are covered with non-stressed vegetation. The site plan is shown in Figure 1.1-13. The northern boundary of the site is defined by an unnamed dirt road which is the access road to Building 311 and runs east-west from Administration Avenue towards Building 311. SEAD-59 (the fill area west of Building 135) is located northwest and adjacent to SEAD-5. A small wooded area is located to the west of the site and a grassy area is located



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(feet)

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EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-13

SEAD-5 SEWAGE SLUDGE WASTE PILES
SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

ACAD\SENECA\BMLSWMU\ACADFIG\SD5SITE.DWG

to the south of the site. Buildings 130 and 128 are located in the areas north and northeast of SEAD-5, respectively.

The topography in the immediate area suggests a planned man-made variable terrain. An intermittent drainage ditch originates at the northwestern boundary of SEAD-5 (south of the unnamed dirt road) and flows west towards SEAD-59. This ditch intersects a large drainage ditch running north-south along the western boundary of SEAD-59. To the south of the site, the terrain remains flat and grassy with railroad tracks originating from Building 311 intersecting the area.

1.1.2.1.2 Site History

Sewage sludge was stockpiled in this area during the 1980's and deposited west of Building 135. The sludge was removed from the drying beds of on-site Sewage Treatment Plants No's 4 and 715. The process of removing the sludge and transporting it to this area occurred at two month intervals, according to SEDA personnel. In June of 1992, SEDA removed approximately 560 tons of sludge from this area. The sludge was placed in a secure offsite landfill.

1.1.2.1.3 Existing Analytical Data

Two (2) sludge samples were taken from the piles on January 9, 1992. The exact locations of the samples within the waste pile area are uncertain. The analysis was performed to determine the feasibility of disposing of the sludge at the Seneca Meadows Municipal Landfill. A TCLP analysis consisting of metals, organic extractable pesticides, VOC's, organic extractable base neutrals, and acids was performed on the two samples. The only constituent found to be above detection limits was cadmium.

1.1.2.2 SEAD-9 Old Scrap Wood Site

1.1.2.2.1 Physical Site Setting

The Old Scrap Wood Site (SEAD-9) is located about 400 feet north of the intersection of East Kendaia Road and East Patrol Road (Figure 1.1-14). The dirt road leads to a cul de sac at the end of which debris is present. This debris consists of numerous piles of scrap wood and other miscellaneous items that exist in and around the cul de sac. There are no buildings or existing structures near this 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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(feet)

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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 720518-01002

FIGURE 1.1-14
SEAD-9 OLD SCRAP WOOD SITE
SITE PLAN

SCALE 1" = 100'

DATE DECEMBER 1995

REV A

ACAD\SENECA\BMLSWMU\SD9SI.DWG

Topographically, the area is basically flat and takes on a semi circular shape towards the western boundary where it drops off about 10 or 15 feet to a lower region. This steep slope does not appear to be native and is possibly indicative of a fill boundary.

1.1.2.2.2 Site History

Construction debris was deposited at this site from 1977-1984, and scrap wood from 1984 to 1986. Periodically between 1985 and 1992 the fire department used this area for training when they burned scrapwood that could not be sold. The nature of this fire training is uncertain. No historical data exists on the procedures used or materials burned.

1.1.2.2.3 Existing Analytical Data

There are no existing analytical data for the site.

1.1.2.3 SEAD-12A Radioactive Waste Burial Site

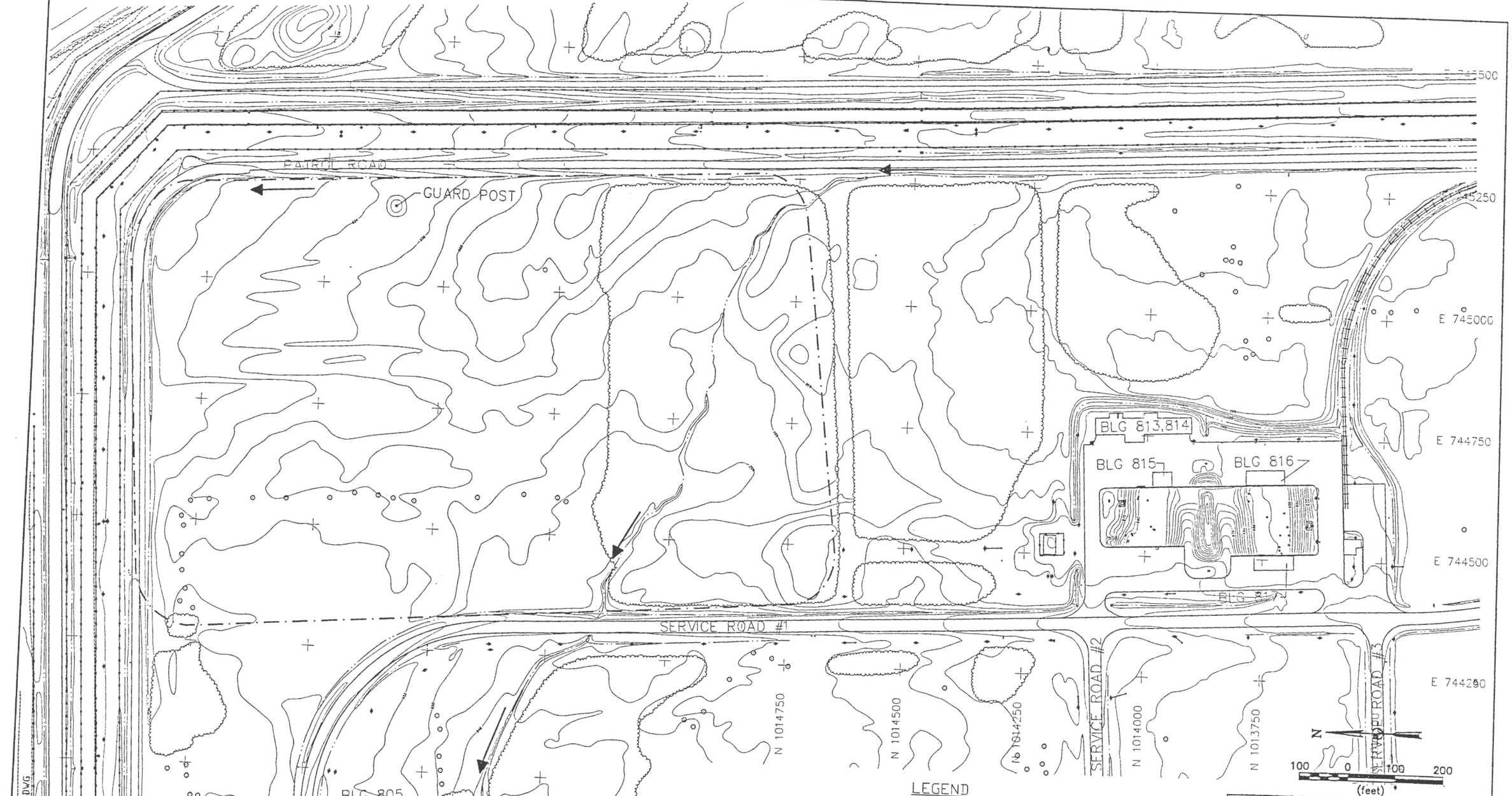
1.1.2.3.1 Physical Site Setting

SEAD-12A is located in the northeast corner of the Q between Patrol Road and Service Road No. 1. There are no buildings located on the site which is approximately 800 feet north of Buildings 813 and 815 (Figure 1.1-15). SEAD-12A covers an area approximately 1,000 feet long and 1,000 feet wide. It is suspected that up to five small burial pits are located in this area.

The topography of SEAD-12A is relatively flat and grassy with a row of deciduous trees running north-south bisecting the area. The only elevation gain and loss occurs to the east as it slopes gradually to Patrol Road. The extreme southern flank is also lined with dense deciduous trees. There are low lying wet areas along the north part of the woods and a stream that runs East to West.

1.1.2.3.2 Site History

SEAD-12A was believed to be used for the disposal of laboratory wastes. It is believed that these burials took place between 1940 and 1980. In 1986, a large radiologic screening was done in the area. Also, in 1986, a large amount of laboratory trash was excavated from 5 pits



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

DIRECTION OF FLOW IN DITCHES.

APPROXIMATE EXTENT OF AOC

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SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-15

SEAD-12A RADIOACTIVE WASTE BURIAL SITE
SITE PLAN

SCALE	DATE	REV.
1" = 200'	DECEMBER 1995	A

located in the southeastern corner of SEAD-12A. The waste was stored in several concrete pipes and one metal pipe (positioned vertically within the overburden soils). These storage vessels were discovered under large concrete slabs, 4-6" thick, which were apparent from the ground surface. The laboratory waste removed from the excavated pits was shipped to an authorized off-site radioactive waste Landfill in December 1987.

1.1.2.3.3 Existing Analytical Data

There are not existing analytical data for the site.

1.1.2.4 SEAD 12B Radioactive Waste Burial Site

1.1.2.4.1 Physical Site Setting

SEAD-12B lies northeast of Buildings 803, 804 and 805 (Figure 1.1-16). A 5,000 gallon tank is thought to be located north of Building 804. Another dry storage pit is thought to be located north of Building 803 and 804. The area is roughly 300 feet wide and 300 feet long. It is bordered on the northern side by Patrol Road and to the south by Service Road No. 1.

The landscape of the area is relatively flat and vegetation is stressed because of the amount of activity the region has received. A large bunker is present on the central northern side where strategic defense positions were once placed. The area is depressed about 3 feet from Service Road No. 1 for drainage purposes.

1.1.2.4.2 Site History

The 5000 gallon storage tank at SEAD 12B was designed for the storage of contaminated wastewaters from the operations performed in Building 804 during the 1950's and 1960's. This wastewater was generated from the washing of radioactive contaminated clothing. In July of 1987, SEDA attempted to remove the tank. During this removal attempt, a portion of the top of the tank was ripped off. The tank was then backfilled in place. The dry storage pit was also excavated in 1987. This dry storage pit contained pieces of plywood according to the SWMU Classification Report (ECRE, 1991).

E 743000
E 743250
E 743500
E 743750
E 744000
NORTH PATROL ROAD
N 1016250
PATROL ROAD
APPROXIMATE LOCATION OF DRY WASTE DISPOSAL PIT
GUARD POST
N 1016000
APPROXIMATE AREA OF STRESSED VEGETATION
APPROXIMATE LOCATION OF WASTEWATER STORAGE TANK 5000 GAL.
642
640
638
BLDG 803
BLDG 804
BLDG 805
BLDG 802
DRIVE EDGE
BLDG 807
BLDG 806
BLDG 805
BLDG 810
N 1015750
SERVICE ROAD NO. 1
652
650
N 1015500
N
646
UNNAMED CREEK
642
640
638

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 1.1-16
SEAD-12B RADIOACTIVE WASTE BURIAL SITE
SITE PLAN

SCALE 1" = 100' | DATE DECEMBER 1995 | REV A

ACAD\SENECA\BMLS\MUNACAD\FIG\SD12BSI.DWG

1.1.2.4.3 Existing Analytical Data

Reports documenting the closure, cleanup and excavation indicate that soil samples from the dry storage pit north of Building 804 were collected and of the 16 samples analyzed by a Nuclear Multi-channel analyzer (model 608) all results were less than minimum detectable values.

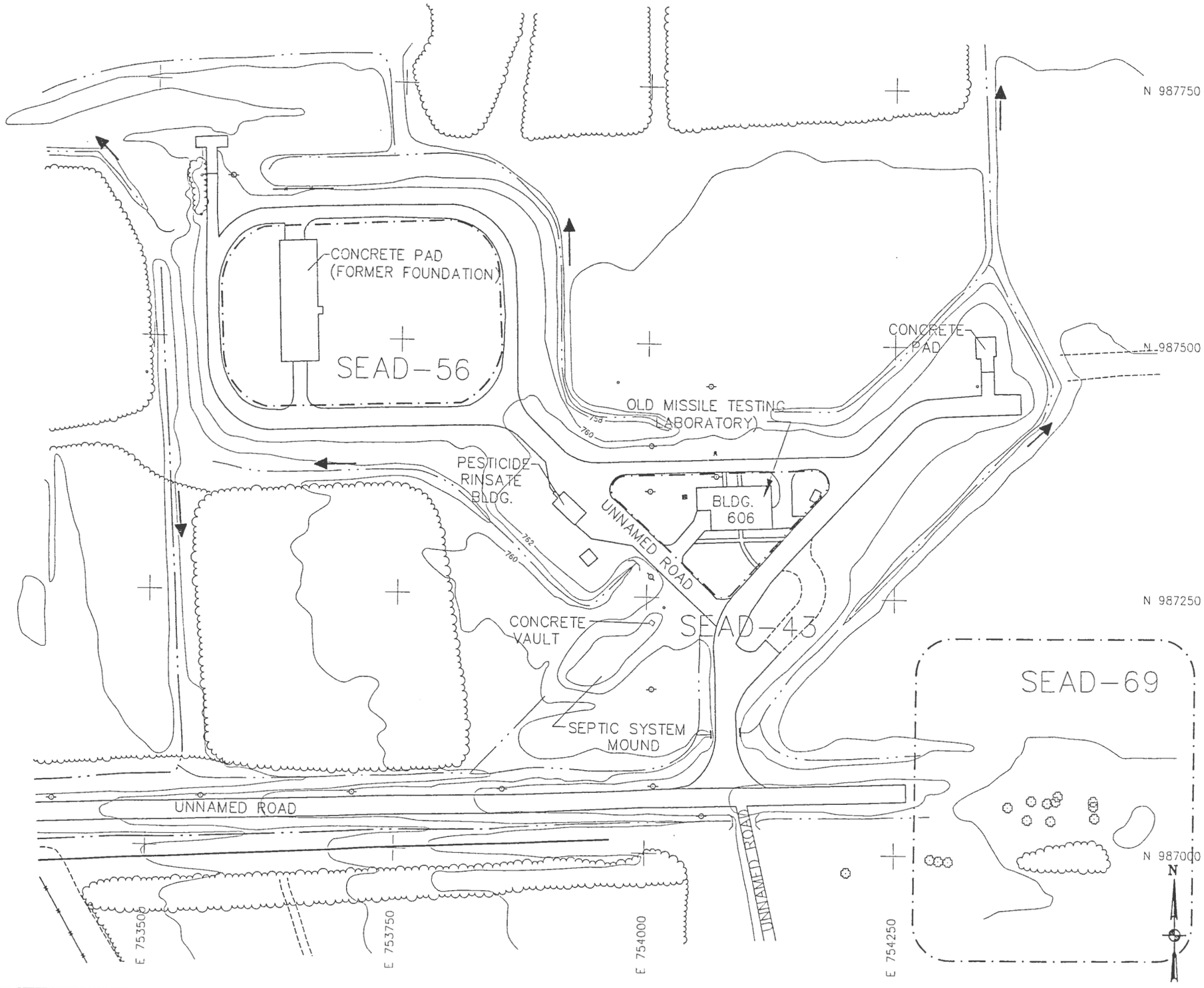
1.1.2.5 SEADS 43, 56 and 69 Old Missile Propellant Test Lab, Herbicide/Pesticide Storage, Building 606 Disposal Area

1.1.2.5.1. Physical Site Setting

SEADs 43, 56 and 69 are located in the southeast corner of the depot. These AOCs will be discussed together due to their association with Building 606. Building 606, was once used as a missile propellant test laboratory (SEAD-43). An old Building foundation, west of Building 606, was used for herbicide and pesticide storage (SEAD-56). A disposal area associated with these operations is also located nearby (SEAD-69). The entire area encompassed by the three SWMUs is roughly 900 feet long (east-west) and 600 feet wide (north-south) (Figure 1.1-17).

Southwest of Building 606 is a structure believed to be a septic system. Two above ground concrete vaults are located at either end of an approximately 100 foot long mound. Atop the mound are several black vent pipes. Two working sump pumps are located at the most eastern end of the mound. There are two drainage swales located in the area: one to the west of the rinsate facility and another on the eastern side of Building 606. Approximately 300 feet southeast of Building 606 a road leads east to an open field that was used as a disposal area for Building 606.

The waste disposal area (SEAD-69), contains various construction debris including bricks and concrete blocks which are visible on the surface. The area of concern measures approximately 100 feet by 100 feet. There are no signs of stained soil or stressed vegetation and the area is relatively flat and grassy sloping off the road accesses about 2-3 feet for drainage purposes.



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

SEAD 43: BLDG.606 OLD MISSLE PROPELLANT TEST LABORATORY
SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA
SEAD 69: DISPOSAL AREA

50 0 50 100
(Feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-17
SEAD-43,56 AND 69
SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

There is also a dilapidated corrugated metal shack behind the concrete foundation (Figure 1.1-19).

1.1.2.7.1 Physical Site Setting

Topographically, there is a drainage ditch on the eastern border of the SEAD boundary which runs parallel to Brady Road. The vegetation around SEAD-44B is abundant with no apparent stressed vegetation. The terrain of SEAD-44B is variable with flat areas and some 1 to 2 feet high mounds of dirt which appear to have no significance.

1.1.2.7.2 Site History

SEAD-44B, like 44A, was used for quality assurance testing of CS grenades fire devices and pyrotechnics. Unlike SEAD-44A, at SEAD-44B, the QA laboratory tested timed fuzes. However, it has not been determined if the fuzes were actually at SEAD-44B.

1.1.2.7.3 Existing Analytical Data

There is not existing analytical data for this site.

1.1.2.8 SEAD-50 Tank Farms

1.1.2.8.1 Physical Site Setting

The tank farm (SEAD-50) is located in a triangular shaped area immediately west of East Patrol Road between Building 350 and Building 356 and 357.

The topography of the area is relatively flat with a total relief of 2 to 3 feet. There are 4 existing tanks remaining on the site, three of which are empty, (Figure 1.1-20). The two tanks used for the storage of antimony ore and the one tank used for the storage of rutile ore are empty. Tank #88 currenlty contains asbestos. There is an access road bisecting the site and connecting Avenue H with East Patrol Road. From this road north, the AOC is very overgrown with vegetation except in the areas where tanks were previously located which are circular in shape and gravel covered. The area south of the road down to the ferro chromate ore site is flat and grassy. There are no wetlands in the area.

1.1.2.5.2 Site History

Building 606 was reported to have been used as a missile propellant test laboratory in the 1960's. The Old Missile Test Facility conducted QA surveillance testing. This commonly involved operational or functional testing of explosive devices. The SWMU Classification Report indicates that liquid IRFNA that was disposed of at the IRFNA disposal site (SEAD 13) was generated in the Building 606 area. During this time IRFNA and/or liquid propellants may have been disposed of in this area. Since 1976, Building 606 has been used for herbicide/pesticide storage. The building was renovated in 1979 to include the following health and safety features: ventilation fan with lowering door vents, local exhaust for the mixing area, shower, emergency spill kits, a fire protection system connected directly with the on-post fire department, and adequate shop signs and disposal procedures. The buildings drains and concrete floors have been sealed.

Northwest of Building 606 is a concrete foundation that is believed to have been associated with the old missile test facility. This may have been an acid storage building. The actual corrugated metal building has been moved to the Administrative area, and is now Building 132. This concrete pad has been used in the past, and currently, to aerate spill residues.

A concrete underground tank was used for intermittent storage of wastewater from the rinsing of the portable truck mounted tank used for mobile spraying operations. The mobile tank requires rinsing between dissimilar pesticide and herbicide applications. Rinseate is always used for diluent for the next application of the pesticide or herbicide. In 1989, the tank was removed and was replaced with a new tank located within a vault to comply with underground tank regulation. West of Building 606 a pesticide rinseate building has been constructed. The rinseate from this process is now discharged into the new tank.

In June of 1992, the building 606 water faucet was repaired by Depot employees. During the repair excavation, a floating product and a diesel fuel odor was observed. Seneca environmental personnel interviewed a Depot employee which resulted in the report of a fuel line break in a small tractor that was stored at this site several years ago, which may have resulted in the release of virgin diesel fuel.

1.1.2.5.3 Existing Analytical Data

Groundwater and soil samples were taken outside of Building 606 to determine if diesel fuel

may have leaked from a fuel line. A petroleum fingerprinting analysis indicated 1.09mg/l of diesel fuel in the water. A composite soil sample taken from the excavation tested negative (non-detect) using Analytical Method NYSDOH 310-13.

1.1.2.6 SEAD-44A QA Test Laboratory

1.1.2.6.1 Physical Site Setting

SEAD-44A is approximately 1,000 feet East of Brady Road and 1,500 feet North of South Patrol Road. The site is on an unnamed dirt road which runs parallel to South Patrol Road. Along both sides of the dirt road at SEAD-44A there are berms (Figure 1.1-18). These bermed areas potentially contain unexploded ordinances since they were used for QA testing. There were no visible signs of any building foundations. Along the north side of the dirt road there were three metal poles that may have been used for holding screens in place while detonating munitions. There was also a small ditch on the north side of the dirt road. There were no apparent wetlands or stressed vegetation in the area. At the end of the dirt road, on the south side, is an empty drum labelled steam waste.

1.1.2.6.2 Site History

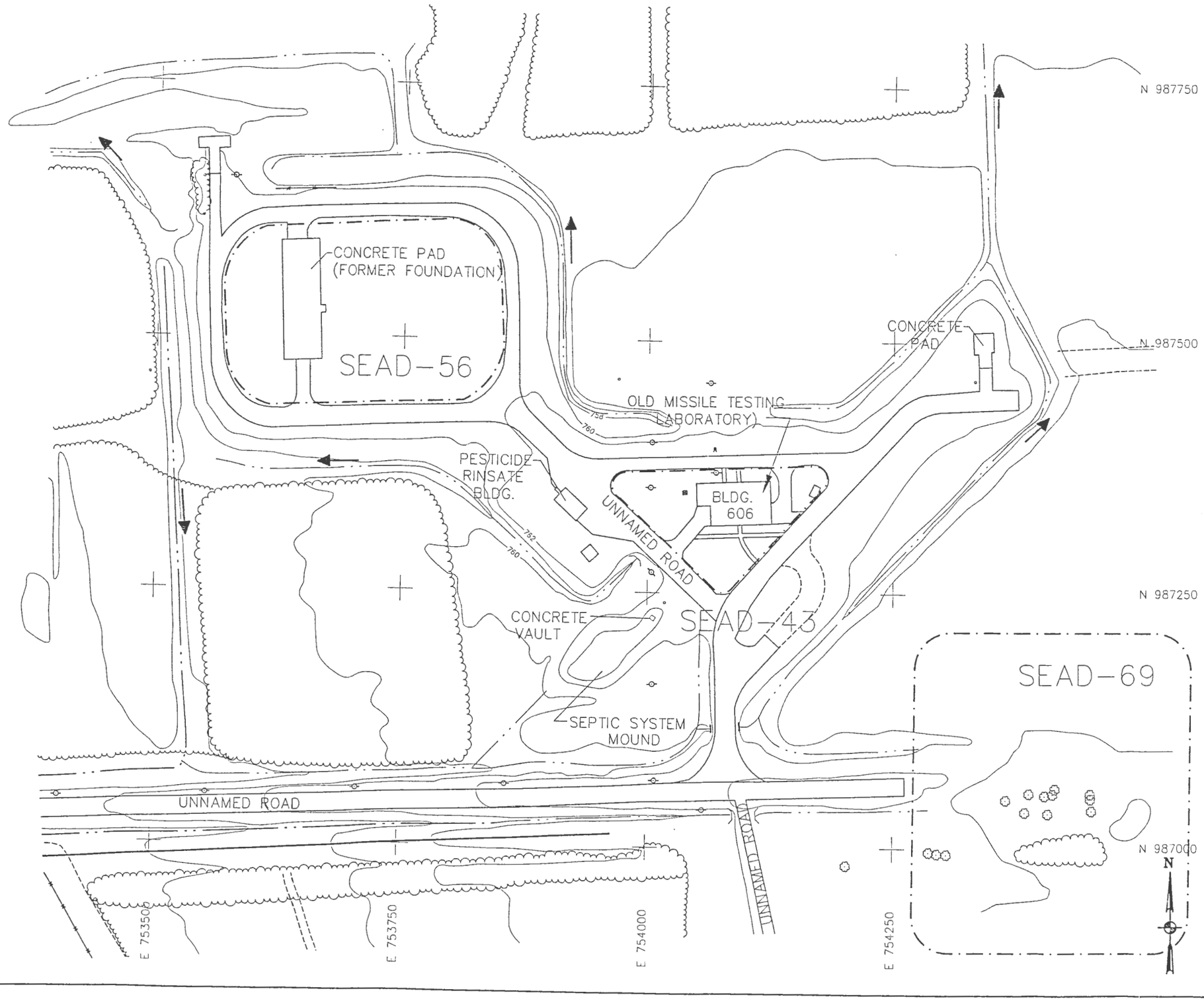
SEAD-44A was used for quality assurance testing of CS grenades, fire devices and pyrotechnics. Mines were also detonated aboveground at the bermed area associated with SEAD 44A. Building 416 (no longer standing) was situated in the eastern portion of SEAD-44A.

1.1.2.6.3 Existing Analytical Data

There is no existing analytical data for this site.

1.1.2.7 SEAD-44B QA Test Laboratory

SEAD-44B runs along the east side of Brady Road and occupies an area that is approximately 350 feet by 200 feet. Contained within these boundaries are two structural remains of buildings. There is an abandoned concrete foundation that is approximately 20 feet by 50 feet. Directly behind this foundation, slightly to the east, is a metal pole believed to have been used to display a red flag that was used to signal when testing was being performed.



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

SEAD 43: BLDG.606 OLD MISSLE PROPELLANT TEST LABORATORY
SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA
SEAD 69: DISPOSAL AREA

50 0 50 100
(feet)

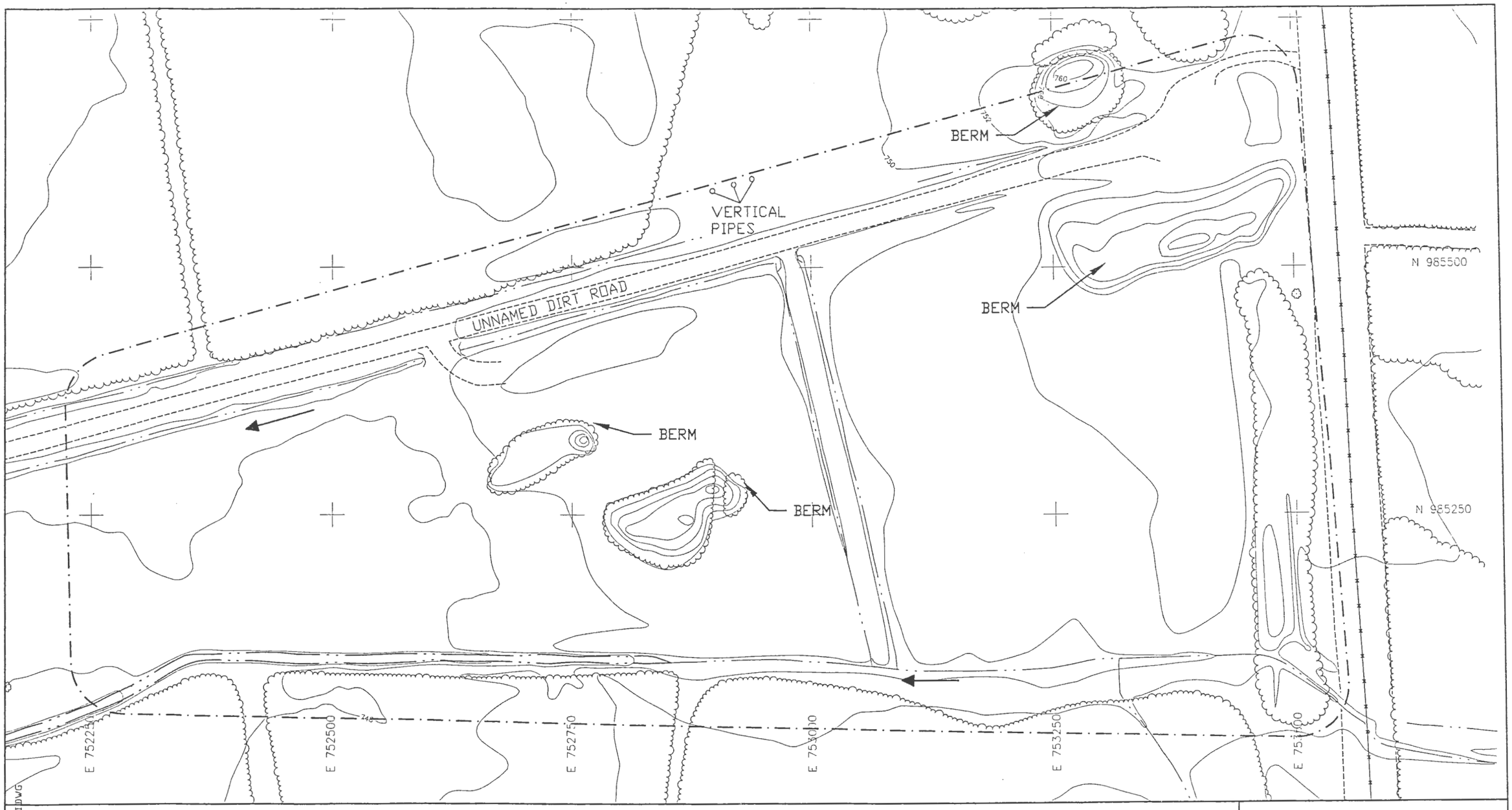
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 1.1-17
SEAD-43,56 AND 69
SITE PLAN

SCALE 1" = 100' | DATE DECEMBER 1995 | REV A



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

OVERHEAD UTILITY POLE · MAILBOX/RR SIGNAL

DIRECTION OF FLOW IN DITCHES.

APPROXIMATE EXTENT OF AOC

N

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

D•G. No. 720518-01002

FIGURE 1.1-18

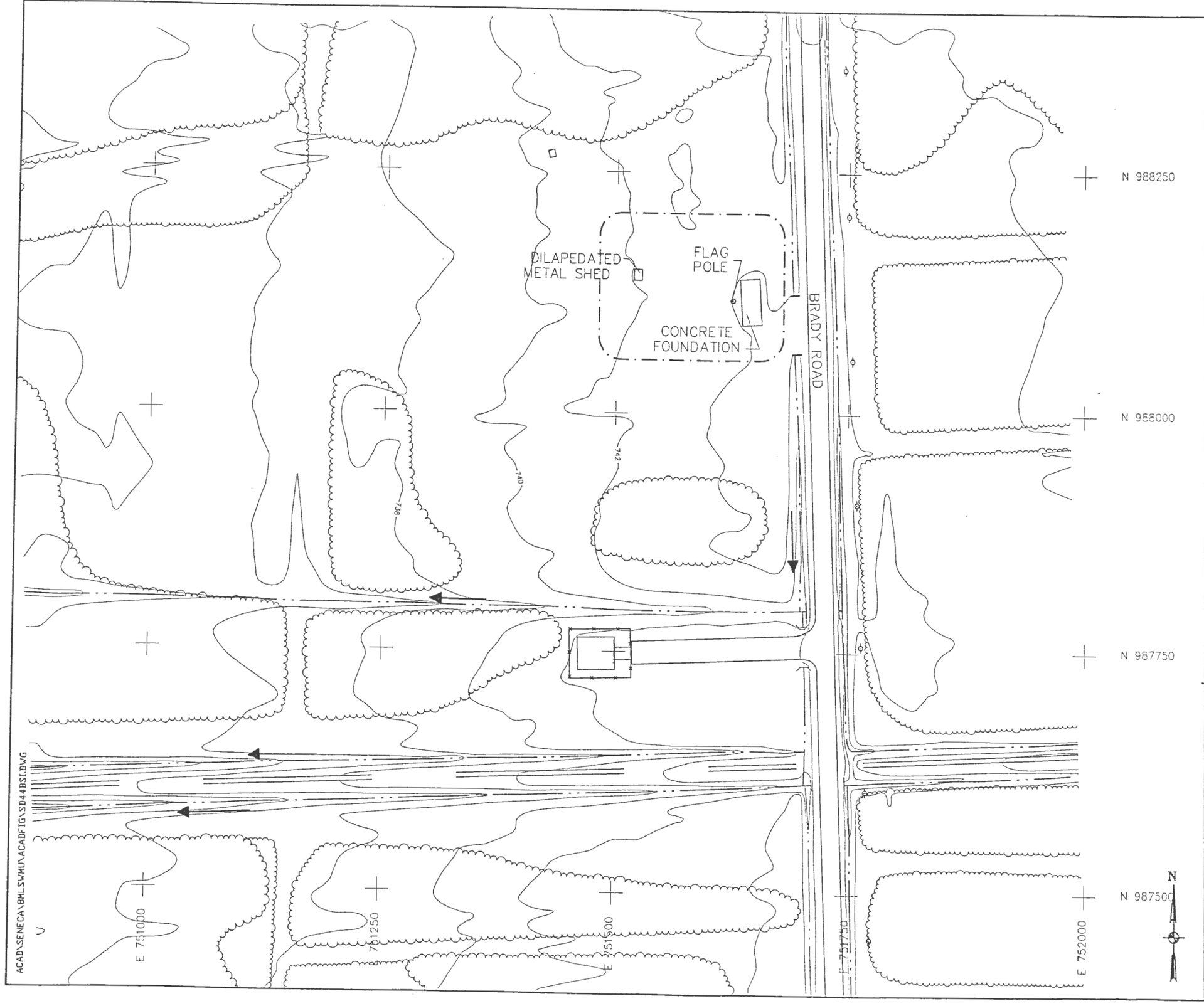
SEAD-44A QUALITY ASSURANCE TEST LABORATORY
SITE PLAN

SCALE 1" = 100'

DATE DECEMBER 1995

REV A

ACAD\SENECA\8HLSWMU\ACADFIG\SD44ASI.DWG



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(Feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

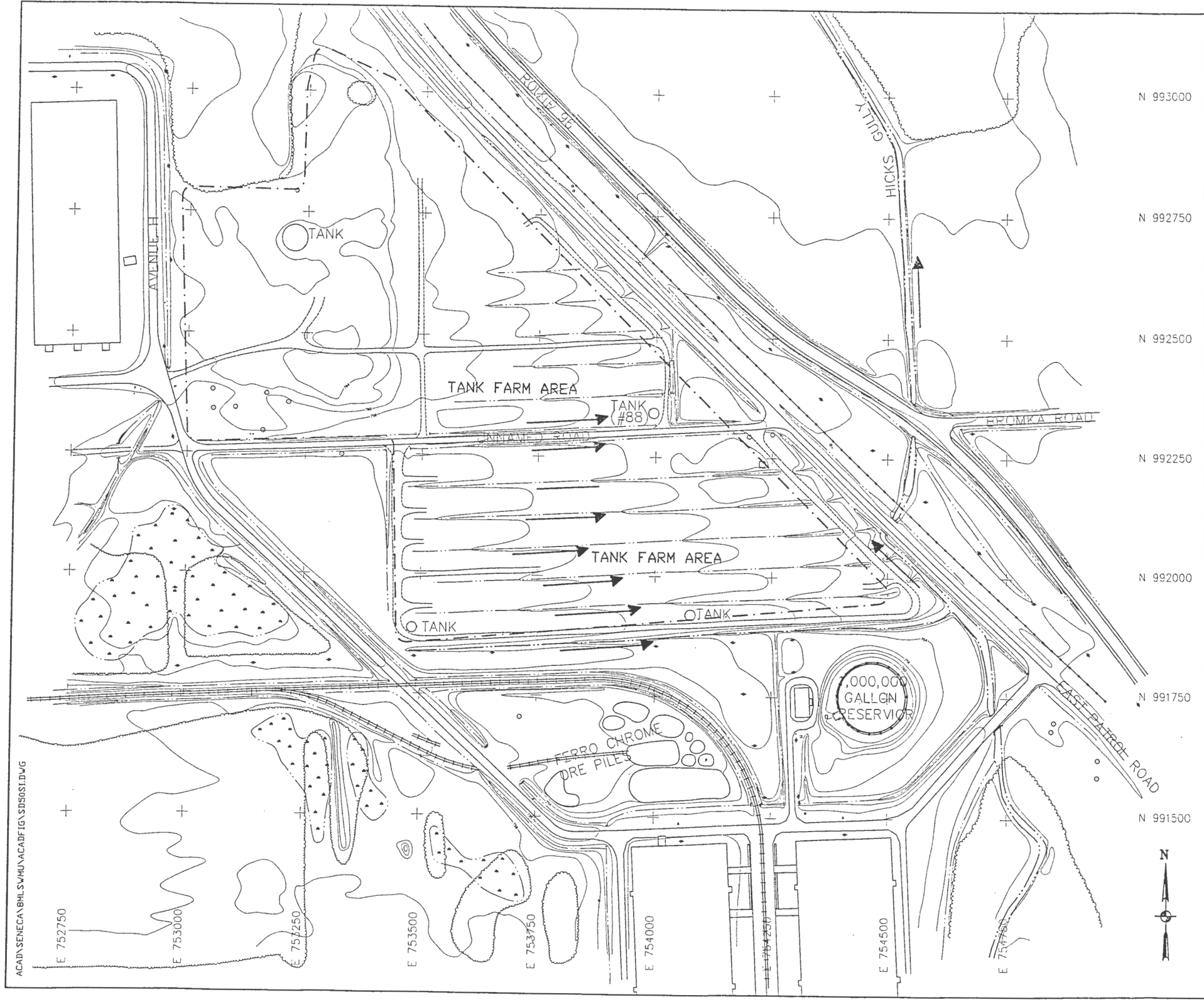
DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-19

SEAD-44B QUALITY ASSURANCE TEST LABORATORY
SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

ACAD\SENECA\BHLSWMU\ACADFIG\SD44BSI.DWG



ACAD\SENECA\BMLSWMU\ACADFIG\SD50S1.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

100 0 100 200
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-20
SEAD-50 TANK FARM AREA
SITE PLAN

SCALE	DATE	REV
1" = 200'	DECEMBER 1995	A

1.1.2.8.2 Site History

It is not known at what time the tank farm originated. At one time there were approximately 160 aboveground storage tanks in this area. The tanks were only used to store dry materials, according to SEAD personnel. These materials included minerals, ores, and asbestos. Tanks have been removed from the farm over an extended period. In 1988, ten tanks were removed and sold to area farmers.

1.1.2.8.3 Existing Analytical Data

There is no existing analytical data from this site.

1.1.2.9 SEAD-58 Debris Area Near Booster Station 2131

1.1.2.9.1. Physical Site Setting

The debris area (SEAD-58) is located about 335 feet northeast of Booster Station 2131. The site has two distinct areas separated by a drainage swale which runs east-west. The larger area, located about 50 feet north of the drainage swale, is circular and 300 feet in diameter. The smaller area encompasses an area approximately 125 feet by 175 feet and is just south of the drainage swale.

Topography in the area is very flat (Figure 1.1-21) with evidence of stressed vegetation and many exposed root systems with underlying growth. The drainage swale makes vehicular access to the south area difficult. There is a rock wall lining the south side of the swale rising about 2 feet. A small stream runs east-west south of the smaller area.

1.1.2.9.2 Site History

The booster station, Building (2131), is a pumphouse used to pump drinking water from the lake to the on-site reservoir. Interviews with SEDA personnel have indicated that debris had been dumped in this area. It is not known what types of waste were disposed of in this area. It is rumored that DDT, a contact insecticide, may have been disposed of at SEAD-58. However, there are no DDT usage records available for SEAD-58.

E 739500

E 739250

E 739000

E 738750

N 1000500

N 1000250

N 1000000

N 999750

N 999500

618

614

610

612

AREA OF SURFACE DEBRIS

KENDAIA CREEK

BOOSTER STATION 2131

WEST PATROL ROAD

ACAD\SENECA\BML\SWMU\ACADFIG\SD58SI.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-21

SEAD-58 DEBRIS AREA NEAR BOOSTER STATION 2131
SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

1.1.2.9.3 Existing Analytical Data

There is no existing analytical data from this site.

1.1.2.10 SEAD-59 Fill Area West of Building 135

1.1.2.10.1 Physical Site Setting

SEAD 59 encompasses an area along both sides of the dirt road which runs perpendicular to the south side of the road Administration Avenue and terminates at Building 311. The topography to the south of the road is relatively flat and slopes gently towards the west. This area is approximately 100 feet by 100 feet and is covered with vegetation. A drainage swale running north-south traverses the southwestern side of this area.

The area that contains waste piles on the northern side of the road (Figure 1.1-22) is approximately 300 feet by 150 feet in area. This area has about 10 feet of relief and appears to be one large filled area. The area has stressed vegetation and the terrain is variable with many elevation changes. The entire western border of the area is defined by the fence to Building 311. A drainage swale running to east to west joins the south north running drainage swale and forms the northern boundary of SEAD-59.

1.1.2.10.2 Site History

This area was used for the disposal of construction debris and oily sludges. SEDA personnel have indicated that there may be a lot of miscellaneous "Roads and Grounds" waste buried. It is not known when the disposal took place.

1.1.2.10.3 Existing Analytical Data

There is no existing analytical data for this site.

UNNAMED DIRT ROAD

SEAD 59-1

60,000 GALLON TANK

BLDG 128

FILL AREA

UNNAMED DIRT ROAD

CATWALK

SEAD 59

BLDG 311

GATE

GATE

GATE

GATE

N 999250

N 999000

N 998750

N 998500

E 749750

E 750000

E 750250

E 750500

E 750750

N

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- APPROXIMATE EXTENT OF AOC
- DIRECTION OF FLOW IN DITCHES.

50 0 50 100
(feet)

ACAD\SENECA\BHLSWMU\ACADFIG\SD59S1.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-22

SEAD-59 FILL AREA WEST OF BLDG.135
SITE PLAN

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

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 eight 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 Fifteen SWMU Workplan (ES, 1993), which was approved by EPA, Region II and NYSDEC, prior to initiation of fieldwork in February 1994. The workplan describes the following tasks:

1. Geophysical Investigations
2. Surface and Subsurface Soil Sampling
3. Monitoring Well Installation, Development and Sampling
4. Surface Water and Sediment 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 in Table 2.1-1. Analytical methods utilized at each AOC and the rationale for the selection of analytes for each AOC are presented in Table 2.1-2. Table 2.1-3 presents a summary of samples collected and analyses performed as part of this investigation.

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., buildings, filled areas, waste piles, stressed vegetation,

TABLE 2.1-1

SUMMARY OF CHEMICAL CONSTITUENTS OF CONCERN

Material Managed at SEDA	Chemical Group	Analytical Method
1. Propellants, Explosives and Pyrotechnics (PEP)	Cyanide Heavy metals Semi-voltile organic compounds (SVOs) Explosives	NYSDEC CLP Cyanide NYSDEC TAL Metals NYSDEC TCL SVOs NYSDEC CLP 8330
2. Solvents	Volatile organic compounds (VOCs) Semi-volatile organic compounds (SVOs)	NYSDEC CLP TCL VOCs, 524.2 NYSDEC CLP TCL SVOs
3. Oils	Petroleum hydrocarbons (TPH) Polychlorinated byphenyls (PCBs)	TPH 418.1 PCB in oil 8080
4. Transformer Oil	Polychlorinated biphenyls (PCBs)	NYSDEC CLP TCL Pest./PCB
5. Herbicides	Herbicides	8150
6. Pesticides	Pesticides	NYSDEC CLP TCL Pest./PCB
7. Sludge	Cyanide Heavy metals Semi-volatile organic compounds (SVOs) Nitrates Volatile Organic Compounds	NYSDEC CLP Cyanide NYSDEC CLP TAL Metals NYSDEC CLP TCL SVOs NYSDEC CLP 353.2 NYSDEC CLP TCL VOCs, 524.2
8. Radioactive	Radionuclides	9310, Gross Alpha, Gross Beta 906.0 Tritium 901.1 Gamma Spec.
9. Asbestos	Asbestos	EPA 6001 M4-82-020

TABLE 2.1-2

SMWU - SPECIFIC EPA ANALYTICAL METHODS AND SELECTION RATIONALE

SMWU/ AOC	8150 Herbicides	NYSDEC CLP TCL SVOs	NYSDEC CLP TCL VOCs; 542.2	NYSDEC CLP TAL Metals and Cyanide	8080 PCB; NYSDEC CLP TCL Pestcides/ PCB	418.1 TPH	8330 Exp.	353.2 Nitrates	EPA 6001 M4-82-0202 Asbestos	9310 Gross α Gross β Radio-activity	901.1 Gamma Spec.	906 Tritium	Selection Rationale
SEAD 5	-	X	X	X	X	-	-	X	-	-	-	-	Sewage sludge piles
SEAD 9	-	X	X	X	X	X	-	-	-	-	-	-	Fire training area and scrapwood landfill
SEAD 12A & 12B	-	X	X	X	X	-	-	-	-	X	X	12B Ground-water only	Possible radioactive waste disposal sites.
SEAD 43,56,& 69	X	X	X	X	X	X SB43-4 only	X	X	-	-	-	-	Herb/pest storage area, propellent testing.
SEAD 44A & 44B	-	X	X	X	X	-	X	X	-	-	-	-	Propellants and explosives testing area
SEAD 50	-	X	X	X	X	-	-	-	X	-	-	-	Minerals, ores and asbestos storage

TABLE 2.1-2
SMWU - SPECIFIC EPA ANALYTICAL METHODS AND SELECTION RATIONALE
(Cont.)

SMWU/ AOC	8150 Herbicides	NYSDEC CLP TCL SVOs	NYSDEC CLP TCL VOCs; 542.2	NYSDEC CLP TAL Metals and Cyanide	8080 PCB; NYSDEC CLP TCL Pestcides/ PCB	418.1 TPH	8330 Exp.	353.2 Nitrates	EPA 6001 M4-82-0202 Asbestos	9310 Gross α Gross β Radio-activity	901.1 Gamma Spec.	906 Tritium	Selection Rationale
SEAD 58	-	X	X	X	X	-	-	-	-	-	-	-	Rumored pesticide disposal
SEAD 59	-	X	X	X	X	X	-	-	-	-	-	-	Possible oily sludge disposal

TABLE 2.1-3

SUMMARY OF LABORATORY ANALYSES

	ANALYSES								
	No. of Samples	Suite[2]	TPH 418.1	Exp. 8330	Herbicides 8150	Nitrates 353.2	Asbestos[3]	Radio-activity[4] 9310 901.1	Tritium 906.0
SEAD 5									
TP[1] Soils	5	5	NS	NS	NS	5	NS	NS	NS
Groundwater	3	3	NS	NS	NS	3	NS	NS	NS
SEAD 9									
B[1] Soils	9	9	9	NS	NS	NS	NS	NS	NS
Groundwater	2	2	2	NS	NS	NS	NS	NS	NS
SEAD 12A									
B[1] Soils	3	3	NS	NS	NS	NS	NS	3	NS
TP[1] Soils	13	13	NS	NS	NS	NS	NS	13	NS
Groundwater	3	3	NS	NS	NS	NS	NS	3	NS
Surface Water	3	3	NS	NS	NS	NS	NS	3	NS
Sediment	4	4	NS	NS	NS	NS	NS	4	NS
SEAD 12B									
B[1] Soils	4	4	NS	NS	NS	NS	NS	4	NS
Groundwater	3	3	NS	NS	NS	NS	NS	3	3
TP[1] Soils	3	3	NS	NS	NS	NS	NS	3	NS

TABLE 2.1-3 (Con't)
SUMMARY OF LABORATORY ANALYSES

	ANALYSES								
	No. of Samples	Suite[2]	TPH 418.1	Exp. 8330	Herbicides 8150	Nitrates 353.2	Asbestos[3]	Radio-activity[4] 9310 901.1	Tritium 906.0
SEAD 43									
B[1] Soils	12	12	3	12	12	12	NS	NS	NS
Groundwater	4	4	NS	4	4	4	NS	NS	NS
Surface water	5	5	NS	5	5	5	NS	NS	NS
Sediment	5	5	NS	5	5	5	NS	NS	NS
SEAD 56 B[1] Soils	9	9	NS	9	9	9	NS	NS	NS
SEAD 69 B[1] Soils	9	9	NS	9	9	9	NS	NS	NS
SEAD 44A									
Surface Soils	6	6	NS	6	NS	6	NS	NS	NS
Groundwater	3	3	NS	3	NS	3	NS	NS	NS
Surface water	4	4	NS	4	NS	4	NS	NS	NS
Sediment	4	4	NS	4	NS	4	NS	NS	NS
TP[1] Soils	9	9	NS	9	NS	9	NS	NS	NS

TABLE 2.1-3 (Con't)
SUMMARY OF LABORATORY ANALYSES

	ANALYSES								
	No. of Samples	Suite[2]	TPH 418.1	Exp. 8330	Herbicides 8150	Nitrates 353.2	Asbestos[3]	Radio-activity[4] 9310 901.1	Tritium 906.0
SEAD 44B									
Surface Soils	3	3	NS	3	NS	3	NS	NS	NS
Groundwater	3	3	NS	3	NS	3	NS	NS	NS
Surface water	2	2	NS	2	NS	2	NS	NS	NS
Sediment	2	2	NS	2	NS	2	NS	NS	NS
SEAD 50									
Surface Soil	15	15	NS	NS	NS	NS	15	NS	NS
Groundwater	3	3	NS	NS	NS	NS	NS	NS	NS
Surface water	3	3	NS	NS	NS	NS	NS	NS	NS
Sediment	3	3	NS	NS	NS	NS	NS	NS	NS
SEAD 58									
B[1] Soils	9	9	NS	NS	NS	NS	NS	NS	NS
Groundwater	4	4	NS	NS	NS	NS	NS	NS	NS
Surface water	6	6	NS	NS	NS	NS	NS	NS	NS
Sediment	6	6	NS	NS	NS	NS	NS	NS	NS
Surface Soils	3	3	NS	NS	NS	NS	NS	NS	NS
TP[1] Soils	6	6	NS	NS	NS	NS	NS	NS	NS

TABLE 2.1-3 (Con't)
SUMMARY OF LABORATORY ANALYSES

	ANALYSES								
	No. of Samples	Suite[2]	TPH 418.1	Exp. 8330	Herbicides 8150	Nitrates 353.2	Asbestos[3]	Radio-activity[4] 9310 901.1	Tritium 906.0
SEAD 59									
B[1] Soils	15	15	15	NS	NS	NS	NS	NS	NS
Groundwater	3	3	3	NS	NS	NS	NS	NS	NS
TP[1] Soils	6[6]	5	5	NS	NS	NS	NS	NS	NS
Sample Total	217	216	37	80	44	88	15	36	3

NOTES TABLE 4-3:

1. B = Borings
   TP = Test Pits (test pits include sewage sludge piles and berm excavations.)
   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 and PCBs in oil by Method 8080.
3. Asbestos analysis by Method EPA 6001/M4-82-020.
4. Analysis for radioactivity consisted of gross alpha and gross beta analysis by Method 9310, gamma spectral analysis by Method 901.1, and Tritium analysis by Method 906.0.
5. A matrix spike analysis, performed every 20 samples, actually consisted of 3 analyses: matrix spike blank, matrix spike, and matrix spike duplicate.
6. TP59-3X was analyzed for NYSDEC CLP TCL VOC only.

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 for each of the eight moderately low priority AOCs.

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 a more complete field reconnaissance.

2.2 METHODOLOGY

2.2.1 Geophysical Investigations

Seismic Refraction

Seismic refraction surveys were performed at all AOCs, except SEAD-44A, 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 upgradient and downgradient monitoring wells.

Four 115-foot seismic refraction transects were laid out at each site. They were located approximately equidistant from the center of the AOC with each transect located near the perimeter of the AOC. The shot points were located along each profile and were used to define each individual seismic spread. The seismic data were collected using an EG&G Geometrics 24 channel seismograph. Geophone stations were placed at equal intervals along each survey line and the individual geophones were coupled to the ground by a metal spike firmly attached to their bases. When the geophones were placed on asphalt or concrete, small metal base plates replaced the metal spike on each geophone. Those geophones placed on asphalt or concrete were 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 for all of the surveys.

Once the seismograph set up 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 had their placement adjusted.

An impact hammer was used as the seismic energy source. Due to a shallow water table (i.e., generally less than 10 feet in depth) a low energy source was sufficient to accurately image the water table surface. Five impact points were used for each geophysical spread: one located at the spread center, one at each end of the spread and one approximately 40 feet beyond each end of the spread. 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 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 in conjunction 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 were 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.

EM-31 Survey

Electromagnetic (EM-31) surveys were performed at SEADs-9, 12A, 12B, 43, 69, 58 and 59. 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 a maximum delineation of the subsurface from 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 40 foot by 10 foot or a 20 foot by 10 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 tape measures and a surveying level.

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 were 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 was occurring during each survey.

Upon completion of each electromagnetic survey, the data were presented in both profile and contour form. Both the in-phase and quadrature components were plotted. All of these data 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 was initially calibrated by the manufacturer. This calibration can be rechecked in the field but requires access to highly resistive rock outcrops. 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 was the only performance evaluation that was performed on these instruments. The EM-31 data were collected at each AOC to evaluate only relative variations in subsurface conductivities. An accurate terrain conductivity was not required since the individual objectives of these surveys 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 quantitatively evaluate the overall data repeatability.

GPR Survey

A GPR survey was conducted at SEADs-9, 12A, 12B, 43, 69, 58 and 59. The objectives of the GPR surveys were to locate buried structures (i.e., buried or filled-in pits, trenches, disposal areas) and to provide better subsurface definition of anomalies detected during the EM-31 surveys.
The GPR instrument used was a hand operated GSSI SIR-3 Ground Penetrating Radar. 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.

An operational verification of the GPR unit was performed over a location where underground utilities were known to exist. Data acquired over this area also allowed for an approximate calculation of the two-way travel time for RADAR waves through the soils at SEDA. A two-way travel time of 7 nanoseconds per foot was established by analyzing GPR records acquired over a forced water main known to be buried 4 to 4.5 feet below grade.

2.2.2 Soil Sampling Programs

The objectives of the soil sampling program were to provide data on the background soil chemistry, and to define the horizontal and vertical extent of contaminated soils at each of the eight moderately low priority AOCs.

The soils investigation program was completed at all SEADs in accordance with the pre-approved workplan. The sampling plan at SEAD-12A was modified from that described in the workplan for better identification of suspected buried objects. Sample locations were located in source areas and in hydrologic upgradient locations, the latter 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 defined 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 test pit excavations under the direction of ES personnel.

Soil Borings

Soil borings were performed using a CME-55 drilling rig and a CME 850 drilling rig, each equipped with 4.25-inch I.D. hollow stem augers. The soil borings were advanced until spoon or auger refusal on shale was encountered. The total depth of the boring was determined by the degree of weathering of the shale. During drilling, soil samples were collected continuously at 2-foot intervals using a decontaminated 2-inch or 3-inch diameter by 2-foot long 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 weathered or competent shale was encountered. Soil samples were classified according to the United Soil Classification System (USCS).

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 soil samples from each soil boring were selected for chemical analysis including: 1) a surface soil sample collected from 0 to 2" below grade; this sample was collected with a stainless steel trowel after the overlying vegetation has been removed; 2) a soil sample collected immediately above the water table; and 3) the third sample based on one of the following site specific criteria: (1) visibly affected soil (e.g., oil stains), (2) elevated photoionization detection (PID) readings, or (3) a stratigraphic change such as the base of the fill or the fill/bedrock interface. If none of these occurred, then the third sample was collected at the halfway point between the samples collected at the surface and at the water table. If similar looking split spoon samples exhibit elevated PID readings, the one with the highest concentration was submitted for chemical analysis. Samples to be analyzed for volatile organic compounds were collected first in two 40 ml vials with septum seals. The remaining soil from the spoon was mixed in a decontaminated stainless steel bowl with a decontaminated stainless steel utensil and placed in the appropriate sample containers.

After the boring was completed, it was filled to ground surface with lean grout containing at least 3% bentonite powder by volume. If groundwater was present in the borehole, the grout was pumped through a tremie pipe to the bottom of the boring. Grout was pumped in until undiluted grout discharges from the boring at ground surface.

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.

Split spoon barrels were decontaminated as described in the workplan. Drilling augers were steam cleaned along with other drilling equipment between subsequent soil borings.

2.2.3 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 pit locations were marked in the field prior to performing the excavation. The excavations were performed with a backhoe using a smooth edged bucket when possible. The top 6 to 12 inches of soil were segregated so that it could be used to cover the other backfilled soils when the test pit was closed. The length and width of the excavation was kept as small as practical to minimize the potential of exposing field personnel to hazardous conditions.

The excavations were continuously monitored by ES personnel with a PID and a radiation meter. At no time was any personnel permitted to enter the excavation. The test pits were closed by backfilling the pit with the soil that was removed from it. If the pit was not to be closed immediately after the required samples had been obtained, the excavation was barricaded to prevent accidental entry by personnel working on the site. Each excavation was marked after closure as needed for identification of the sample location.

A log for each test pit was prepared to record the subsurface soil conditions, monitoring data, location of samples obtained, and other information. These are included in Appendix B. Where appropriate, photographs of the test pits were taken.

Soil samples were taken from test pits performed at SEADs 5, 12A, 12B, 44A, 58, and 59. The samples were taken from fill material based on field screening (stained soils or elevated PID readings). Test pit samples were collected using the bucket of the backhoe. The bucket was scraped along the side of the test pit at the desired depth to allow material to fall into the bucket or scooped from the bottom of the test pit. The sample was collected from the backhoe bucket with a stainless steel trowel or scoop, mixed in a stainless steel bowl, then

transferred to the appropriate sample containers. Samples for volatile analysis were collected as soon as possible from the middle of the backhoe bucket prior to mixing.

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. Surface soil samples were collected using a stainless steel trowel or scoop and a stainless steel bowl. VOC samples were placed in the VOA vials before mixing the soil. The soil was then mixed in the bowl and placed in the appropriate sample containers.

2.2.4 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 from the site in the groundwater of the overburden aquifer. 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 program which was implemented was consistent with the USEPA Region II CERCLA QA Manual and the NYSDEC Technical and Administrative Guidance Manuals (TAGMS) regarding design, installation, development and collection of groundwater samples. Further, the program is in compliance with all requirements described in the NYSDEC, 6 NYCRR Part 360, Solid Waste Management Facilities Regulations, Section 360-2.11, which details groundwater monitoring well requirements.

The installation of each monitoring well began after the soil boring was completed. The soil borings were advanced to split spoon or auger refusal, which for the purposes of this investigation defined the contact between the overburden and the 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.

Only one well was installed in each boring. Once installation was begun, no breaks in the installation process were made until the well was grouted and the augers were removed.

These wells were screened from 3 feet above the water table (if space allowed) to the top of weathered or competent bedrock. Soil samples were collected as described in the soil boring program. The monitoring wells were constructed of new 2-inch schedule 40 PVC with a screen slot size of 0.010" and threaded, flush joints.

A coarse sand pack (#3 Q-Rock) was placed by a tremie pipe in the annular space between the well screen and the hollow stem auger. This sand pack did not extend more than 2 feet above the top, or 6 inches below the bottom of the screen. A finer grained 6 inch sand pack (#1 Q-Rock), was placed between the coarse sand pack and the bentonite seal to prevent infiltration of the bentonite into the coarse sand pack. A layer of bentonite pellets, ranging from 1.0 foot to 1.5 feet in thickness, was poured within the annular space to seal the well. The bentonite pellets were hydrated by pouring potable water into the annular space. After a one hour hydration period, the remaining annular space was completely filled with a lean cement grout containing at least 3% bentonite. The grout mixture was placed in the annular space using a tremie pipe. Augers were removed as the grouting progressed to prevent caving. Table 2.2-1 presents monitoring well construction details.

In untrafficked areas, wells were protected with a steel casing, 4 inches in diameter. This protective steel casing extended at least 1.5 feet below the ground surface to prevent heaving by frost. The protective casing was held in place by a 2-foot square cement pad. Weep holes were drilled at the base of the protective casing above the cement collar to allow for the drainage of water. The protective casing was installed with a locking cap and a weather resistant padlock. In trafficked areas where the steel casing may be hit, a roadway box was installed. The protective casings were marked with the well number using metal stamps. The well number was also stamped on the roadway box cover.

2.2.5 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).

TABLE 2.2 - 1

MONITORING WELL CONSTRUCTION DETAILS

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY 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	MW5-1	12.0	13.32	5.9	4.3 - 11.0	1.5	1.4	739.76
2	MW5-2	10.0	11.09	4.8	3.3 - 9.1	1.0	1.1	737.18
3	MW5-3	8.5	8.56	4.0	3.4 - 7.4	1.7	*	736.82
4	MW9-1	5.2	6.63	0.9	3.4 - 4.3	1.0	1.5	748.77
5	MW9-2	5.3	7.08	2.0	2.5 - 4.5	0.9	1.9	733.36
6	MW9-3	10.2	11.62	4.9	3.4 - 9.0	1.0	1.4	735.75
7	MW12A-1	14.0	15.36	9.0	4.0 - 13.0	1.4	1.4	658.32
8	MW12A-2	12.0	13.0	6.0	4.3 - 11.1	1.7	1.1	657.40
9	MW12A-3	15.1	16.86	9.8	3.4 - 14	1.0	1.8	657.44
10	MW12B-1	17.8	19.26	10.9	5.3 - 17	2.8	1.3	653.36
11	MW12B-2	14.0	16.26	9.0	3.9 - 12.9	1.5	1.9	649.93
12	MW12B-3	14.6	15.98	8.9	4.6 - 13.5	2.0	1.3	650.03
13	MW43-1	15.0	16.0	9.0	4.9 - 13.9	1.0	1.1	765.96
14	MW43-2	18.4	19.34	13.0	3.3 - 17.3	1.0	0.8	763.32
15	MW43-3	18.7	20.22	13.0	3.6 - 17.6	1.0	1.5	762.20
16	MW43-4	13.4	14.38	6.9	4.1 - 12.3	1.0	1.1	758.10
17	MW44A-1	10.8	11.62	4.0	5.7 - 9.7	2.3	0.9	753.77
18	MW44A-2	30.1	31.45	12.8	15.0 - 28.9	3.0	1.4	751.71
19	MW44A-3	13.5	15.24	9.0	3.5 - 12.5	1.0	1.7	749.81
20	MW44B-1	11.8	12.16	6.0	4.2 - 8.2	1.5	1.4	746.66
21	MW44B-2	12.8	13.57	5.8	4.4 - 11.7	1.4	1.0	742.51
22	MW44B-3	14.4	15.82	9.0	4.3 - 13.3	1.4	2.0	743.08
23	MW50-1	9.0	10.32	4.0	3.9 - 7.9	1.0	1.5	761.31
24	MW50-2	6.9	7.80	2.0	4.1 - 6.1	1.0	1.0	752.93
25	MW50-3	7.4	9.22	4.0	2.3 - 6.3	0.8	1.9	755.36
26	MW58-1	11.2	11.85	4.8	4.6 - 10.3	1.0	1.1	618.97
27	MW58-2	9.6	10.60	4.0	4.5 - 8.4	1.0	1.3	616.18
28	MW58-3	10.6	10.74	4.8	4 - 9.7	1.0	1.6	611.98
29	MW58-4	9.5	10.6	4.0	4.4 - 8.4	1.0	1.2	614.05
30	MW59-1	9.2	10.52	4.0	4.1 - 8.1	1.2	1.5	734.86
31	MW59-2	11.4	13.26	4.9	4.7 - 10.5	2.0	1.9	736.20
32	MW59-3	8.8	8.36	4.0	3.7 - 7.7	1.6	*	737.61

Notes:
1. All wells were installed by Empire Soils Investigations, Inc. under the supervision of Engineering-Science, Inc.
2. Data obtained from Well Installation forms, Well Development forms and survey summary.
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.
5. Part of screened interval may be connection section (.8 ft).
6. *=MW5-3 and MW59-3 were installed with roadway box protective casings.

The development of monitoring wells was performed at least 2 days after well installation and at least 7 days prior to the well sampling and monitoring activities. If the wells were slow to recharge due to the low permeability of the formation, surging and overpumping were required to be performed numerous times on each well, with complete recharge between each episode. Every attempt was made to remove excessive turbidity from the wells because high turbidity can result in elevated metal concentrations detected in the groundwater.

The criteria for determining if the well was properly developed was based upon the guidance provided by the NYSDEC TAGM #HWR-88-4015. This guidance document specifies an upper level of allowable levels of turbidity in groundwater from monitoring wells which is considered acceptable for determining the water quality of metals in the aquifer.

Development operations were performed until the following conditions were met:

1. Water samples had the lowest possible NTUs
2. The temperature, specific conductivity and pH of the well water varied by no more than 10 percent.

Temperature and specific conductivity were measured in the field using a YSI model 33 SCT meter; pH was measured in the field using an Orion model 230A pH meter. A nephelometer was used to measure turbidity. The instruction manuals for these instruments were kept with the instrument in the field.

The development procedure which was used for these wells reduced the turbidity of the water in the wells. For development of these wells, surging with a bailer for 5 to 60 minutes was performed and the water in the well was removed using a peristaltic pump at a rate of between 0.05 and 2.1 liters per minute. The 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. The final turbidity values, measured after well development was completed, are shown in Table 2.2-2.

TABLE 2.2 - 2

MONITORING WELL DEVELOPMENT INFORMATION

SENECA ARMY DEPOT
8 AOCs

MONITORING WELL	INSTALLATION DATE	INDICATORS				GALLONS REMOVED	BORING WELL VOLUMES REMOVED
		TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTUs)		
MW5-1	03/16/94	5.5/6.5/6/5.5/6.5/6	7.29/7.24/7.19/7.2/7.2/7.12	590/600/650/650/650/650	9.38/55.5/1.21	71.5	7.9
MW5-2	03/05/94	4.5/4.5/4.0	7.09/7.17/7.17	600/600/600	238/16.8/2.42	29	3.9
MW5-3	03/17/94	5/5/5/4.5/5/5/5	7.08/6.98/9.96/6.97/7.19/7.08/7	950/925/900/900/925/900/900	1000+/1000+/62.6/101/450/223/11.6	55	10.6
MW9-1	03/21/94	6/6/5.8/7/7.5/7.6	7.28/7.3/7.39/7.54/7.63/7.6	410/415/395/410/425/420	700/98/90/15.3/19.5/clear	7.35	2.8
MW9-2	03/09/94	2.5/2.5/2.5/1.5	7.04/7.10/7.07/7.07	500/500/500/500	184/6.70/3.18	20.5	5.7
MW9-3	03/21/94	6.4/6.5/6.4	6.87/6.93/6.86	780/760/750	80.5/1.89/3.05	30.8	3.7
MW12A-1	06/11/94	11/11/11/10/9.5	7.16/7.19/7.26/7.26/7.24	600/590/590/580/590	1000+/219/14.3/10.2/26.1	45.5	5
MW12A-2	06/11/94	9/8/8.5/8.5/8.5	7.11/7.12/7.11/7.10/7.11	490/425/425/400/425	1000+/54.5/55.6/13.7/4.94	39	5
MW12A-3	06/12/94	10.6/9.6/9.7/9.8/10	7.94/7.94/7.82/7.88/8.02	600/590/565/600/580	1000+/100+/90/25/20	58	4.6
MW12B-1	06/13/94	12/10/10/11/10	6.98/6.99/7.01/7/6.96	1025/1025/1050/1050/1100	1000+/78.5/15.7/20.5/13.7	47	5
MW12B-2	06/13/94	10/10/10/10/9.5	7.14/7.08/7.06/7.11/7.15	800/825/800/800/800	1000+/27.3/34.7/74.5/43.3/4.33	47	5.2
MW12B-3	06/12/94	12/12/12/12/11/12/12	7.22/7.27/7.34/7.34/7.23/7.21/7.1	700/850/850/875/850/900/850	1000+/1000+/1000+/109/9.12/12.4/15	59.1	6.8
MW43-1	03/18/94	6/5.5/5.5	7.10/7.31/7.29	395/385/385	140/4.09/0.67	40.5	3.4
MW43-2	03/19/94	8/6.25/8/9.5/8.5/8.5	7.3/7.17/7.32/7.14/7.19/7.2	600/500/550/550/550/550	448/169/1000+/30.3/1.79	96.5	6
MW43-3	03/15/94	8.5/8.5/8.5	6.89/6.97/7.01	625/700/700	4.95/14.7/7.51	50.9	3.2
MW43-4	03/17/94	6/6/6	6.91/7.0/7.06	550/550/550	245/36/7.62	40	3.7
MW44A-1	02/17/94	6.5/6/6	7.41/7.40/7.41	370/360/315	23.5/20.5/3.47	33	4.1
MW44A-2	06/07/94	12.5/13.3/12.6	7.48/7.56/7.50	900/900/850	1000+/67.11/1000+/1000+	58.45	7
MW44A-3	06/07/94	10.5/10/10/10.7/10.8	7.32/7.68/7.51/8.02/7.8	610/575/600/575/550	1000+/1000+/115/6.09/3.15/11	48	43
MW44B-1	03/21/94	6/7/7/6	7.4/7.4/7.35/7.50	430/405/400/400	64.9/10.1/30.0	45	5
MW44B-2	03/08/94	6/6/6	7.09/7.28/7.25	370/360/340	190/17.8/22.1	32	3.2
MW44B-3	03/20/94	6/7/6.5/7.5	7.24/7.60/7.18/7.34	475/525/455/465	236/556/37.2/0.83	59	5
MW50-1	03/23/94	6.1/6.5/6.1/8/9.8	7.03/7.05/7.03/6.44/6.89	620/650/600/620/650	1000+/1000+/430/34.6/4.62	45.15	7.2
MW50-2	03/23/94	5/4.7/5	7.20/7.18/7.23	630/580/580	60/7	18.7	4
MW50-3	03/07/94	4.5/4/2	7.06/7.45/7.0	500/450/470	1.09/0.26/0.54	16.3	2.9
MW58-1	04/01/94	11.3/11.5/10.5/8.5/8.7	6.90/6.99/7.19/7.14/7.15	400/420/400/390/390	1000+/1000+/479/208/38.9	45.5	5.8
MW58-2	04/01/94	10.5/10.8/9.6/9.4/9.4/9.6	7.18/7.22/7.10/7.28/7.14/7.19	440/420/410/400/400/400	1000+/9.28/2.34/6.69/73.6/16.4	44.5	6.6
MW58-3	04/02/94	11.5/11.5/10.5/10.5/10.5/10.5	7.1/7.35/7.38/7.59/6.8/7.1	390/385/390/370/390/390	1000+/855/5.66/579/241/42	60	7.5
MW58-4	04/04/94	11/11/11.5/11	6.9/7.4/7.6/7.7	420/410/380/380	1000+/260/8.17/5.18	40	6.1
MW59-1	03/19/94	5/5/5/5	7.1/7.22/7.26/7.30	650/700/700/700	271/35.9/31.3/38.9	37	5.8
MW59-2	03/16/94	6/6/6.5	7.35/7.35/7.32	550/550/600	1000+/14.9/2.9	24.5	3
MW59-3	03/18/94	5.7/5.7/5.5	7.11/7.20/7.23	1100/1100/1100	1000+/1000+/18.2/20.3	24	3.9

Note: All wells were developed by the surge and pump method.

2.2.6 Groundwater Sampling

Monitoring wells were sampled to evaluate the presence and extent of organic and inorganic 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 groundwater samples with the lowest possible turbidity values. Water levels in all monitoring wells were measured prior to the groundwater sample collection.

Groundwater sampling was performed in three steps: (1) remove the silt, (2) purge the water standing in the well, and (3) sample the water. Each of these steps is described in the following sections.

Silt Removal

One day prior to sampling, the depth to groundwater was measured and recorded. A previously unused piece of 3/8"OD Teflon tubing was installed in the well. The thickness of silt in the bottom of the well was determined by measuring the depth to the top of the silt. If the thickness of silt was greater than 1-inch, silt removal as described below was performed. If the thickness was less than 1-inch, then no silt removal was necessary prior to the purging process.

The Teflon tubing was connected to 1/4" Tygon tubing installed in the head of a peristaltic pump. Purging began with the bottom opening of the Teflon tube immediately above the silt layer. The silt was slowly agitated with the tube so that the silt was disturbed, became suspended, and was collected by the tube (the purge water would become silt-laden and have a dark brown-gray color indicating that the silt was being removed). An appropriate flow rate was used for the silt removal. If more force was required to adequately disturb the silt at the bottom of the well, a decontaminated one-inch stainless steel or Teflon bailer was slowly lowered to the bottom of the well to slowly agitate the silt while pumping. Silt removal was complete when the water was no longer silt-laden and dark brown-gray in color.

Monitoring Well Purging

The monitoring wells were purged prior to sampling using a peristaltic pump with a dedicated Teflon tube. Before purging, the depth to water was measured with a decontaminated electronic water level meter. The water level probe was left in the well so that the water

TABLE 2.2 - 3

MONITORING WELL FIELD SAMPLING INFORMATION

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

MONITORING WELL	DATE SAMPLED	INDICATORS				GALLONS REMOVED (gal)	STANDING WATER VOLUME (gal)	WELL VOLUMES REMOVED
		TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTUs)			
MW5-1	7/11	15.0/12.3/13.1	6.83/6.86/6.86	1330/1250/1220	40	3.2	0.94	3.4
MW5-2	3/30	3.7/3.6/3.4	7.32/7.23/7.15	550/5751/550	70.6	4.5	1.5	3.0
MW5-3	7/11	16.9/19.4/19.5	6.78/6.70/6.72	1300/1250/NA	>100	1.7	0.5	3.4
MW9-1	*	NA	NA	NA	NA	NA	NA	NA
MW9-2	3/30	4.2/4/3.9	7.52/7.65/7.65	600/550/550	309	2.4	0.8	3.0
MW9-3	7/19	16.0/12.9/14.6/14.1	7.26/7.35/7.34/7.35	1100/1100/1100/1100	160	4.2	1.2	3.5
MW12A-1	7/20	13.5/13.8/13.1/13.7	6.70/6.92/7.65/7.87	650/650/625/625	198	6	1.5	4.0
MW12A-2	7/20	11.5/14.0/11.5	6.41/7.41/7.40	500/500/500	114	3.75	1.25	3.0
MW12A-3	7/20	12.9/12.5/13.2	6.17/6.83/7.06	600/550/575	165	5.25	1.75	3.0
MW12B-1	7/19	12.8/13.2/12.9	5.57/6.02/5.55	1100/1100/1100	>1000	4.35	1.45	3.0
MW12B-2	7/19	13.8/15.7/14.0	7.0/7.01/6.85	875/800/875	>1000	4.35	1.45	3.0
MW12B-3	7/19	13.2/14.0/14.3	6.46/8.06/8.22	1050/105/1075	>1000	4.35	1.45	3.0
MW43-1	7/19	13.0/13.6/13.7	7.13/7.09/7.07	470/480/460	14.8	6	2	3.0
MW43-2	7/19	12.2/13.8/13.1	7.12/7.14/7.11	590/600/610	16.6	8.1	2.7	3.0
MW43-3	3/28	8.6/7.8/8	6.99/7.62/7.70	625/600/600	431	9	2.9	3.1
MW43-4	3/28	6.3/5.9/6.1	6.85/7.07/7.07	490/495/530	0.23	6.3	2.1	3.0
MW44A-1	7/12	13.0/13.4/13.4	7.05/7.33/7.76	450/410/410	11.9	4.2	1.4	3.0
MW44A-2	7/12	12.9/14.9/14.7	7.70/7.20/7.52	825/900/900	693	8	2.6	3.1
MW44A-3	7/12	16.8/16.4/15.4	7.76/7.55/7.46	500/550/550	16.8	5.6	1.9	2.9
MW44B-1	7/12	13.0/13.4/13.4	7.12/7.31/7.10	600/560/620	16.5	4.5	1.5	3.0
MW44B-2	3/29	6/5.8/5.9	7.83/7.86/7.96	385/380/383	67.4	6	2	3.0
MW44B-3	7/12	16.1/16.0/15.0	7.21/7.14/7.19	680/650/600	2.54	6.3	2	3.2
MW50-1	7/12	16.8/17.9/17.0	6.87/6.94/6.94	810/800/820	160	2.5	0.85	2.9
MW50-2	7/18	17.8/18.3/18.5/18.2/17.9	7.08/7.07/7.06/6.99/6.90	980/900/888/900/900	27.7	2	0.65	3.1
MW50-3	7/18	17.7/18.0/18.1/18.7	7.14/7.09/7.15/7.16	550/575/580/580	1.48	3.7	0.5	7.4
MW58-1	7/11	13.4/13.0/13.1	7.10/7.35/7.47	455/450/445	49.2	4.5	1.3	3.5
MW58-2	7/11	17.3/16.3/16.1	8.06/7.94/7.93	500/500/500	2.79	3.6	1.2	3.0
MW58-3	7/12	14.5/16.5/15.0	7.24/7.20/7.26	470/480/480	1092	3	1	3.0
MW58-4	7/11	13.3/12.9/13.3	6.04/7.42/7.50	480/475/475	812	3.1	0.86	3.6
MW59-1	3/30	4/3.8/3.9	7/7.16/7.19	700/680/650	146	4.5	1.44	3.1
MW59-2	7/21	13.9/15.6/14.6	7.65/7.70/7.90	750/700/750	14.0	3	1	3.0
MW59-3	7/21	17.0/17.5/17.6	7.05/7.08/7.09	1650/1600/1600	56.0	1.56	0.5	3.1

Notes:

1) NA = Not Available
2) * = MW9-1 was not sampled

level could be monitored continuously during purging. The purging process began with the open-end of the tube at least 6 inches from the bottom of the well. The purging flow rate was between 100 ml/min and 1600 ml/min. The purge rate was set so that pumping the well to near dryness during purging was avoided and also so that the turbidity of the groundwater sample was less than 50 NTUs. If the water level fell below one half the static water column height, the purge rate was lowered to minimize the drawdown while still maintaining a practical purging rate. If the turbidity was greater than 50 NTUs, the purge rate was reduced to minimize the turbidity while maintaining a practical purging rate. The exact flow rate was determined using a plastic graduated beaker and was recorded on the sampling data sheet. The water was purged into a graduated 5-gallon bucket. 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. A 1-gallon plastic container was filled from the outlet side of the peristaltic pump and the temperature, turbidity, specific conductance, and pH were measured. For wells which were not purged to near dryness after one well volume had been removed, the Teflon tube was slowly raised to a point between the top of the well screen and the water surface. When two well volumes were removed, the required data (noted above) were again recorded on the data sheet. Purging of the well continued until three well volumes had been removed. After purging the third well volume, the required data (noted above) were again recorded. If necessary additional temperature, specific conductance, turbidity, and pH measurements were made on additional well volumes until their measurements stabilized (two successive measurements varying by less than 10%). 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 the necessary well volumes, the water level was measured in the well. If the well had recovered to 95% of the original static level, then sampling of the well was performed. If the 95% recovery had not been achieved after 3 hours, then the recovery requirement for the well was reduced to 85% water level recovery prior to sampling.

For wells which were very slow to recharge, purging of groundwater, at the 100 ml/min flow rate, was continued until the well had been purged to near dryness (i.e., when the water level was at 1 foot above the bottom of the well). Again the purging process began with the open end of the Teflon tube at the bottom of the well screen or at least 6 inches from the bottom of the well. The time, flow rate, depth to the bottom of the open tube, and total volume of water removed were recorded after purging the well to near dryness. The temperature, specific conductance and pH were also recorded immediately after purging the well to near

dryness. The water level was monitored with an electronic water level meter during purging. After these procedures, 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. Once purged to near dryness, the well was allowed to recover to 95% of the original static level prior to sampling. If, however, the well had not recharged to 95% after 3 hours then the recovery requirement for the well was reduced to 85% water level recovery prior to sampling. If the well had not recharged to 85% of the original static level after six hours then sampling of the well was begun as water was available for each parameter.

Monitoring Well Sampling

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

Groundwater samples collected for volatile analyses were collected first, before any of the other parameters, in a manner that would minimize the loss of volatile compounds. Sampling for the remaining parameters was carried out in the following sequence: semivolatiles, metals, cyanide, explosives, pesticides/PCB, herbicides, total petroleum, hydrocarbons, nitrates, and radionuclides. Groundwater samples were collected with the required quality assurance/quality control (QA/QC) samples, then transmitted to the laboratory for chemical analysis in accordance with the Chemical Data Acquisition Plan (CDAP).

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 Petroleum Hydrocarbons)
7. Method 353.2 (Nitrates)
8. Radionuclides: Method 9310 Gross Alpha, Gross Beta
   Method 901.1 Gamma Spectrum Analysis
9. Method 6001/M4-82-020 (Asbestos)
10. Method 906.0 (Tritium)

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

2.2.7 Surface Water and Sediment Sampling Procedures

Surface water samples were collected by immersing a clean glass sample bottle without preservatives into the surface water body. The sample was then transferred to a pre-preserved sample bottle, if required. Temperature, conductivity, pH, and turbidity of surface water, were measured directly in the field with calibrated meters. The sample pH was measured with an Orion pH meter, Model SA230 or SA230A, conductivity and temperature were measured with a YSI Model 33 conductivity meter, and turbidity was measured with a Hach Portable Turbidimeter, Model 2100p or Model 16800.

Sediment samples were collected by scooping sediment into a decontaminated stainless steel bowl with a decontaminated trowel. Volatile Organic Compound 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.

2.3 SEAD 5-SEWAGE SLUDGE WASTE PILES

SEAD-5 is composed of a number of sewage sludge waste piles that are located west of Building 135. Sewage sludge from the drying beds of Sewage Treatment Plants No's 4 and 715 were stockpiled at SEAD-5 during the 1980's. Rainfall runoff flowing off these waste piles could leach contaminants into the surrounding soils and groundwater. Therefore, the

transport media for the chemicals of concern at SEAD-5 include soil and groundwater. The classification of the groundwater at SEAD-5 is GA, meaning that it is protected for a source of drinking water. However, there are no drinking water wells which exist within the areas influenced by SEAD-5.

2.3.1 Chemicals of Interest

Chemicals of interest include VOCs, SVOs, pesticides/PCBs, cyanides, nitrates, and heavy metals.

2.3.2 Media Investigated

Geophysics

Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of the AOC. The seismic refraction transect locations are shown in Figure 2.3-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the AOC. Because of the relative position SEAD-5 has with SEADs 59 and 71, seismic line locations were selected which would yield the best information without overlap or repetition on bordering SEADS.

Soils

Five (5) test pits were excavated at SEAD-5. The test pit locations are shown in Figure 2.3-2. One excavation was advanced through each of the five sewage sludge piles identified in the 15 SWMU Work Plan. In each case, the test pit bisected the entire pile allowing a complete visual inspection of the fill material. One soil sample was collected from each test pit and submitted for the chemical analyses identified in Section 2.3.3 (Table 2.3-1).

Groundwater

Three (3) groundwater monitoring wells were installed at this AOC as shown in Figure 2.3-2. One monitoring well (MW5-1) was installed upgradient of the AOC to obtain background water quality data, while the remaining two monitoring wells were installed adjacent to, and downgradient of, the AOC to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- SEISMIC PROFILE

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.3-1
SEAD-5 SEWAGE SLUDGE WASTE PILES
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV.
1" = 100'	4/10/95	A

ACAD\SE BHLS\WMU\ACADFIG\SDSGS.DWG

UNNAMED DIRT ROAD

BLDG 130

BLDG 128

BLDG

60,000 GALLON OIL TANK

UNNAMED DIRT ROAD

BLDG 135

CATWALK

GATE

GATE

GATE

MW5-3

MW5-2

MW5-1

TP5-1

TP5-2

TP5-3

TP5-4

TP5-5

N 999250

N 999000

N 998750

N 998500

E 750000

E 750250

E 750500

E 750750

N

ACAD\SEP... \BHLSWMU\ACADFIG\SDSSEP.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.3-2
SEAD-5 SEWAGE SLUDGE WASTE PILES
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	4/10/95	A

TABLE 2.3-1

SEAD-5 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP5-1	TP5-1	7'
TP5-2	TP5-2	3'
TP5-3	TP5-3	3'
TP5-4	TP5-4	3'
TP5-5	TP5-5	3'
TP5-6	TP5-6	7'

Notes:

1) The sample number contains the sample location with a test pit (TP) identifier.
2) All SEAD-5 soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, and nitrates.

flow at this AOC was to the southwest. The geophysical survey showed the direction to be more to the west-northwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of the AOC and the two downgradient monitoring wells were placed near the northwestern corner and the center of the western boundary of the AOC.

One (1) 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 2.3.3.

2.3.3 Analytical Program

A total of five (5) soil samples and three (3) groundwater samples were collected from SEAD-5 for chemical analysis. All of the samples were analyzed for TCL VOC's, SVOs, pesticides/PCBs, TAL metals, cyanide and nitrates according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD-5 is presented in Table 2.1.3.

2.4 SEAD 9-OLD SCRAP WOOD SITE

The old scrap wood pile (SEAD 9) is located along East Patrol Road, approximately 400 feet north of East Kendaia Road. This area served as a waste disposal site for construction debris and scrap wood. It was also used for staging fire training exercises, although no historical data exist on the procedures used or material burned. Leaching of rainwater through the debris and into the surrounding soils and groundwater were considered as the primary migration pathways for potential contaminants at SEAD-9. The groundwater at SEAD-9 has been classified as GA, meaning that it is protected for a source of drinking water. However, no drinking water wells exist within the areas influenced by SEAD-9.

2.4.1 Chemical of Interest

Chemical of interest include VOCs, SVOs, pesticides/PCBs, cyanide, and total petroleum hydrocarbons.

2.4.2 Media Investigated

Geophysics

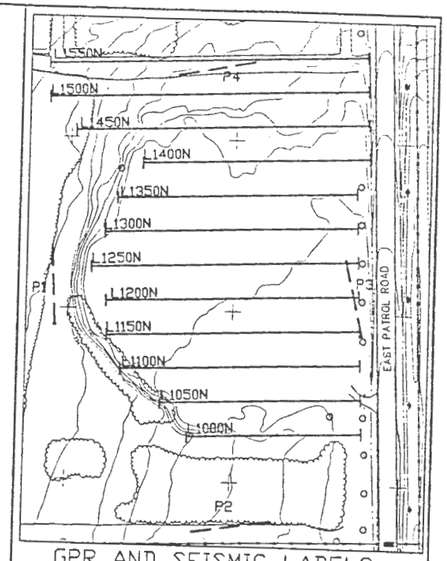
Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of the AOC. The seismic refraction transect locations are shown in Figure 2.4-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the AOC. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. The EM-31 data were collected on profiles spaced at 20-foot intervals across the site. EM-31 measurements were made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The locations of the EM-31 and GPR profiles are shown in Figure 2.4-1.

Soils

A total of three (3) soil borings were performed at SEAD-9. The soil boring locations are shown in Figure 2.4-2. The three soil borings were drilled over detected geophysical anomalies to determine the thickness of fill and to provide subsurface samples for chemical analysis. Three (3) samples from each soil boring were submitted for the chemical analyses identified in Section 2.4.3 (Table 2.4-1).

Three (3) test pits were excavated at distinct geophysical anomalies detected during the EM-31 and GPR surveys. The test pit locations are shown in Figure 2.4-2. The purpose of these test pits was to visually identify the contents of the old scrap wood pile area, and therefore no soil samples were collected.

L1550N
L1530N
L1000N
L980N
L800E
L850E
L900E
L950E
L980E
L1000E
L1100E
L1200E
L1300E
L1400E
L1460E
A'
A
730
734
740
744
750
EAST PATROL ROAD
GATE
N 1001000
N 1000750
N 1000500
N 1000250
E 1050250
E 1050500
E 1050750
E 1051000
N
50 0 50 100
(feet)



GPR AND SEISMIC LABELS
NO SCALE

- 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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- L1000N — GPR TRANSECT
- P2 — SEISMIC PROFILE
- L1200E — EM TRANSECT
- A' A — GPR PROFILE SHOWN IN SECTION 3 OF THIS REPORT

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 2.4-1
SEAD-9 OLD SCRAP WOOD SITE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE 1" = 100' | DATE 4/11/95 | REV. A

\BML\SWMU\SD9GS.DWG
ACAD\S

TABLE 2.4-1

SEAD-9 SOIL BORING SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB9-1	SB9-1-00	0-2"
	SB9-1-03	4-6'
	SB9-1-05	8-9'
SB9-2	SB9-2-00	0-2"
	SB9-2-03	4-6'
	SB9-2-05	8-9'
SB9-3	SB9-3-00	0-2"
	SB9-3-03	4-6'
	SB9-3-04	6-8'

Notes:

1) The sample number contains the sample location with a soil boring (SB) identifier.
2) All SEAD-9 soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, and TPH.

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-9 as shown in Figure 2.4-2. One monitoring well (MW9-1) was installed upgradient of SEAD-9 to obtain background water quality data, while the remaining two monitoring wells were installed adjacent to and downgradient from SEAD-9 to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-9 was to the northwest. The geophysical survey showed the direction to be more to the west-northwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation and the EM-31 survey results. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of SEAD-9 and the two downgradient monitoring wells were placed along the western boundary of SEAD-9, immediately downgradient of the western extent of the scrap wood pile as determined by the EM-31 survey.

One (1) 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 (1) groundwater sample was collected from the two downgradient wells and tested for the parameters listed in Section 2.4.3. The upgradient well was dry.

2.4.3 Analytical Program

A total of nine (9) soil samples and two (2) groundwater samples were collected from SEAD-9 for chemical analysis. All of the samples were analyzed for TCL VOC's, SVOs, pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, and total petroleum hydrocarbons by EPA method 418.1. A summary of the laboratory analysis for SEAD-9 is presented in Table 2.1-3.

2.5 SEAD 12A-RADIOACTIVE WASTE BURIAL SITES

SEAD 12A is located in the northeastern corner of the Q area of SEDA. Five (5) small disposal pits containing lab wastes were suspected to have been located in this area. The locations of these pits were not known and the nature of their construction remained in question. A stream, flowing east to west, was situated along the southern boundary of SEAD-12A. The primary migrational pathways considered for SEAD-12A were leaching of contaminants into the surrounding soils, and transport via groundwater and surface water runoff. The groundwater at SEAD-12A has been classified as GA, meaning that it is

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(Feet)

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.4-2
SEAD-9 OLD SCRAP WOOD SITE
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	4/10/95	A

ACAD\SE1 3MLS\WW\WS09SP.DWG

protected for a source of drinking water. However, no drinking water wells exist within the areas influenced by SEAD-12A.

2.5.1 Chemicals of Interest

Chemicals of interest include VOCs, SVOs, pesticides/PCBs, TAL metals, cyanide, and radioactive materials.

2.5.2 Media Investigated

Geophysics

Four (4) seismic refraction profiles were surveyed on 4 lines encompassing SEADs-12A & 12B. The seismic refraction transect locations are shown in Figure 2.5-1. The seismic profiles consisted of four (4) 115 foot transects. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-12A.

To locate the exact location of the suspected disposal pits, GPR and EM-31 surveys were performed throughout SEAD-12A. The locations of the survey grids are shown in Figure 2.5-1. The electromagnetic data were collected along profiles spaced at 20 foot intervals with readings taken every 10 feet along each profile. GPR data were acquired along profiles spaced every 50. Where electromagnetic anomalies possibly associated with buried metallic objects, additional GPR data were collected to characterize the anomaly source. A radiological screening was also performed along the survey lines which were used for the GPR data acquisition.

Soils

Sixteen (16) soil samples were originally proposed for SEAD-12A. Ten soil samples were to be collected from five test pits and six soil samples were to be collected from two soil borings located at upgradient locations to SEAD-12A. However, due to the nature of materials stored and potentially disposed of in this area, an amendment to this sampling plan was drafted following the completion of the geophysical surveys. The presence of large quantities of buried metallic objects in three areas located about the central and southern portions of SEAD-12A had been revealed, and it was decided that a better identification of suspected

L1880N
L1700N
L1600N
L1500N
L1400N
L1300N
L1200N
L1100N
L1000N
L960N

E 745500
E 745250
E 745000
E 744750
E 744500
E 744250

BLG 813,814
BLG 815
BLG 816
BLG 817
BLG 805
BLG 806

SERVICE ROAD #1
SERVICE ROAD #2
SERVICE ROAD #3

N 1016250
N 1016000
N 1015750
N 1015500
N 1015250
N 1015000
N 1014750
N 1014500
N 1014250
N 1014000
N 1013750

N

100 0 100 200
(feet)

ACAD\SENECA\SMI_SWMI\SSD12AGS.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- L1200E — EM TRANSECT

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

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FIGURE 2.5-1 PAGE 1 OF 2
SEAD12A RADIOACTIVE WASTE BURIAL SITE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE 1" = 200'
DATE DECEMBER 1995
REV A

L1850N L1800N L1750N L1700N L1650N L1600N L1550N L1500N L1450N L1400N L1350N L1300N L1250N L1200N L1150N L1100N L1050N L1000N

GUARD

P4

L1020N

A A'

B B

L1517E

P1

L1552E

P3

E 745500

E 745250

E 745000

E 744750

E 744500

E 744250

BLG 813,814

BLG 815

BLG 816

BLG 81

SERVICE ROAD #1

SERVICE ROAD #2

SERVICE ROAD #3

N 1014750

N 1014500

N 1014250

N 1014000

N 1013750

BLG 805

BLG 80

N 1016250

N 1016000

N 1015750

N 1015500

N 1015250

N 1015000

ACAD\SENECA\BHLSWMHS\DIZAGSE.DWG

LEGEND

1000E — GPR TRANSECT

P2 ---------- SEISMIC PROFILE

A′ ——— A GPR PROFILE SHOWN IN SECTION 3 OF THIS REPORT

N

100 0 100 200

(feet)

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.5-1 PAGE 2 OF 2
SEAD12A RADIOACTIVE WASTE BURIAL SITE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 200'	DECEMBER 1995	A

buried objects could be obtained by performing additional test pits rather than performing the two upgradient soil borings originally proposed. This amendment, calling for the collection of two soil samples from each of 5 test pits, the collection one soil sample from each of three additional test pits, and the collection of three soil samples from the background monitoring well location, was approved by NYSDEC and the EPA on 8 June, 1994, and 29 June, 1994, respectively.

Eight (8) test pit excavations were performed over areas of geophysical anomalies. The test pit locations are shown in Figure 2.5-2. The test pits were located in zones of disturbed soil as determined by the GPR survey, areas of large EM-31 anomalies and areas with visible surface debris. The soil samples collected from each of the eight test pits were submitted for the chemical analyses identified in section 2.5.3 (Table 2.5-1).

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-12A as shown in Figure 2.5-2. One monitoring well (MW12A-1) was installed upgradient of SEAD-12A to obtain backgroundwater quality data, while the remaining two monitoring wells were installed adjacent to and downgradient of SEAD-12A to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-12A was to the northwest. The geophysical survey showed the direction to be more to the west and southwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation and the EM-31 survey results. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of SEAD-12A and the two remaining monitoring wells were placed adjacent to, and downgradient from, the zones of pronounced EM-31 anomalies.

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 2.5.3.

Surface Water and Sediment

A total of three (3) surface water and four sediment samples were collected from SEAD-12A. The sampling locations are shown in Figure 2.5-2. One sediment sample (SD12A-4) was collected within the boundaries of SEAD-12A at the pit location containing suspected

PATROL ROAD

GUARD POST

MW12A-1

SD12A-4

TP12A-1

TP12A-2

MW12A-2

SWSD12A-1

TP12A-3

TP12A-4

TP12A-6

TP12A-7

TP12A-5

TP12A-8

MW12A-3

SWSD12A-2

SWSD12A-3

SERVICE ROAD #1

SERVICE ROAD #2

SERVICE ROAD #3

BLG 813,814

BLG 815

BLG 816

BLG 817

BLG 825

BLG 206

E 745500

E 745250

E 745000

E 744750

E 744500

E 744250

N 1016250

N 1016000

N 1015750

N 1015500

N 1015250

N 1015000

N 1014750

N 1014500

N 1014250

N 1014000

N 1013750

N

100 0 100 200

(feet)

LEGEND

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

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I:\SWMU\SD12ASP.DWG

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PARSONS ENGINEERING SCIENCS, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 720518-01002

FIGURE 2.5-2
SEAD-12A RADIOACTIVE WASTE BURIAL SITE
LOCATION OF SAMPLING POINTS

SCALE 1" = 200'

DATE 4/13/95

REV A

TABLE 2.5-1

SEAD-12A SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORINGS

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
MW12A-1	MW12A-1-00	0-2"
	MW12A-1-03	4-6'
	MW12A-1-05	8-9.5'

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP12A-1	TP12A-1	2.5'
	TP12A-1	3'
TP12A-2	TP12A-2	6'
	TP12A-2	5'
TP12A-3	TP12A-3	2.5'
	TP12A-3	6'
TP12A-4	TP12A-4	4'
	TP12A-4	4'
TP12A-5	TP12A-5	3'
TP12A-6	TP12A-6	1'
	TP12A-6	7'
TP12A-7	TP12A-7	4'
TP12A-8	TP12A-8	7'

Notes:

1) The sample number contains the sample location with a monitoring well (MW), or test pit (TP) identifier.
2) All SEAD-12A soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, cyanide, and radionuclides.

were surveyed at SEADs-12A and 12B. The seismic refraction transect locations are shown in Figure 2.6-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-12B.

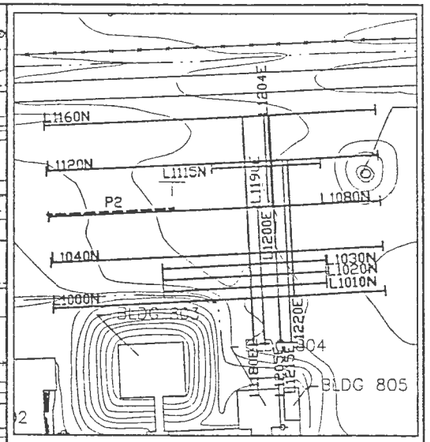
To locate the exact location of the 5,000 gallon underground storage tank and the suspected disposal pit, GPR and EM-31 surveys were performed throughout SEAD-12B. The locations of the survey grids are shown in Figure 2.6-1. The electromagnetic data were collected along profiles spaced at 20 foot intervals with readings taken every 10 feet along each profile. GPR data were acquired along profiles spaced every 50 feet. Where electromagnetic anomalies possibly associated with buried metallic objects were detected, additional GPR data were collected to characterize the anomaly source. A radiological screening was also performed along the survey lines which were used for the GPR data acquisition.

Soils

Eleven (11) soil samples were originally proposed for SEAD-12B. Of these, two soil samples were to be collected from two test pits and six soil samples were to be collected from two soil borings located at upgradient locations of SEAD-12B and 3 samples from the 5,000 gallon tank. However, following the completion of the geophysical surveys, an amendment to this sampling plan was drafted due to the nature of the materials stored and potentially disposed of at SEAD-12B. It was decided that a better identification of any suspected underground (buried) objects could be obtained by performing test pits in place of the soil borings which had been originally proposed. Therefore, the amendment to the sampling plan called for the collection of one (1) soil sample from each of four test pits, and the collection of three (3) soil samples from the background monitoring well location (MW12B-1). This amendment was approved by NYSDEC and the EPA on 8 June, 1994 and 29 June, 1994, respectively.

Three (3) test pit excavations were performed over areas of geophysical anomalies. These test pit locations are shown in Figure 2.6.2. The test pits were located in zones of disturbed soil as determined by the GPR survey and over areas of EM-31 anomalies. A soil boring was performed in and around the area where the 5,000 gallon underground tank was thought to be. A single soil sample (SB12B-1) was taken from the 18 to 20 foot spoon. This sample, along with each soil sample collected from the three test pits were submitted for the chemical analysis identified in Section 2.6.3 (Table 2.6-1).

E 743000
E 743250
E 743500
E 743750
E 744000
NORTH PATROL ROAD
N 1016250
PATROL ROAD
N 1016000
N 1015750
N 1015500
L1160N POST
L1140N
L1120N
L1100N
L1080N
L1060N
L1040N
L1020N
L1000N
BLDG 803
BLDG 804
BLDG 805
L1160E
L1180E
L1200E
L1220E
L1240E
L1260E
L1280E
L1300E
BLDG 802
BLDG 810
BLDG 807
BLDG 806
BLDG 825
DRIVE EDGE
SERVICE ROAD NO. 1
642
640
638
652
650
50 0 50 100
(feet)
N
ACAD\SE 3MES\WMU\ACAD\FIG\SDI2BGS.DWG



GPR AND SEISMIC LABELS
NO SCALE

- 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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- L1000E GPR TRANSECT
- P2 SEISMIC PROFILE
- L1200E EM TRANSECT

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA army DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	DWG. NO.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.6-1
SEAD-12B RADIOACTIVE WASTE BURIAL SITE
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	1/06/95	A

E 743000
E 743250
E 743500
E 743750
E 744000
NORTH PATROL ROAD
N 1016250
PATROL ROAD
APPROXIMATE LOCATION OF DRY WASTE DISPOSAL PIT
GUARD POST
TP12B-4
TP12B-3
MW12B-3
TP12B-2
APPROXIMATE AREA OF STRESSED VEGETATION
MW12B-1
MW12B-2
SB12B-1
N 1016000
642
640
638
BLDG 803
BLDG 804
BLDG 805
APPROXIMATE LOCATION OF WASTEWATER STORAGE TANK 5000 GAL.
BLDG 802
N 1015750
SERVICE ROAD NO. 1
DRIVE EDGE
BLDG 807
BLDG 806
BLDG 805
BLDG 810
652
650
N 1015500
N
646
UNNAMED CREEK
C:\ACAD\SENECA\BHLS\WMU\ACAD\FIG\SD12BSP.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS
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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 2.6-2
SEAD-12B RADIOACTIVE WASTE BURIAL SITE
LOCATION OF SAMPLING POINTS

SCALE 1" = 100'
DATE DECEMBER 1995
REV A

TABLE 2.6-1

SEAD-12B SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORINGS

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
MW12-1	MW12-1	0-2"
	MW12-1	4-6'
	MW12-1	12-13.5'
SB12B-1	SB12B-1	18-21'

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP12B-1	TP12B-1	4'
TP12B-2	TP12B-2-1	2.5'
TP12B-3	TP12B-3	2.5'

Notes:

1) The sample number contains the sample location with a monitoring well (MW), soil boring (SB), or test pit (TP) identifier.
2) All SEAD-12B soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, cyanide, and radionuclides.

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-12B as shown in Figure 2.6-2. One monitoring well (MW12B-1) was installed upgradient of SEAD-12B to obtain backgroundwater quality data, while the remaining two monitoring wells were installed adjacent to and downgradient of SEAD-12B to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-12B was to the northwest. The geophysical survey showed the direction to be more to the west and southwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation and the EM-31 survey results. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of SEAD-12B and the two remaining monitoring wells were placed adjacent to, and downgradient from, the zones of pronounced EM-31 anomalies.

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 2.6.3.

2.6.3 Analytical Program

A total of 7 soil samples and 3 groundwater samples were collected from SEAD-12B for chemical analysis. All of the samples were analyzed for TCL VOC's, SVOs, pesticide/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, and radiochemical analysis, for gross alpha and gross beta by method 9310, gamma spectral analysis by method 901.1, and, for the groundwater samples, tritium by method 906.0. A summary of the laboratory analysis for SEAD-12B is presented in Table 2.1-3.

2.7 SEAD 43-OLD MISSILE PROPELLANT TEST LAB
SEAD 56-HERBICIDE/PESTICIDE STORAGE
SEAD 69-BUILDING 606 DISPOSAL AREA

Due to their respective association with Building 606, SEADs 43, 56, and 69 were investigated together as a whole. The historical nature of the activities which took place here, (propellent testing, herbicide/pesticide storage, and process disposal), indicates that several potential migrational pathways were possible. Therefore, leaching to soil, and transport via

groundwater flow and surface water runoff were considered as the primary migrational pathways at SEADs 43, 56, and 69.

2.7.1 Chemicals of Interest

Chemicals of interest include VOC's, SVO's, pesticides/PCB's, heavy metals, cyanide, herbicides, nitrates, and explosives.

2.7.2 Media Investigated

Geophysics

Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along the outside boundary of SEAD-43, 56 and 69. These seismic transect locations are shown in Figure 2.7-1. Data from the survey were used to determine the direction of groundwater flow and to adjust monitoring well locations to assure that one monitoring well was installed upgradient and three (3) monitoring wells were installed downgradient of the SEADs. Additionally, data was used to delineate disposal pit extents (SEAD-69) and identify metallic objects.

EM-31 and GPR surveys were also performed to delineate the limits of the suspected disposal pits (SEAD-69) and to identify anomalies of metallic origin at both SEAD-43, and 69. The electromagnetic data was collected from a grid laid out across the two SEADs (43, and 69). The profiles were spaced at 20 foot intervals and EM-31 measurements were taken at 10 foot intervals along each profile. GPR data was collected along profiles spaced at 50 foot intervals. Supplemental GPR data were also collected over distinct EM-31 anomalies to provide a more defined characterization of the suspected metallic sources. The locations of the EM-31 and GPR profiles are shown in Figure 2.7-1.

Soils

A total of ten (10) soil borings were performed at SEADs-43, 56, and 69; three (3) borings at SEAD-56 and 69, and 4 borings at SEAD-43. The soil boring locations are shown in Figure 2.7-2. A total thirty (30) samples from ten (10) soil borings were submitted for the chemical analyses identified in 2.7.3 (Table 2.7-1).

P2

P1

P3

P4

CONCRETE PAD
(FORMER FOUNDATION)

SEAD-56

CONCRETE PAD

OLD MISSILE TESTING LABORATORY)

PESTICIDE RINSATE BLDG.

BLDG. 606

UNNAMED ROAD

SEAD-43

SEAD-69

UNNAMED ROAD

UNNAMED ROAD

N 987750

N 987500

N 987250

N 987000

L1000N

L900N

L800N

L700N

L600N

L560N

L1000E

L1100E

L1200E

L1240E

E 753500

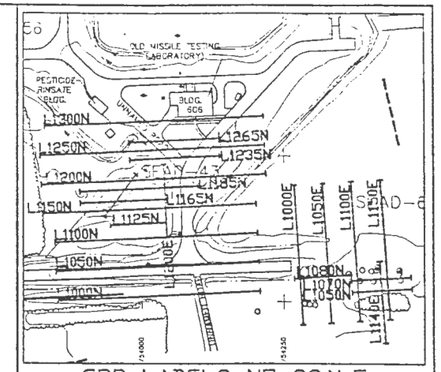
E 753750

E 754000

E 754250

760

N



GPR LABELS-NO SCALE

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- L1000E — GPR TRANSECT
- P2 — SEISMIC PROFILE
- L1200E — EM TRANSECT

SEAD 43: BLDG.606 OLD MISSLE PROPELLANT TEST LABORATORY

SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA

SEAD 69: DISPOSAL AREA

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

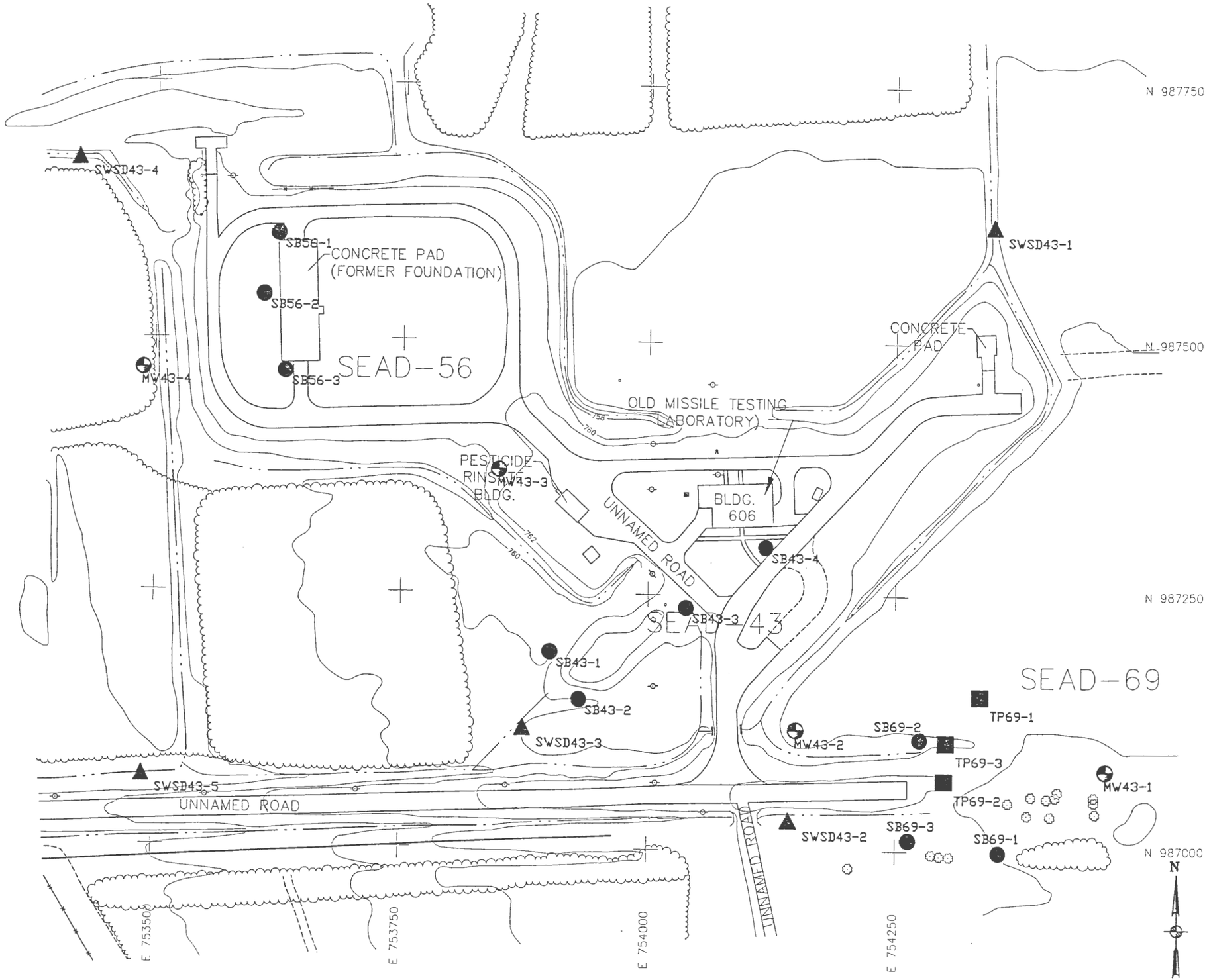
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	D-G. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.7-1
SEAD-43,56 AND 69
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	1/08/94	A

ACADVSEN 4LSWMU\ACADFIG\SD4356GS.DWG



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

SEAD 43: BLDG.606 OLD MISSLE PROPELLANT TEST LABORATORY
SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA
SEAD 69: DISPOSAL AREA

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA army DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg No. 720518-01002

FIGURE 2.7-2
SEAD-43,56 AND 69
LOCATION OF SAMPLING POINTS

SCALE 1" = 100' | DATE 4/14/95 | REV A

ACAD\SEN ...\SWMU\ACADFIG\SD43565P.DWG

TABLE 2.7-1

SEAD-43,56,69 SOIL BORING SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB43-1	SB43-1-00	0-2"
	SB43-1-03	4-5'
	SB43-1-08	14-16'
SB43-2	SB43-2-00	0-2"
	SB43-2-03	4-6'
	SB43-2-06	10-12'
SB43-3	SB43-3-00	0-2"
	SB43-3-02	2-4'
	SB43-3-03	4-5.5'
SB43-4	SB43-4.01	12-18"
	SB43-4.02	2-4'
	SB43-4.07	12-14'
SB56-1	SB56-1-00	0-2"
	SB56-1-03	4-6'
	SB56-1-07	12-13'
SB56-2	SB56-2-00	0-2"
	SB56-2-03	4-6'
	SB56-2-05	8-10'
SB56-3	SB56-3-00	0-2"
	SB56-3-04	6-8'
	SB56-3-08	14-16'
SB69-1	SB69-1-00	0-2"
	SB69-1-05	8-10'
	SB69-1-06	10-12'
SB69-2	SB69-2-01	0-2"
	SB69-2-04	6-8'
	SB69-2-07	12-14'
SB69-3	SB69-3.01	0-2"
	SB69-3.04	6-8'
	SB69-3.06	10-12'

Notes:

1) The sample number contains the sample location with a soil boring (SB) identifier.
2) All SEAD-43,56,69 soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, explosives, nitrates and herbicides. All SEAD-43 soil samples were also analyzed for TPH.

Three (3) test pits were excavated at SEAD-69 over distinct geophysical anomalies and over areas with debris on the ground surface. The test pit locations are shown in Figure 2.7-2. The purpose of the test pits, specific to SEAD-69, was to visually identify the contents of the disposal area for Building 606, and therefore, no samples were taken.

Groundwater

Four (4) groundwater monitoring wells were installed at SEAD-43, 56, and 69, inclusively, as shown in Figure 2.7-2. One monitoring well (MW43-1) was installed upgradient of SEAD-43, 56, and 69 to obtain background water quality data, while the remaining three monitoring wells were installed downgradient of the individual SEADs (SEAD-43, 56, and 69) to determine if hazardous constituents have migrated from the respective areas and to further determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-43, 56 and 69 was to the southwest. The geophysical survey showed the direction to be more to the west-southwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation. Specifically, the upgradient monitoring well was placed on the eastern boundary of SEAD-43, 56, and 69 and the three downgradient monitoring wells were placed in a linear fashion along the southwestern side of each potentially contaminated area of SEAD-43, 56, and 69.

One (1) 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 in Section 2.7.3.

Sediment/Surface Water

A total of five (5) surface water and sediment samples were collected from SEAD-43, 56 and 69. The sampling locations are shown in Figure 2.7-2. The five (5) samples were collected along the various drainage swales running amongst SEAD-43, 56 and 69. Of these samples, one was collected from the drainage swale located upgradient of the site, two were taken downgradient of SEADs 43 and 56 following both possible drainage directions (northwest and southwest). The final sample was collected downgradient of the suspected disposal area for Building 606 (SEAD-69). All surface water and sediment samples were analyzed for the parameters listed in Section 2.7.3.

2.7.3 Analytical Program

A total of thirty (30) soil samples, three (3) groundwater samples, and five (5) surface water and sediment samples were collected from SEAD-43, 56, and 69 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, explosives by Method 8330, herbicides by Method 8150, and nitrates by Method 353.2.

2.8 SEAD 44A-QA TEST LABORATORY

The quality assurance test lab (SEAD-44A) was used for the testing of various pyrotechnics, firing devices, and specifically, CS grenades. The detonation of land mines occurred in aboveground bermed areas. Any potential for contamination, given the varying topography and historical site activities, could result from rainfall run-off over these berms as well as direct contact to nearby surface water and soils. Therefore, the contaminant transport media for the chemicals of concern at SEAD-44A included soil, surface water, and groundwater. The groundwater classification in the area is GA, meaning that it is protected for a source drinking water. However, no drinking water wells are known to exist at or near the area influenced by SEAD-44A.

2.8.1 Chemicals of Interest

Chemicals of interest include VOCs, SVOs, explosives, nitrates, and heavy metals.

2.8.2 Media Investigated

Soils

A total of nine (9) berm excavations were performed at three berms; three (3) samples were taken from each berm. The sampling locations are shown in Figure 2.8-1. The soil samples were collected with the use of a backhoe from a mid-depth locality within each of the three berms investigated.

Two (2) surface soil samples were collected at various points around each of the three berms from a depth of 0-2". All surface soil samples were submitted for the chemical analysis identified in Section 2.8.3 (Table 2.8-1).

SS44A-6
SS44A-5
760
752
BE44A-7
BE44A-8
BE44A-9
MW44A-1
SWSD44A-4
BE44A-4
BE44A-5
BE44A-6
N 985500
SS44A-4
SS44A-3
MW44A-2
BE44A-1
BE44A-3
BE44A-2
SS44A-1
SS44A-2
MW44A-3
N 985250
SWSD44A-3
SWSD44A-2
SWSD44A-1
748
E 752250
E 752500
E 752750
E 753000
E 753250
E 753500

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
OVERHEAD UTILITY POLE · MAILBOX/RR SIGNAL

- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT
- BERM EXCAVATION

N

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 2.8-1
SEAD-44A QUALITY ASSURANCE TEST LABORATORY
LOCATION OF SAMPLING POINTS

SCALE 1" = 100'
DATE 4/13//95
REV A

ACAD\SEN\ 1LSWMU\ACADFIG\SD44ASP.DWG

TABLE 2.8-1

SEAD-44A SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

SURFACE SOILS

SAMPLE NUMBER	SAMPLE DEPTH
SS44A-1	0-2"
SS44A-2	0-2"
SS44A-3	0-2"
SS44A-4	0-2"
SS44A-5	0-2"
SS44A-6	0-2"

TEST PITS

SAMPLE NUMBER	SAMPLE DEPTH
TP44A-1	3'
TP44A-2	3'
TP44A-3	3'
TP44A-4	3'
TP44A-5	3'
TP44A-6	3'
TP44A-7	3'
TP44A-8	7'
TP44A-9	3'

Notes:

1) The sample number contains the sample location with a surface soil (SS), or test pit (TP) identifier.
2) All SEAD-44A soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, cyanide, explosives, and nitrates.

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-44A as shown in Figure 2.8.1. One monitoring well (MW44A-1) was installed upgradient of the AOC to obtain background water quality data, while the remaining two monitoring wells were installed downgradient of specific berms to determine if hazardous constituents have migrated from a specific berm and to determine the direction of groundwater flow. The presumed direction of groundwater flow was to the southwest.

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.

Surface Water and Sediment

A total of four (4) surface water and sediment samples were collected from SEAD-44A. The sampling locations are shown on Figure 2.8-1. The primary area sampled was a drainage ditch which drains east to west along the southern boundary of SEAD-44B. This drainage ditch is south of the bermed areas and is in line with the direction of groundwater flow. Three surface water and sediment samples were collected along this drainage ditch. The final sample was taken from a small ditch containing some pooled water on the north side of the dirt access road to SEAD-44A. All surface water and sediment samples were analyzed for the parameters listed in Section 2.8.3.

2.8.3 Analytical Program

A total of fifteen (15) soil samples, three (3) groundwater samples, and four (4) surface water and sediment samples were collected from SEAD-44A for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOs, pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, explosives by Method 8330, and nitrates by Method 353.2.

2.9 SEAD-44B - QA TEST LABORATORY

The Quality Assurance Testing Lab (SEAD-44B), like SEAD-44A, was used to test pyrotechnics, CS grenades, and other fire devices. Additionally, the QA laboratory at this

locale tested timed fuzes but it has not been determined if the fuzes were actually detonated at the site. In consideration of the various factors affecting the contamination potential at SEAD-44B, such as topography and historical site activities, the transport media investigated were surface water, soil, and groundwater. The groundwater classification in the area is GA, meaning that it is protected for a source of drinking water. However, no drinking water wells are known to exist at or near the area influenced by SEAD-44B.

2.9.1 Chemicals of Interest

The chemicals of interest include VOCs, SVOs, Pesticides/PCBs, heavy metals, and asbestos.

2.9.2 Media Investigated

Geophysics

Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of SEAD-44B. The seismic refraction transect locations are shown in Figure 2.9-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-44B.

Soils

Three (3) surface soil samples were collected from a depth of 0-2". One sample was collected to the west (downgradient) of the concrete pad and flag pole. A second sample was collected in the southwestern portion of SEAD-44B, immediately downgradient of several small piles observed on the ground surface. The last sample was collected to the west (downgradient) of the dilapidated metal shed. All surface soil samples were submitted for the chemical analyses identified in Section 2.9.3 (Table 2.9-1).

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-44B as shown in Figure 2.9.2. One monitoring well (MW44B-1) was installed upgradient of SEAD-44B, east of Brady Road, to obtain background water quality data. The two remaining monitoring wells were installed downgradient of the concrete slab and the dilapidated metal shed along the western boundary of SEAD-44B to determine if hazardous constituents have migrated from SEAD-44B and to determine the direction of groundwater flow. The presumed direction of groundwater, based upon the seismic refraction survey, was to the southwest.

P3

P2
DILAPIDATED
METAL SHED

FLAG
POLE

P1

CONCRETE
FOUNDATION

BRADY ROAD

P4

740

742

738

N 988250

N 988000

N 987750

N 987500

E 751000

E 751250

E 751500

E 751750

E 752000

N

ACAD\SEA MLSWMUVACADFIG\SD44BGS.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

P2 ---------- SEISMIC PROFILE

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	D+G No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.9-1
SEAD-44B QUALITY ASSURANCE TEST LABORATORY
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV.
1" = 100'	4/14/95	A

LEGEND

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

LEGEND

- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

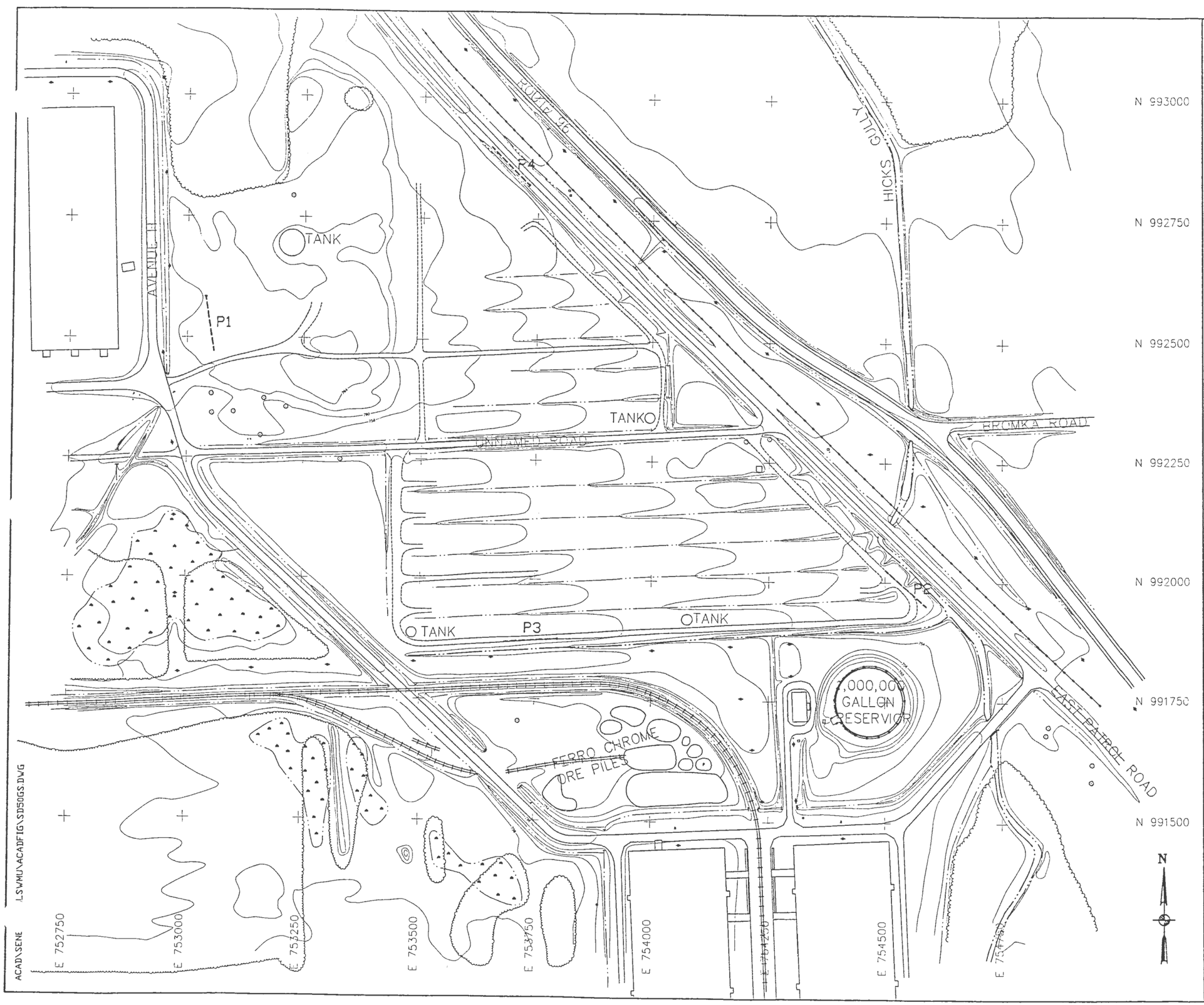
DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.9-2

SEAD-44B QUALITY ASSURANCE TEST LABORATORY
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	4/14/95	A

ACAD\SENF 1LSWMU\ACADFIG\SD44BSP.DWG



ACAD\SENE LSWMU\ACADFIG\SD50GS.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

P2 ---------- SEISMIC PROFILE

100 0 100 200
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

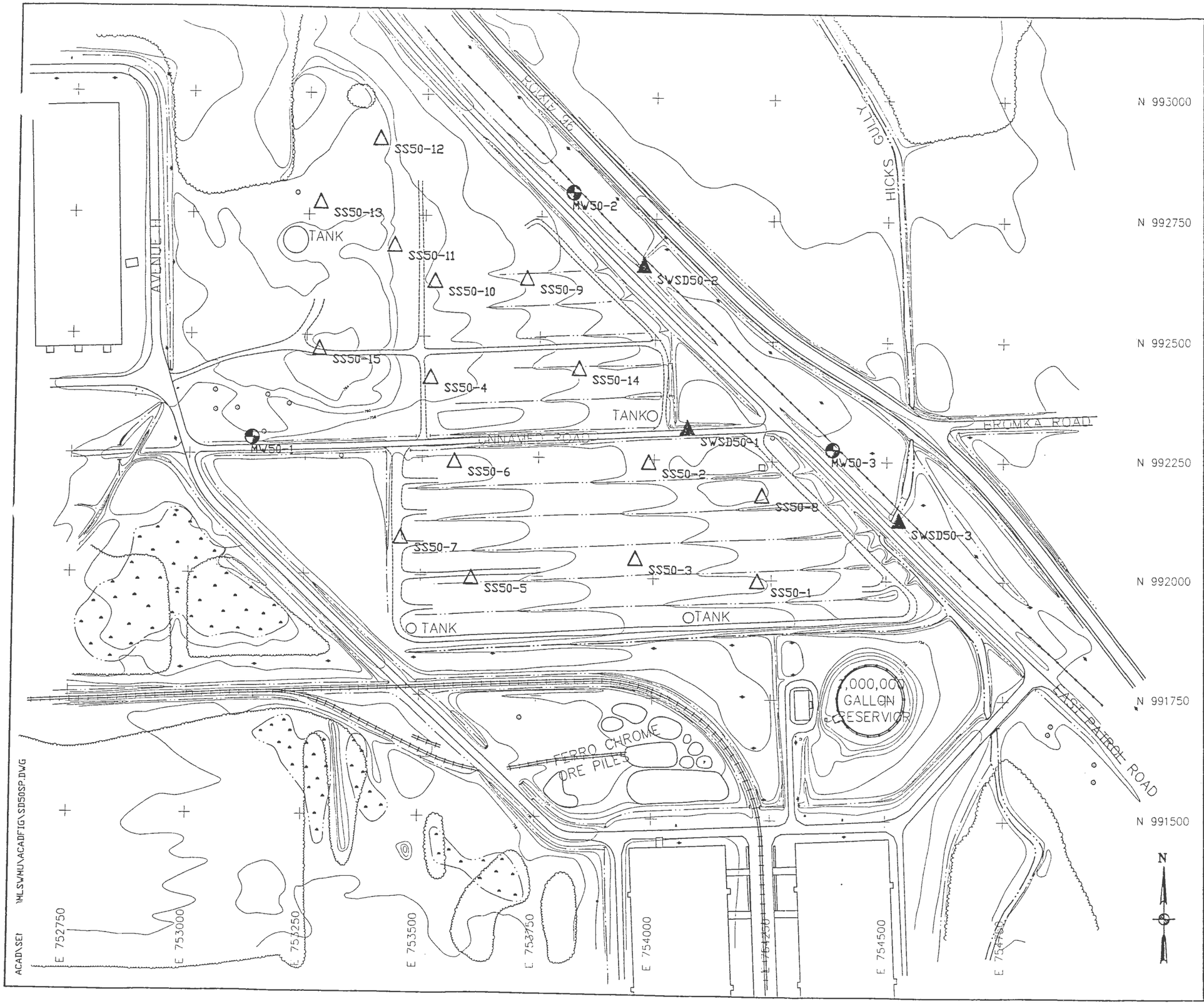
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.10-1
SEAD-50 TANK FARM AREA
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 200'	4/14/95	A



ACAD\SEI \MLSWMU\ACADFIG\SD50SP.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

100 0 100 200
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.10-2
SEAD-50 TANK FARM AREA
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 200'	4/14/95	A

TABLE 2.10-1

SEAD-50 SURFACE SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

SAMPLE NUMBER	SAMPLE DEPTH
SS50-1	0-12"
SS50-2	0-2"
SS50-3	0-12"
SS50-4	0-12"
SS50-5	0-2"
SS50-6	0-2"
SS50-7	0-12"
SS50-8	0-12"
SS50-9	0-2"
SS50-10	0-12"
SS50-11	0-2"
SS50-12	0-12"
SS50-13	0-2"
SS50-14	0-12"
SS50-15	0-2"

Notes:

1) The sample number contains the sample location with a surface soil (SS) identifier.
2) All SEAD-50 soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, and cyanide.
   Asbestos was analyzed by polarized light microscopy.

Road. The sampling locations are shown on Figure 2.10-2. All surface water and sediment samples were analyzed for the parameters listed in Section 2.10.3.

2.10.3 Analytical Program

A total of fifteen (15) surface soil samples, three (3) groundwater samples, and three (3) surface water and sediment samples were collected from SEAD-50 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW. In addition, all of the surface soil samples were analyzed for asbestos.

2.11 SEAD-58 - DEBRIS AREA NEAR BOOSTER STATION 2131

SEAD-58 is a debris area about 200 feet northeast of booster station 2131. Physical inspections have revealed areas with surface debris comprised of broken glass bottles, 55 gallon drums, and smaller rusted drums of varying size. A drainage swale, flowing from east to west, separates the area of stressed vegetation from the area with the surface debris. In consideration of the various factors affecting the contamination potential at SEAD-58, such as the physical state of the dumped debris and historical site activities, the transport media investigated were surface water, soil, and groundwater. The groundwater classification in the area is GA, meaning that it is protected for a source of drinking water. However, no drinking water wells are known to exist at or near the area influenced by SEAD-58.

2.11.1 Chemicals of Interest

Chemicals of interest include VOCs, SVOs, Pesticides/PCBs, and heavy metals.

2.11.2 Media Investigated

Geophysics

Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of SEAD-58. The seismic refraction transect locations are shown in Figure 2.11-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed

E 739500

E 739250

E 739000

E 738750

N 1000500

N 1000250

N 1000000

N 999750

L1240N

L1200N

L1100N

L1000N

L900N

L800N

L700N

618

619

616

612

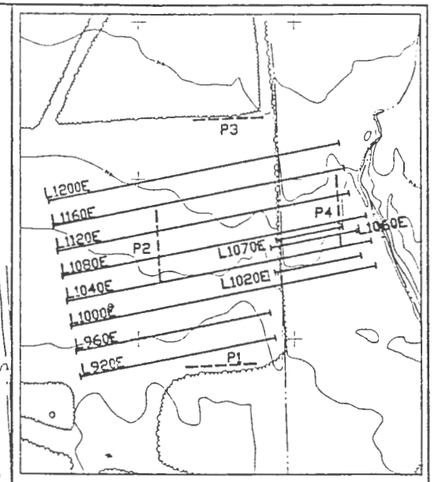
614

610

KENDAIA CREEK

BOOSTER STATION 2131

WEST PATROL ROAD



GPR AND SEISMIC LABELS
NO SCALE

LEGEND

L1000E — GPR TRANSECT

P2 - - - - - SEISMIC PROFILE

L1200E +++++++++++ EM TRANSECT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.11-1
SEAD-58 DEBRIS AREA NEAR BOOSTER STA. 2131
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV.
1" = 100'	4/14/95	A

L:\SWMU\ACADFIG\SD58gs.DWG

ACAD\SENE

upgradient and two monitoring wells were installed downgradient of SEAD-58. EM-31 and GPR surveys were also performed to delineate any vertical extent to the surface features observed at SEAD-58. A grid of electromagnetic data was laid out and surveyed across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals. GPR data were acquired along profiles spaced every 40 feet. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The locations of the EM-31 and GPR profiles are shown in Figure 2.11-1.

Soils

Three (3) soil borings were performed in the area of stressed vegetation at SEAD-58. The soil boring locations are shown in Figure 2.11-2. A total of nine (9) soil samples from the three soil borings were submitted for the chemical analyses identified in Section 2.11.3 (Table 2.11-1).

Six (6) test pits were excavated at SEAD-58. All six test pits were centered over distinct geophysical anomalies detected during the EM-31 and GPR surveys. The test pit locations are shown in Figure 2.11-2. One soil sample was collected from each test pit and submitted for the chemical analysis identified in Section 2.11.3 (Table 2.11-1).

Three (3) surface soil samples were collected from a depth of 0-2" in the area of stressed vegetation. These samples provided a more accurate determination of surficial contaminant locations, if any, present within the stressed area. All surface soil samples were analyzed for the parameters listed in Section 2.11.3 (Table 2.11-1).

Groundwater

Four (4) groundwater monitoring wells were installed at SEAD-58 as shown in Figure 2.11-2. One monitoring well (MW58-1) was installed upgradient of SEAD-58 to obtain background water quality data, while the remaining three monitoring wells were installed adjacent to and downgradient from SEAD-58 to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-58 was to the southwest. The geophysical survey showed the direction to be more to the northwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of SEAD-58 and the other three monitoring

E 739500

E 739250

E 739000

E 738750

N 1000500

N 1000250

N 1000000

N 999750

618

616

614

612

610

SWSD58-1

SWSD58-4

SWSD58-2

SWSD58-5

SWSD58-6

SWSD58-3

MW58-1

MW58-2

MW58-3

MW58-4

TP58-1

TP58-2

TP58-3

TP58-4

TP58-5

TP58-6

SS58-1

SS58-2

SS58-3

SB58-1

SB58-2

SB58-3

BOOSTER STATION 2131

WEST PATROL ROAD

KENDAIA CREEK

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 2.11-2

SEAD-58 DEBRIS AREA NEAR BOOSTER STA. 2131
LOCATION OF SAMPLING POINTS

SCALE 1" = 100' | DATE 4/14/95 | Rev. A

ACAD\SEN\4\SWMUACADFIG\SD58SP.DWG

TABLE 2.11-1

SEAD-58 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORINGS

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB58-1	SB58-1-00	0-2"
	SB58-1-02	2-4'
	SB58-1-03	4-5'
SB58-2	SB58-2-00	0-2"
	SB58-2-02	2-4'
	SB58-2-04	4-6'
SB58-3	SB58-3-00	0-2"
	SB58-3-01	0.2-1.5'
	SB58-3-02	1.5-3'

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP58-1	TP58-1-1	2.5'
TP58-2	TP58-2-1	5'
TP58-3	TP58-3-1	2'
TP58-4	TP58-4	3'
TP58-5	TP58-5-1	5'
TP58-6	TP58-6-1	2'

SURFACE SOILS

SAMPLE NUMBER	SAMPLE DEPTH
SS58-1	0-2"
SS58-2	0-2"
SS58-3	0-2"

Notes:

1) The sample number contains the sample location with a soil boring (SB), test pit (TP), or surface soil (SS) identifier
2) All SEAD-58 soil samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, and cyanide.

wells were placed along the western and northern boundaries of SEAD-58, immediately downgradient of the stressed vegetation area and the area of surface debris.

One (1) 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 (1) groundwater sample was collected from each well and tested for the parameters listed in Section 2.11.3.

Surface Water and Sediment

Six (6) surface water and sediment samples were collected at SEAD-58. The sampling locations are shown in Figure 2.11-2. Three surface water and sediment samples were collected from the drainage swale located within SEAD-58. Two surface water and sediment samples were collected from an unnamed creek, flowing east to west, along the southern boundary of SEAD-58. One surface water and sediment was collected from Kendaia Creek at a location immediately downstream of where the unnamed creek feeds into Kendaia Creek. This sampling procedure was aimed at targeting the specific area where surficial contamination, if any, had taken place. All surface water and sediment samples were analyzed for the parameters listed in Section 2.11.3.

2.11.3 Analytical Program

A total of eighteen (18) soil samples, four (4) groundwater samples, and six (6) surface water and sediment samples were collected from SEAD-58 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW.

2.12 SEAD-59 - FILL AREA WEST OF BUILDING 135

SEAD-59 represents a fill area west of Building 135 and northeast of Building 311. Activities in the area have consisted of the disposal of construction debris and oily sludges. Physical inspections have revealed one large waste pile approximately ten feet in height. In consideration of the various factors influencing the contamination potential at SEAD-59, such as the physical state of the site and historical site activities, the transport media investigated were soil and groundwater. The groundwater classification in the area is GA, meaning that it is protected for a source of drinking water. However, no drinking water wells are known to exist at or near the area influenced by SEAD-59.

2.12.1 Chemicals of Interest

The Chemicals of Interest include VOCs, SVOs, Pesticides/PCBs, heavy metals, and petroleum hydrocarbons.

2.12.2 Media Investigated

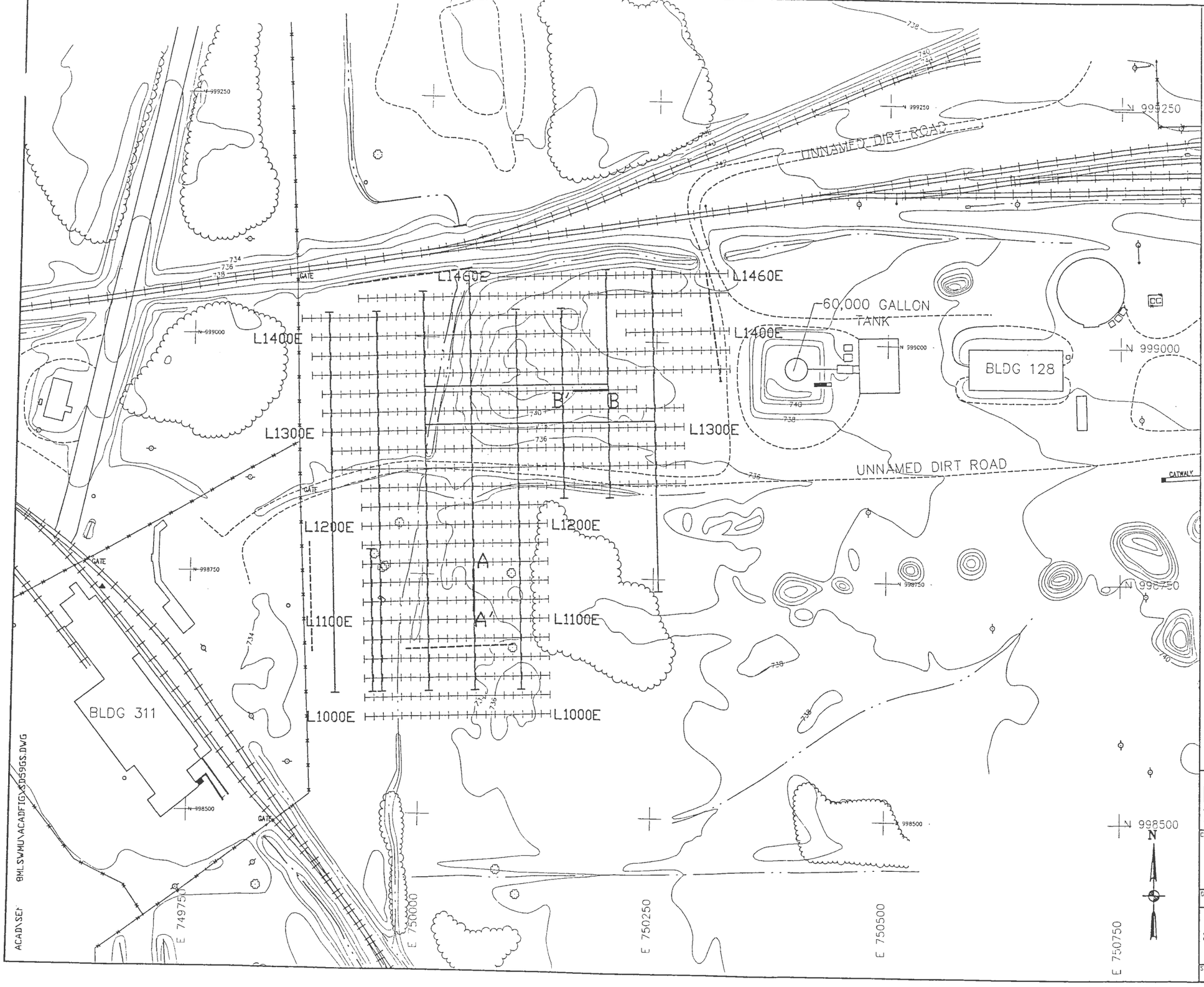
Geophysics

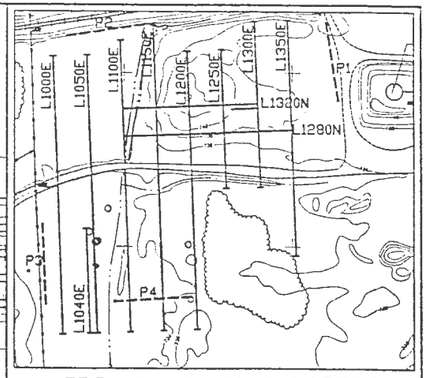
Four (4) 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of the AOC. The seismic refraction transect locations are shown in Figure 2.12-1. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-59. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was laid out and surveyed across SEAD-59. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were acquired along profile lines spaced at 50-foot intervals. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The locations of the EM-31 and GPR profiles are shown in Figure 2.12-1.

Soils

Five (5) soil borings were performed at SEAD-59. The soil boring locations are shown in Figure 2.12-2. The five soil borings were situated throughout the landfill area to determine the thickness of the fill and to provide subsurface samples for chemical analysis. A total of three samples from each soil boring were submitted for the chemical analyses identified in Section 2.12.3 (Table 2.12-1).

Five (5) test pit excavations were performed at SEAD-59. The test pit locations are shown in Figure 2.12-2. The test pits were located in zones of disturbed soil as determined by the GPR survey, areas of large EM-31 anomalies and areas with visible surface debris. One soil sample was collected from each of the five test pits and submitted for the chemical analyses identified in Section 2.12.3 (Table 2.12-1).





GPR AND SEISMIC LABELS
NO SCALE

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- L1000E — GPR TRANSECT
- P2 — SEISMIC PROFILE
- L1200E — EM TRANSECT
- A′ A — GPR PROFILE SHOWN IN SECTION 3 OF THIS REPORT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

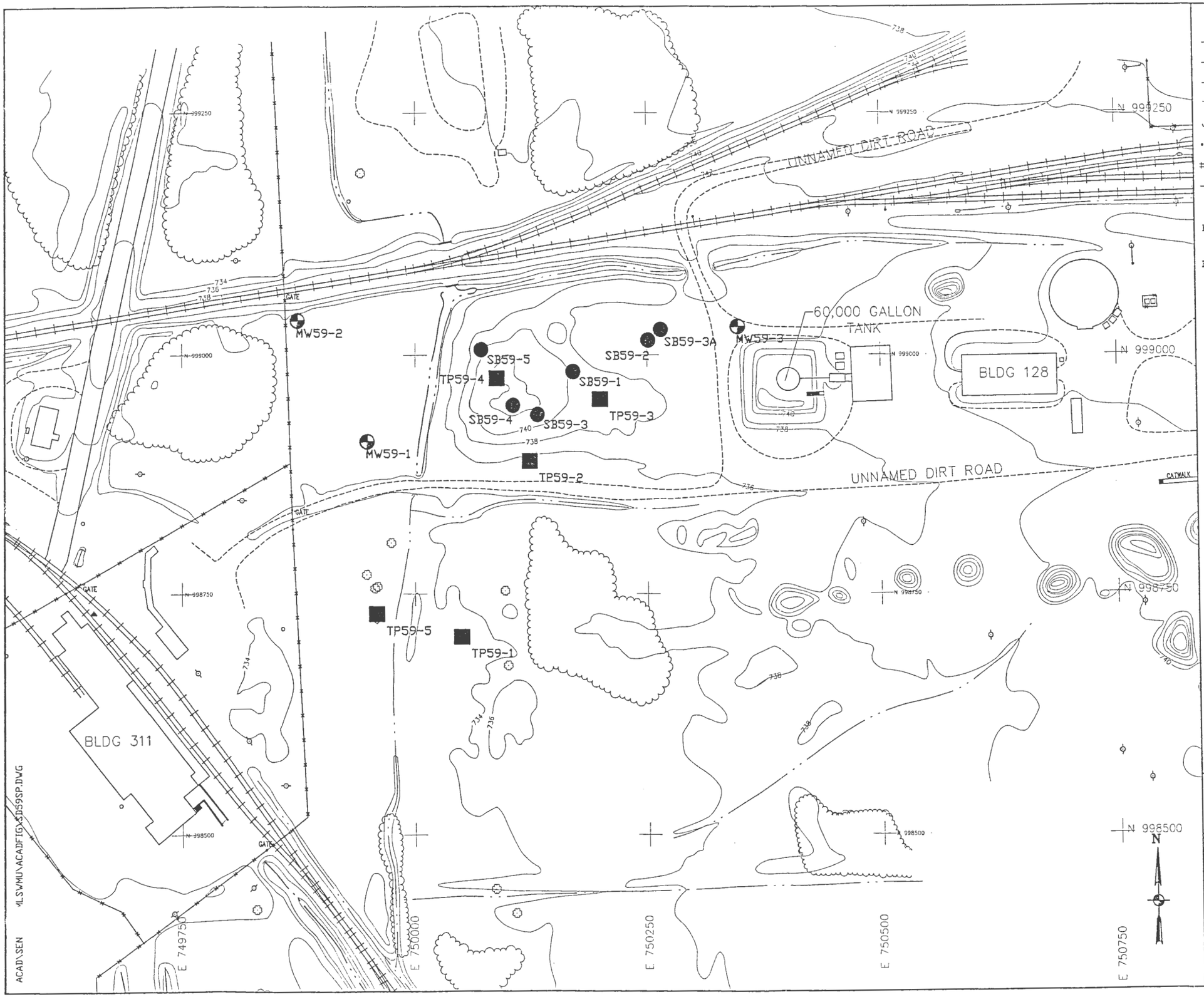
DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.12-1

SEAD-59 FILL AREA WEST OF BLDG. 135
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	4/14/95	A

ACAD\SEI 8ML\SWMU\ACADFIG\720596S.DWG



LEGEND

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

LEGEND

- MONITORING WELL
- SURVEY MONUMENT
- SOIL BORING
- SURFACE SOIL SAMPLE
- SEDIMENT SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.12-2

SEAD-59 FILL AREA WEST OF BLDG. 135
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	4/14/95	A

ACAD\SEN *LSWMU\ACADFIG\SD59SP.DWG

TABLE 2.12-1

SEAD-59 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
8 MODERATELY LOW PRIORITY AOCs

BORINGS

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB59-1	SB59-1.01	0-2"
	SB59-1.04	6-8'
	SB59-1.06	10-12'
SB59-2	SB59-2-00	0-2"
	SB59-2-02	2-4'
	SB59-2-04	6-7'
SB59-3	SB59-3-00	0-2"
	SB59-3-02	2-4'
	SB59-3-04	6-8'
SB59-4	SB59-4-00	0-2"
	SB59-4-05	8-10'
	SB59-4-10	10-20'
SB59-5	SB59-5-00	0-2"
	SB59-5-03	4-6'
	SB59-5-06	10-12'

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP59-1	TP59-1	2'
TP59-2	TP59-2	7'
TP59-3	TP59-3	3'
TP59-3X	TP59-3X	1.5'
TP59-4	TP59-4	2'
TP59-5	TP59-5	2.5'

Notes:

1) The sample number contains the sample location with a soil boring (SB), or test pit (TP) identifier.
2) All SEAD-59 soil samples, except TP59-3X, were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, cyanide, and TPH. TP59-3X was analyzed for volatile organics only.

Groundwater

Three (3) groundwater monitoring wells were installed at SEAD-59 as shown in Figure 2.12-2. One monitoring well (MW59-3) was installed upgradient of SEAD-59 to obtain background water quality data, while the remaining two monitoring wells were installed adjacent to and downgradient of SEAD-59 to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-59 was to the west. The geophysical survey showed the direction to be more to the northwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation and the EM-31 survey results. Specifically, the upgradient monitoring well was placed near the center of the eastern boundary of SEAD-59 and the two remaining monitoring wells were placed adjacent to, and downgradient from, the zones of pronounced EM-31 anomalies.

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 2.12.3.

2.12.3 Analytical Program

A total of twenty (20) soil samples and three (3) groundwater samples were collected from SEAD-59 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW. In addition, all samples were analyzed for Total Petroleum Hydrocarbons (TPH) by Method 418.1.

3.0 GEOLOGICAL, GEOPHYSICAL, AND HYDROLOGICAL SETTING

3.1 SEAD-5: SEWAGE SLUDGE WASTE PILE

3.1.1 Site Geology

Fill material, till, weathered dark gray shale, and competent shale were the four major geologic units encountered at the three overburden borings drilled at SEAD-5. In two of the borings, MW5-1 and MW5-2, a topsoil horizon was present within 1 foot of the ground surface. The third boring, MW5-3, was drilled on an asphalt surface, and no topsoil was encountered. The depths of the borings at SEAD-5 were up to 11.9 feet below grade.

The till was light brown silt with minor components of very fine sand, clay, and gray-black shale fragments up to 2 inches in length. The thickness of the till ranged from 2.3 to 9.4 feet. At each of the three borings there was evidence of disturbed soil within 2.4 feet of the surface. Brick and concrete fragments were found at MW5-1 between 0.4 and 1.0 feet below the surface, a yellow sand made up the horizon between 1.0 and 1.4 feet below the surface in MW5-2, and wood and possible fly ash material was found between 2.0 and 2.4 feet below the surface in MW5-3.

The till directly overlaid competent shale in the borings at MW5-1 and MW5-3. Competent shale was not observed at these borings, instead the till/shale contact was inferred from the point of auger refusal in MW5-3 and the point of spoon refusal in MW5-1. The weathered shale that forms the transition between till and competent shale was encountered at boring MW5-2. Competent shale was not observed at MW5-2, but was inferred by auger refusal.

Competent shale was encountered at depths of 10.4 and 8.8 feet below grade at MW5-1 and MW5-3, respectively. In MW5-2, the bottom of the overburden was 6.3 feet below grade and the base of the weathered shale was 10.0 feet below grade.

3.1.2 Geophysics

3.1.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD-5 are shown in Table 3.1-1. The seismic refraction profiles detected 6.8 to 9.3 feet of unconsolidated overburden (1,050

to 1,780 ft./sec.) overlying bedrock (12,600 to 14,900 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

The overburden velocities of profiles P1 and P2 were slightly elevated (1,590 ft/sec. and 1780 ft./sec.,respectively) in comparison to the overburden velocities normally measured at SEDA (in the range of 1000 ft./sec. to 1400 ft./sec.). These two seismic transects were located in areas of high traffic. The compaction of the soils in these areas should be considered as the probable cause of the elevated overburden velocities observed at SEAD 5. The locations of these seismic profiles are shown in Figure 2.3-1.

The elevations of the bedrock surface, as determined by the seismic survey, indicated that the bedrock sloped to the west-northwest, generally following the surface topography. Groundwater flow was also expected to be directed to the west-northwest, following the slope of the bedrock.

3.1.3 Site Hydrology and Hydrogeology

Surface water flow from SEAD-5 is primarily to the west. Precipitation drains off of the sludge piles in all directions. A drainage ditch and the slope of topography drain most of this runoff to the west. The drainage ditch runs along the east-west dirt road that borders SEAD-5 to the north. Flow in this ditch is to the west and traverses SEAD-59. Local topography slopes gently to the west, but SEAD-5 overall is a poorly drained area and during heavy precipitation, shallow pools of standing water develop. Runoff that is not channelled to the west drains into the grassy field to the south of SEAD-5. There are no sustained surface water bodies at SEAD-5.

The groundwater flow direction in the overburden aquifer at SEAD-5 was determined to be toward the southwest based on ground water elevations measured in the three monitoring wells at SEAD-5 and the three monitoring wells at SEAD-59 on July 6, 1994 (Table 3.1-2 and Figure 3.1-1). The distribution of ground water in the overburden aquifer was characterized by wet to saturated soil within the till and saturated weathered shale. Recharge to the monitoring wells during sampling was fair to good.

TABLE 3.1-1
SEAD-5
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	2.5	98.4	7.2	91.2
	57.5	99.4	7.5	91.9
	112.5	100.0	7.3	92.7
P2	2.5	101.5	9.1	92.4
	57.5	101.2	8.6	92.6
	112.5	101.1	7.5	93.6
P3	2.5	101.1	9.3	91.8
	57.5	101.0	6.8	94.2
	112.5	100.9	6.9	94.0
P4	2.5	98.8	8.0	90.8
	57.5	98.8	7.4	91.1
	112.5	97.8	6.7	91.1

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

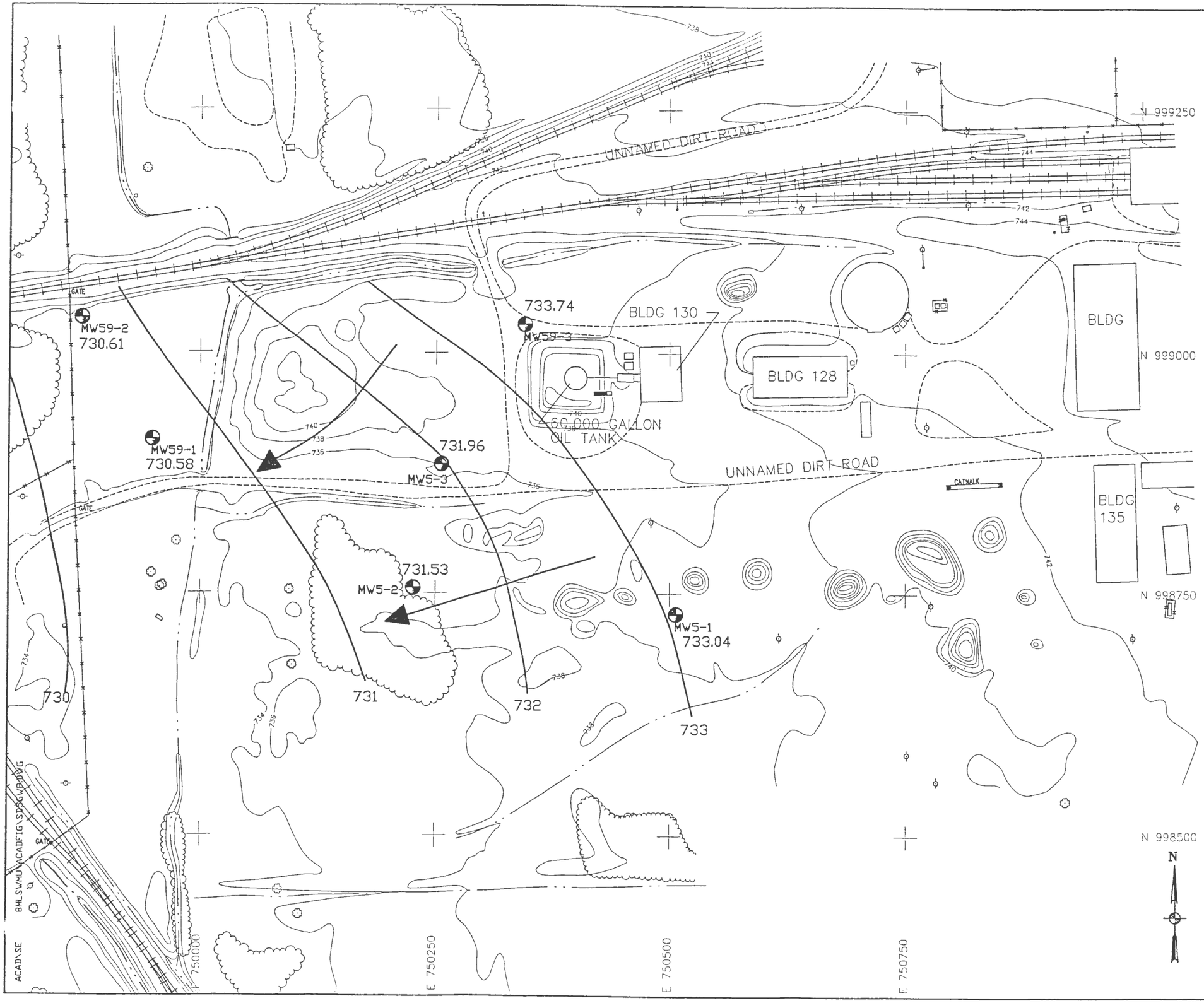
[2]All elevations are relative to an arbitrary datum established at geophone #1 of the SEAD-5 seismic profile P1.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

TABLE 3.1-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-5

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW5-1	739.76	3/18/94	3.36	736.40	7/11/94	7.22	732.54	7/6/94 7/26/94	6.72 6.94	733.04 732.02
MW5-2	737.18	3/8/94	2.71	734.47	3/30/94	1.84	735.34	7/6/94 7/26/94	5.65 6.58	731.53 730.60
MW5-3	730.82	3/19/94	3.33	727.49	7/11/94	5.42	725.40	7/6/94 7/26/94	4.86 5.60	731.93 731.92



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

MW5-1
733.04 — MONITORING WELL WITH WATER TABLE ELEVATION

744 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.1-1

SEAD-5 SEWAGE SLUDGE WASTE PILES
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 100'	4/12/95	A

ACAD\SE BHLSWMU\ACADFIG\SDSGWP.DWG

3.2 SEAD-9: OLD SCRAP WOOD SITE

3.2.1 Site Geology

Fill material, till, weathered dark gray shale and competent gray-black shale were the four major geologic units encountered at the six overburden borings drilled at SEAD-9. In most of the borings, a thin topsoil horizon was present within 1.3 feet of the ground surface. The depths of the borings at SEAD-9 were up to 15.0 feet below grade.

In the three soil borings SB9-1, SB9-2, and SB9-3, which were drilled in the center of SEAD-9, fill was encountered overlying either the till or the weathered shale. At SB9-1 and SB9-3, the fill overlaid till and was lithologically similar to the till in that it was characterized by dark brown silt with minor components of sand and shale fragments, but was identified as fill by the presence of gravel, asphalt, cement and brick fragments, and the level of oxidation of the silt. At SB9-2, the fill exhibited the lithological characteristics of the fill at the other two borings, but instead of overlying the till it extended down to the weathered shale.

The till was light to dark brown silt with minor components of sand, clay, and gray-black shale fragments. At MW9-1, the fine to coarse shale fragments were observed at the bottom of the till layer. The weathered shale that forms the transition between the till and the shale bedrock was encountered at four of the six soil boring locations. At MW9-2, SB9-1, and SB9-2, the till/weathered shale contact was distinct with no shale fragments in the basal portion of the till. At the MW9-3 and SB9-3 soil boring locations, no weathered shale was observed and the till directly overlaid competent bedrock. The depths to the bottom of the overburden and the thicknesses of the weathered shale unit are given below.

Competent shale was observed at some of the borings, but at most of the borings, competent shale was inferred from the point of auger refusal. Each boring was drilled to auger refusal. The depth to bedrock at each of the borings is listed below.

Boring Location	Depth to Bottom of Fill (feet)	Depth to Bottom of Overburden (feet)	Thickness of Weathered Shale (feet)	Depth to Bedrock (feet)
MW9-1	NA	4.3	0.9	5.2
MW9-2	NA	2.4	1.4	4.0
MW9-3	NA	10.0	0	10.0
SB9-1	5.6	8.9	1.1	10.0
SB9-2	8.8	8.8	6.2	15.0
SB9-3	6.7	10.8	0	10.8

NA = Not Applicable

3.2.2 Geophysics

3.2.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 9 are shown in Table 3.2-1. The seismic refraction profiles detected 3.4 to 9.4 feet of unconsolidated overburden (1,000 to 3,660 ft./sec.) overlying bedrock (10,500 to 11,200 ft./sec.). In particular, the unconsolidated material included loose, unsaturated overburden (1,000 to 1,180 ft./sec.) and, beneath profile P2, a layer of compact unsaturated overburden (3,660 ft./sec.) at a depth of 2 to 2.6 feet. Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (< 2 feet) overlying the bedrock surface would be undetectable.

A review of the bedrock surface elevations, presented in Table 3.2-1, indicated that the bedrock surface sloped to the west, following the slope of the surface topography. Groundwater flow was also expected to be directed to the west, following the slope of the bedrock surface.

TABLE 3.2-1
SEAD-9
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	2.5	81.7	4.3	77.4
	57.5	81.4	4.0	77.4
	112.5	80.9	4.8	76.1
P2	2.5	90.5	9.4	81.1
	112.5	92.4	8.9	83.5
P3	2.5	100.4	5.3	95.1
	57.5	99.9	4.9	95.0
	112.5	99.3	3.5	95.8
P4	2.5	89.9	6.1	83.8
	57.5	90.1	4.2	85.9
	112.5	90.9	3.4	87.5

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #1 of SEAD-9 seismic profile P3.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

3.2.2.2 EM-31 Survey

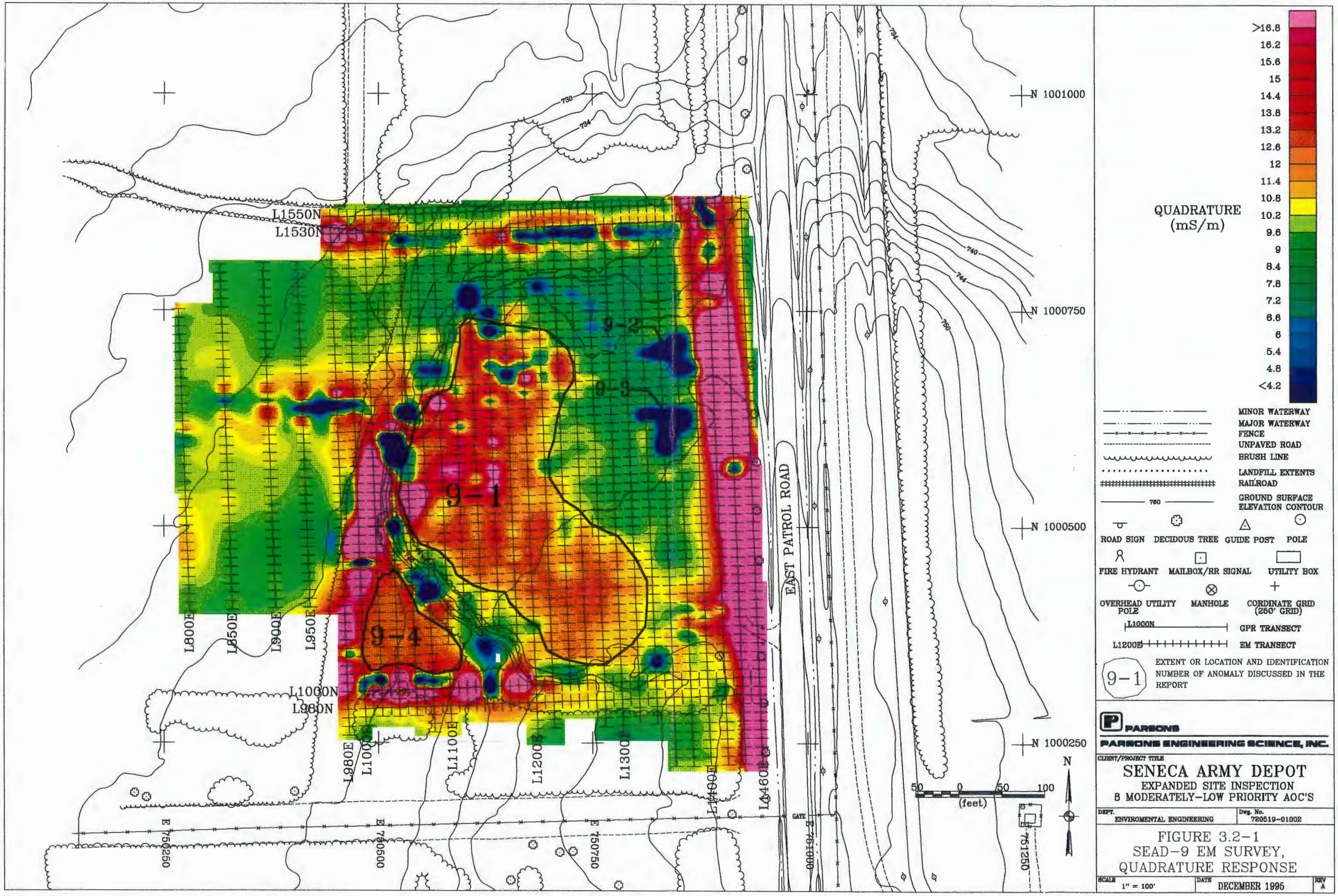
Figure 3.2-1 shows the apparent ground conductivity measured by the EM-31 survey conducted at SEAD-9. The extent of the debris pile is well defined by the areas of predominantly high conductivity values occupying the central portion of the EM grid (Area 9-1). The western and northwestern perimeter of this area of EM anomalies coincided with the physical boundary of the debris pile which was characterized by a 10 to 15 foot step in the surface topography. With the exception of the two predominantly low apparent ground conductivity anomalies in the northeastern portion of the EM grid (anomalies 9-2 and 9-3), the full extent of the debris pile, as detected by the EM-31 survey, would appear to be roughly crescent shaped with an average width of 150 feet. One area of elevated ground conductivity (9-4) was noted in the southwestern portion of the grid and was correlated to a small marsh area. The north-south and east-west trending lineaments observed throughout the EM grid were correlated to barbed wire fences and underground utilities.

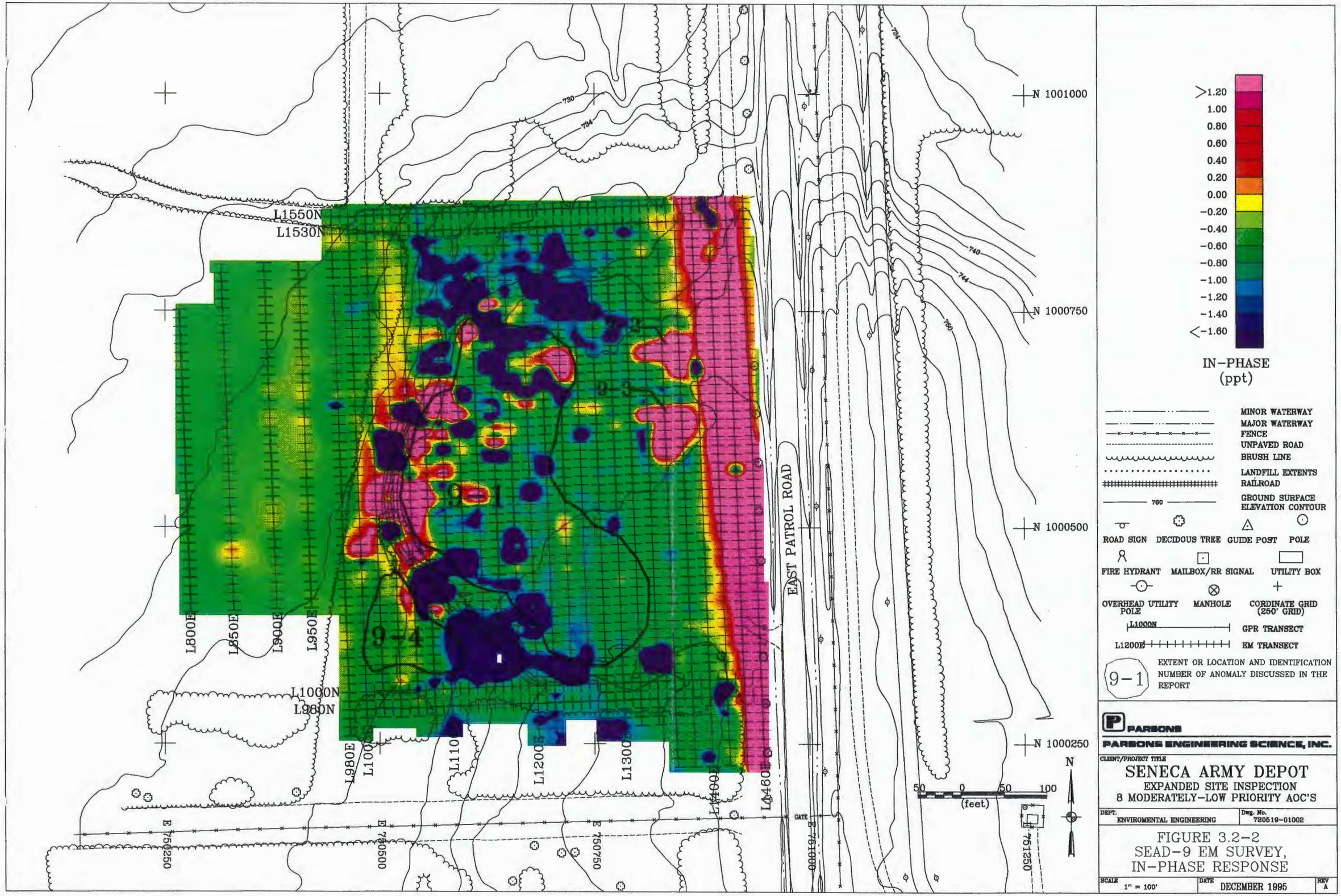
The in-phase response of the EM survey at SEAD 9 is shown in Figure 3.2-2. The extent of the in-phase anomalies associated with the debris pile was smaller in size than the extent of the apparent conductivity anomalies observed in Figure 3.2-1. The results of the in-phase response survey indicated that, with the exception of the two anomalies located in the northeastern portion of the grid (9-2 and 9-3), the majority of buried metallic objects were situated within 75 feet of the western boundary of the debris pile.

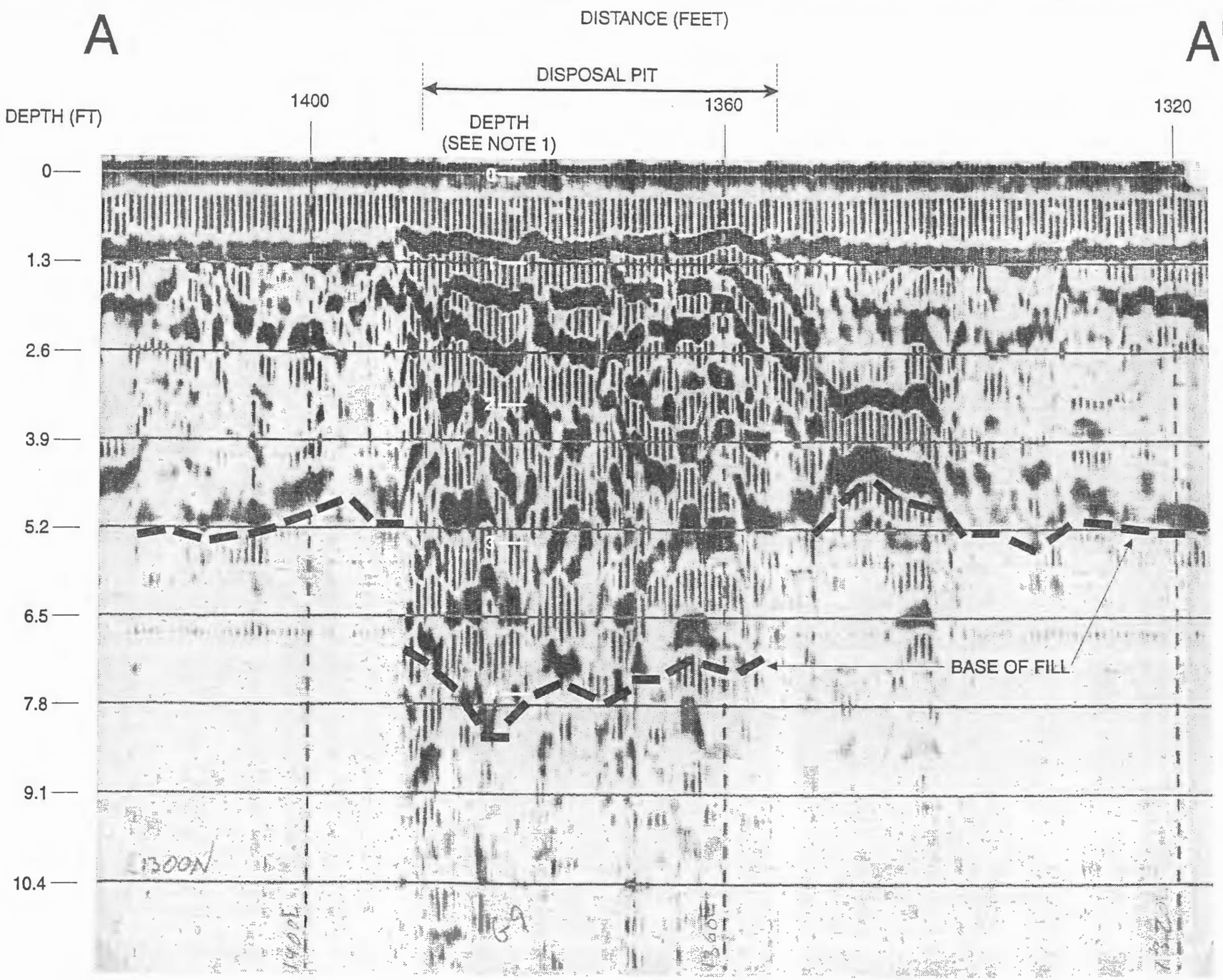
3.2.2.3 GPR Survey

The GPR survey conducted at SEAD-9 revealed two debris pits in the northeastern portion of the EM grid. One debris pit was associated to each of the two EM anomalies detected in the northeastern portion of the EM grid. Each debris pit was characterized by a pronounced subsurface reflector one foot below the ground surface, beneath which, scattered multiple reflectors were detected. Figure 3.2-3 shows an example of a GPR profile acquired over the southern debris pit. To either side of the pit shown in Figure 3.2-3, an intermittent reflector was detected at a depth of 4 to 5 feet, and was presumably associated with the base of fill.

Several localized anomalies were detected throughout SEAD-9, and most were located within the presumed disposal area. All of these localized anomalies exhibited characteristic reflections of small, irregular shaped, metallic objects.


L1550N
L1530N
L1080N
L980N
L800E
L850E
L900E
L950E
L1000E
L1100E
L1200E
L1300E
L1400E
L1460E
9-1
9-2
9-3
9-4
730
734
740
744
750
N 1001000
N 1000750
N 1000500
N 1000250
E 760250
E 760500
E 760750
E 761000
E 761250
EAST PATROL ROAD
GATE
N
50 0 50 100
(feet)
QUADRATURE
(mS/m)
>16.8
16.2
15.6
15
14.4
13.8
13.2
12.6
12
11.4
10.8
10.2
9.6
9
8.4
7.8
7.2
6.6
6
5.4
4.8
<4.2
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000N
GPR TRANSECT
L1200E
EM TRANSECT
9-1
EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S
DEPT.
ENVIROMENTAL ENGINEERING
Dwg. No.
720519-01002
FIGURE 3.2-1
SEAD-9 EM SURVEY,
QUADRATURE RESPONSE
SCALE
1" = 100'
DATE
DECEMBER 1995
REV
A


N 1001000
N 1000750
N 1000500
N 1000250
L1550N
L1530N
L1060N
L980N
L800E
L850E
L900E
L950E
L980E
L1000E
L1100E
L1200E
L1300E
L1400E
L1460E
E 749250
E 749500
E 749750
E 750000
E 750250
EAST PATROL ROAD
GATE
9-1
9-2
9-3
9-4
730
734
740
744
750
760
>1.20
1.00
0.80
0.60
0.40
0.20
0.00
-0.20
-0.40
-0.60
-0.80
-1.00
-1.20
-1.40
<-1.60
IN-PHASE
(ppt)
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000N
GPR TRANSECT
L1200E
EM TRANSECT
9-1
EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT
50 0 50 100
(feet)
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S
DEPT.
ENVIROMENTAL ENGINEERING
Dwg. No.
720519-01002
FIGURE 3.2-2
SEAD-9 EM SURVEY,
IN-PHASE RESPONSE
SCALE
1" = 100'
DATE
DECEMBER 1995
REV
A



NOTE 1

A difference in the electrical properties of the fill material within the disposal pit resulted in an increased two way travel time of reflected radar signals.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-02000

FIGURE 3.2-3
SEAD 9
GPR PROFILE A-A'

SCALE | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\RADAR\19-3-2-3.CDR

Two dipping subsurface contacts were resolved in the eastern portion of SEAD-9. The strike of each contact was roughly oriented in a north-south direction. The western-most contact had a dip angle of approximately 20 degrees to the west. The eastern limit of this subsurface contact was mapped to within one foot of the ground surface (the minimum resolution depth of the GPR equipment used at SEAD-9) and roughly coincided with the eastern boundary of the debris pile as determined by the EM survey. The second subsurface contact, located between 80 and 140 feet east of the presumed eastern boundary of the debris pile, had a dip angle of approximately 10 degrees to the west. This subsurface contact was also mapped to within one foot of the ground surface. Since the western limits of each reflector extended to the near surface, two separate disposal episodes may have occurred at SEAD-9.

3.2.2.4 Test Pitting Program

Three test pits were excavated at SEAD-9. Test pits TP9-1 and TP9-2 were centered over the 2 disposal pits located in the northeastern portion of the EM grid. Test pit TP9-3 was situated in the northern portion of the debris pile over a zone of high gradients in the EM-31 measurements. The test pit logs are presented in Appendix B.

The fill material excavated from test pits TP9-1 and TP9-2 was very similar in nature: the fill material appeared to have been exposed to intense heat (pieces of burnt wood and glass were fused into a black, light weight, rock matrix) and large portions of the fill material were covered with an iron oxide. Both disposal pits extended to a depth of 3 feet. At the TP9-1 location, a layer of weathered shale was encountered at the base of the disposal pit. At the TP9-2 location, a light gray silt layer extended from the base of the disposal pit to a weathered shale layer 4.5 feet below grade. The fill material excavated at TP9-3 consisted primarily of wooden construction debris and metal fence posts with cement bases. The base of fill at this test pit location was 5.5 feet below grade.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro rems per hour of radiation) were observed during the excavation.

3.2.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography. The eastern portion of SEAD-9 is relatively flat, while the western edge of the landfill drops off sharply for approximately 10 to 15 feet. The land to the west of the filled area slopes gently to the northwest but is poorly drained. There are no sustained surface water bodies at SEAD-9, but during heavy precipitation, standing water forms to the west of the landfill.

The groundwater flow direction in the overburden aquifer at SEAD-9 was toward the west-northwest based on ground water elevations measured in the three monitoring wells on July 6, 1994 (Table 3.2-2 and Figure 3.2-4). The distribution of ground water in the aquifer was characterized by wet to saturated soil within the till directly overlying the weathered and competent shale, as well as the interbedded till and weathered shale that makes up the weathered shale unit. At MW9-2, 1.4 feet of the weathered shale was saturated. At SB9-1 and SB9-2, where fill material was encountered, none of the overburden or the weathered shale was saturated. Recharge to the monitoring wells during sampling was good for both MW9-2 and MW9-3, but MW9-1 was not sampled due to poor recharge.

3.3 SEAD-12A: RADIOACTIVE WASTE BURIAL SITE

3.3.1 Site Geology

Till, weathered dark gray shale and competent shale are the three major geologic units encountered at the three overburden borings drilled at SEAD-12A. In all of the borings, a thin topsoil horizon was present to 1.5 feet below the ground surface. The depths of the borings at SEAD-12A were up to 15.3 feet below grade.

The till was light brown or olive gray silt, very fine sand and clay with minor amounts of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at MW12A-1 and MW12A-3 in the bottom of the till unit. The lower portion of the till unit at MW12A-1 and MW12A-3 contained fine to coarse shale fragments with the weathered shale becoming more predominant with depth. Oxidation was noted in the upper and lower portion of the till strata. At the MW12A-2 and MW12A-3 soil boring locations, a thin red clay layer was observed overlying the saturated zone.

Weathered shale that forms the transition between the till and competent shale was evident in each boring.

TABLE 3.2-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-9

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW9-1	748.77	4/1/94	3.84	744.93	7/20/94	Dry	< 748.77	7/6/94 7/25/94	5.87 6.53	742.90 742.24
MW9-2	733.36	3/17/94	2.11	731.25	3/30/94	2.05	731.31	7/6/94 7/25/94	4.56 6.42	728.80 726.94
MW9-3	735.75	4/1/94	1.68	734.07	7/19/94	4.64	731.11	7/6/94 7/25/94	3.53 5.13	732.22 730.62

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

MW9-1
742.90 — MONITORING WELL WITH WATER TABLE ELEVATION

742 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(Feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA army DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | DWG. No. 720518-01002

FIGURE 3.2-4
SEAD-9 OLD SCRAP WOOD SITE
GROUNDWATER ELEVATION MAP

SCALE 1" = 100' | DATE 4/11/95 | REV A

ACAD\SEN 'ML\SWMU\SD9GW.DWG

The competent shale was inferred at MW12A-3 from the point of auger refusal at a depth of 15.3 feet below grade. In this boring, the bottom of the till was determined at 13.0 feet below grade, and the weathered shale interval was 2.3 feet thick. Soil borings MW12A-1 and MW12A-2 were drilled to spoon refusal rather than auger refusal and competent shale was not encountered. At MW12A-1, the bottom of the overburden was determined at 10.0 feet below the grade and the bottom of the weathered was determined at 13.9 feet below grade. At MW12A-2, the bottom of the overburden was determined at 9.2 feet below the grade and the bottom of the weathered shale was determined at 10.9 feet below grade.

3.3.2 Geophysics

3.3.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEADs-12A and 12B are shown in Table 3.3-1. The seismic refraction profiles indicated that 9.5 to 16.3 feet of unconsolidated overburden (1050 to 4800 ft./sec.) overlaid the bedrock surface (9500 to 13400 ft./sec.). In particular, the unconsolidated material included loose, unsaturated overburden (1050 to 1170 ft./sec.); compact unsaturated till (3400 ft./sec.); and saturated overburden (4200 to 4800 ft./sec.).

Saturated overburden was detected beneath profiles P1, P3, and P4 (see Figure 2.3-1 for the profile locations). At the location of profile P2, saturated overburden was not detected, however, a layer of compact till (3400 ft./sec.) was resolved at depths of 3.4 feet (at the western end of the seismic line) to 4.6 feet(at the eastern end of the seismic line.

A review of the seismic refraction results, tabulated in Table 3.2-1, indicated that the groundwater flow direction would be to the southwest along the southern portion of SEAD-12A, and to the west in the remaining portions of SEAD-12. In general, these flow directions roughly follow the slope of the surface topography observed at SEAD-12.

3.3.2.2 EM-31 Survey

Figure 3.3-1 shows the apparent ground conductivity measured at SEAD 12A. Four distinct areas of apparent conductivity anomalies were defined by the EM-31 survey. Area 1, located along the southern boundary of SEAD-12A, had a surface area of approximately 2,500 $ft.^2$ and was associated with the surface pit at SEAD-12A which had been identified in the

TABLE 3.3-1
SEAD-12
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Water Table		Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]	Depth	Elevation[2]
P1	-5	651.9	4.2	647.7	10.3	641.6
	57.5	653.1	4.3	648.8	9.5	643.6
	120.0	653.7			12.0	641.7
P2	-5	645.2	ND	ND	12.0	633.2
	57.5	647.3	ND	ND	13.4	632.9
	120.0	647.9	ND	ND	16.3	631.6
P3	-5	652.1	4.2	647.9	13.6	638.5
	57.5	652.0	3.8	648.2	13.2	638.8
	120.0	651.3	5.0	646.3	15.0	636.3
P4	-5	654.7	4.3	650.4	11.8	642
	57.5	653.8	3.8	650	13.2	640.6
	120.0	653.0	3.4	649.6	13.9	639.1

ND - Not Detected. Due to inherent limitations of the seismic refraction method, a thin layer of saturated till (less than 2 feet) overlying the bedrock surface would be undetectable.

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #1 of the SEAD-12A seismic profile P1.

ADDITIONAL 3

ADDITIONAL 2

AREA 4

AREA 3

ADDITIONAL 1

AREA 1

AREA 2

L1600N

L1500N

L1400N

L1300N

L1200N

L1100N

L1000N

L900N

PATROL ROAD

GUARD POST

N 1016000

N 1015500

N 1015250

N 1015000

E 744250

E 745250

QUADRATURE
(mS/m)

>17.2
16.8
16.4
16
15.6
15.2
14.8
14.4
14
13.6
13.2
12.8
12.4
12
11.6
11.2
10.8
10.4
10
< 9.6

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E GPR TRANSECT
L1200E EM TRANSECT
AREA 1 EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIROMENTAL ENGINEERING

Dwg. No. 720519-01002

FIGURE 3.3-1
SEAD-12A EM SURVEY,
QUADRATURE RESPONSE

SCALE 1" = 100'

DATE DECEMBER 1996

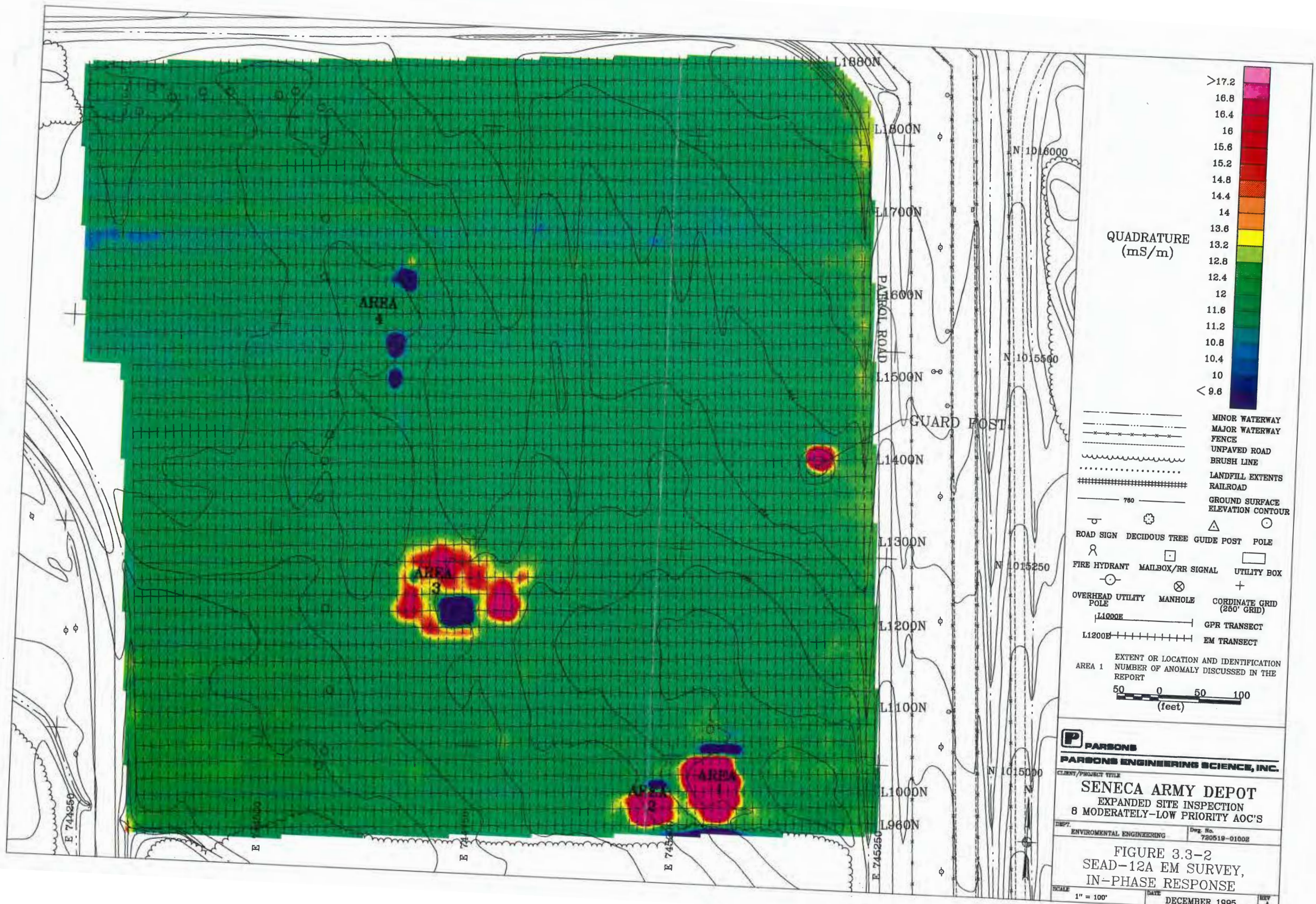
REV

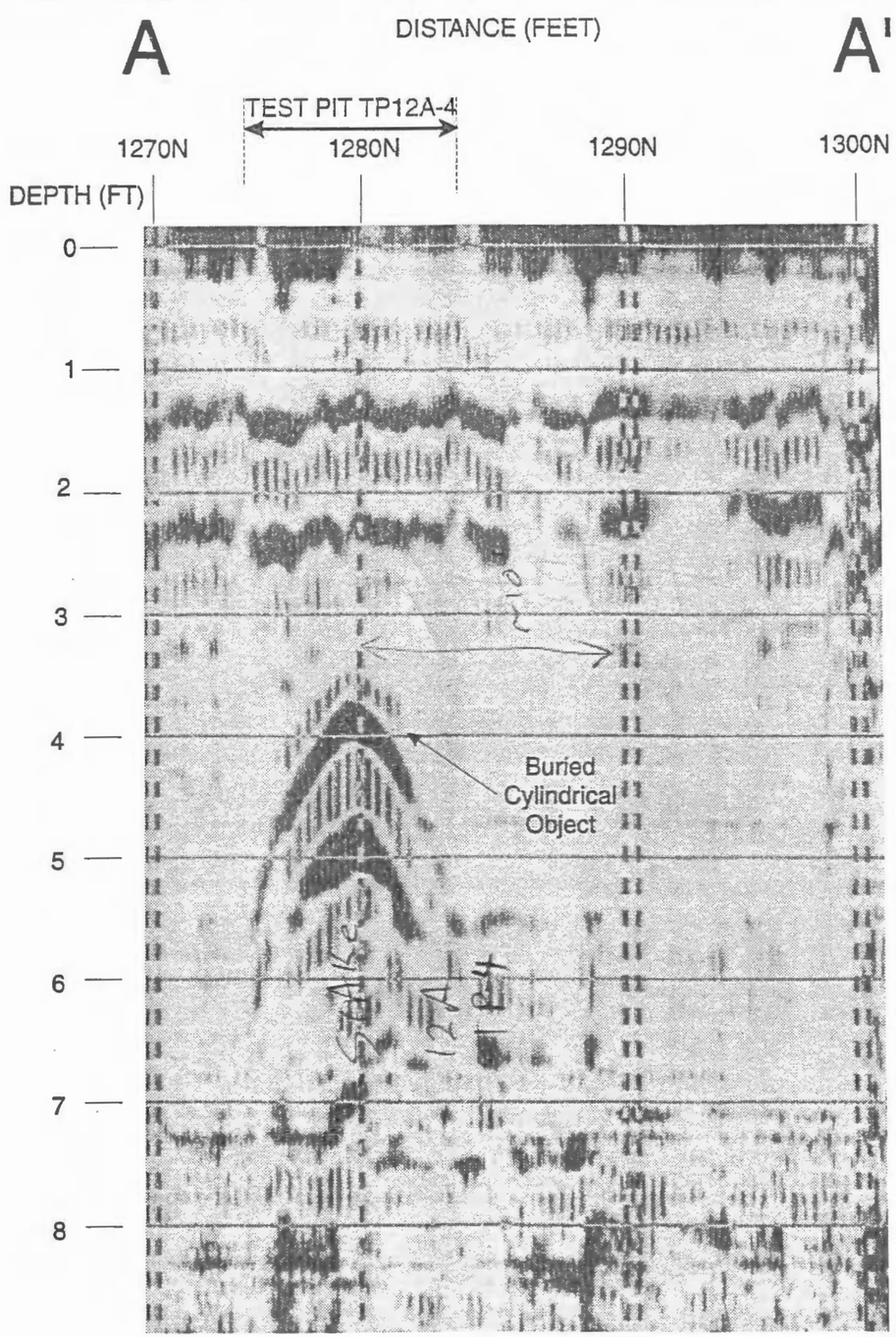
SWMU Classification Report (ES, 1994). Area 2, also located along the southern boundary of SEAD-12A, was located 70 feet west of Area 1 and measured 40 feet in length by 15 feet in width. Area 3 was located in the central portion of the EM grid and was defined by a 130 foot long by 145 foot wide area of elevated ground conductivity. Area 4 was defined by a 200 foot long by 140 foot wide zone of elevated ground conductivity which had three distinct low conductivity anomalies associated to it. Three additional zones of elevated apparent ground conductivities were observed along the western (2 zones) and northern (1 zone) boundaries of SEAD-12A. Each of these zones was correlated to marshy ground in areas of low-lying surface topography. A localized anomaly located near the center of the eastern boundary of SEAD-12A was correlated to a guard post. The north-south trending lineament running the full length of the eastern boundary of SEAD-12A was presumably associated to an underground utility.

The in-phase response of the EM-31 survey is shown in Figure 3.3-2. The extents of the in-phase response anomalies at Area 1 and Area 2 were similar to those discerned by the apparent ground conductivity measurements. The in-phase response measurements in Area 3 showed four separate anomalous zones, each measuring between 20 and 35 feet in diameter. The 3 individual anomalies associated with Area 4 were also observed in the in-phase response data. Anomalies associated to the cultural effects along the eastern boundary of SEAD-12A were also observed

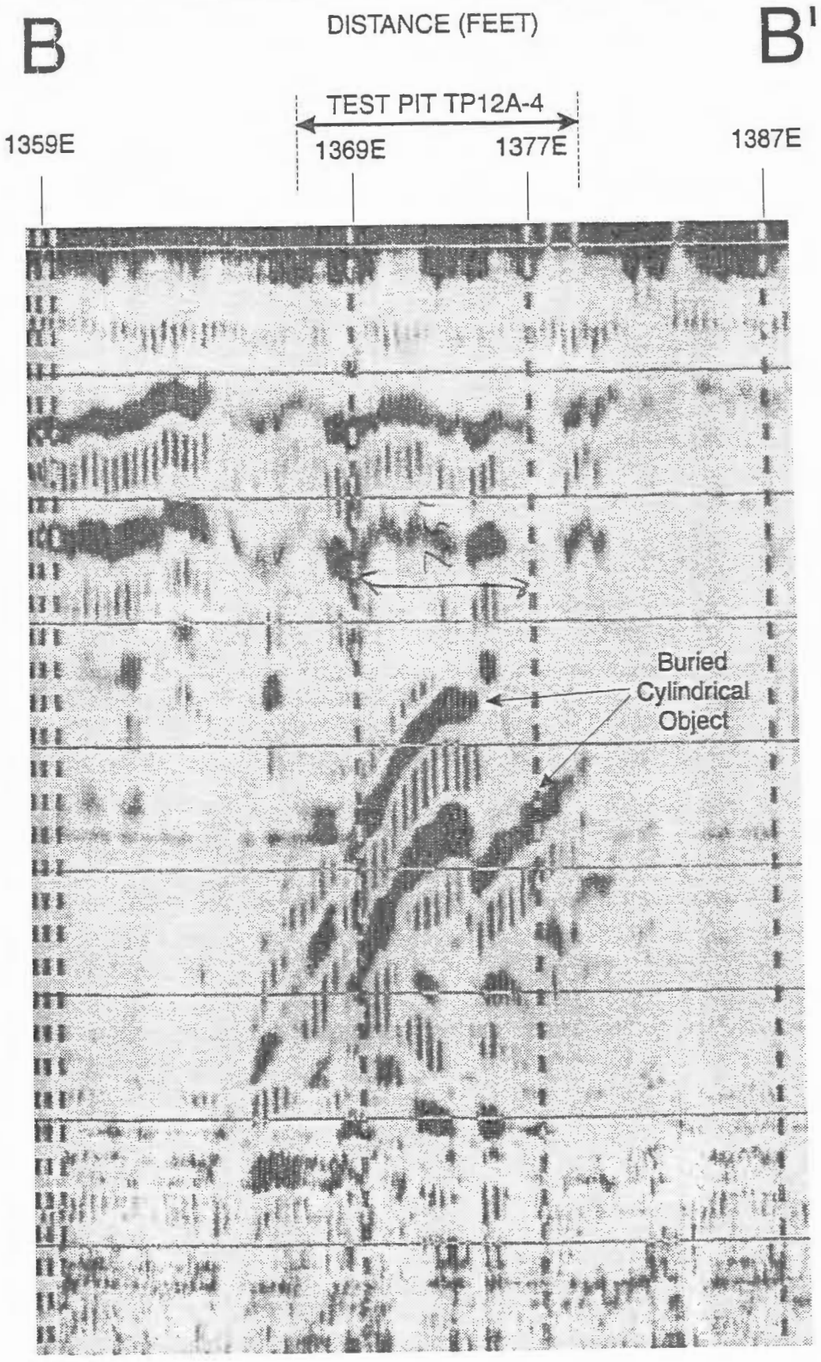
3.3.2.3 GPR Survey

A GPR survey was also conducted at SEAD-12A to delineate the extent of the surface pit and to further characterize the geophysical anomalies located by the EM-31 survey. The GPR profiles acquired over the EM anomalies located along the southern boundary of SEAD-12A (Areas 1 and 2 as discussed in section 3.3.2.2) showed the presence of two disposal pits. The extents of the disposal pits as determined by the GPR survey were identical to those defined by the EM-31 survey. The data also showed large quantities of buried metallic debris within the pits, however, no characteristic reflections from cylindrical objects could be discerned. The GPR profiles acquired over the area of EM anomalies in the central portion of the EM grid (Area 3 as discussed in section 3.3.2.2) identified three buried cylindrical metallic objects measuring at least two feet in diameter and up to 6 feet in length. These buried cylindrical objects were designated as test pit location TP12A-4. Figure 3.3-3 shows two of the GPR profiles used to characterize the nature of the buried cylindrical objects at the TP12A-4 location.


L1800N
L1700N
L1600N
L1500N
L1400N
L1300N
L1200N
L1100N
L1000N
L960N
N 1016000
N 1015500
N 1015250
N 1015000
PATROL ROAD
GUARD POST
AREA 4
AREA 3
AREA 2
AREA 1
E 744250
E 745250
QUADRATURE (mS/m)
>17.2
16.8
16.4
16
15.6
15.2
14.8
14.4
14
13.6
13.2
12.8
12.4
12
11.6
11.2
10.8
10.4
10
< 9.6
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E
GPR TRANSECT
L1200E
EM TRANSECT
AREA 1
EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT
50 0 50 100
(feet)
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S
DEPT.
ENVIROMENTAL ENGINEERING
Dwg. No.
720519-01002
FIGURE 3.3-2
SEAD-12A EM SURVEY,
IN-PHASE RESPONSE
SCALE
1" = 100'
DATE
DECEMBER 1995
REV



GPR Profile A-A', Perpendicular to Long Axis of Buried Cylindrical Objects.



GPR Profile B-B', Parallel to Long Axis of Buried Cylindrical Objects.

PARSONS
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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-02000

FIGURE 3.3-3
SEAD 12A
GPR PROFILES A-A' AND B-B'

SCALE | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\RADAR\19-3-3-3.CDR

The GPR profiles acquired in the area of elevated ground conductivity in the north-central portion of the grid (Area 4 as described in section 3.3.2.2) revealed several isolated anomalies. However, none of these anomalies could be correlated to any of the localized EM anomalies situated within this area of elevated ground conductivity. Two hyperbolic reflections (characteristic signatures of buried cylindrical objects) were detected between the two southern-most localized EM anomalies. Both objects appeared to be no more than one foot in diameter and were buried at a depth of approximately 2 feet.

A series of discontinuities in the shallow subsurface stratigraphy was observed in the northern portion of the EM grid, approximately 20 feet northeast of the area of elevated ground conductivity (Area 4). These discontinuities appeared to be shallow disposal pits, however, no buried objects were detected.

A zone of GPR anomalies, measuring approximately 50 feet long by 7 feet wide, was detected in the north-central portion of SEAD-12A. This zone was characterized by small reflections in the 2 to 4 foot depth interval. Additionally, a region of weak GPR signal returns was detected immediately north of the central EM anomaly area (Area 3 as discussed in section 3.3.2.2) and extended to the north for a distance of approximately 300 feet. This region was approximately 150 feet wide and with an area of low lying topography with zones of fine gravel at the ground surface.

3.3.2.4 Test Pitting Program

A total of eight test pits were excavated at SEAD-12A to characterize the sources of the geophysical anomalies. Three suspected disposal areas, as well as the area of buried cylindrical objects, had both EM and GPR anomalies associated to them. These areas were identified as test pits TP12A-1 through TP12A-4. The 3 EM anomalies detected in the north-central area of elevated ground conductivity were the objects of test pits TP12A-5, TP12A-6, and TP12A-7. Test pit TP12A-8 was situated in an area of elevated ground conductivity in the north-central portion of SEAD-12A. The test pit logs are presented in Appendix B.

Miscellaneous military components were found in test pits TP12A-1 and TP12A-2. The excavations at TP12A-1 and TP12A-2 were stopped at depths of 5.5 and 8 feet, respectively, due to the presence of water within the fill material. The base of the fill material was not identified in either excavation. A zone of elevated beta and/or gamma radiation (40 to 75 micro rems per hour) was encountered in the 2 to 4 foot interval of TP12A-1. The source of the radiation appeared to be a black particulate in the soil which was caked to the disposed

materials. Two soil samples (TP12A-1-1 and TP12A-1-2) were collected from this depth interval and submitted for the chemical and radiolochemical analyses detailed in section 2.5.3. Miscellaneous military components were also unearthed at test pits TP12A-3 and TP12A-4. Several battery cells, containing a liquid which may have been a battery electrolyte were found among the fill material from the TP12A-3 excavation. Some of the battery cell casings were breached and contained various levels of liquid within them. The sources of the EM and GPR anomalies at the TP12A-4 location were found to be 5 foot lengths of corrugated pipes.

A layer of fill was observed in the stratigraphy of the soils at test pits TP12A-5 and TP12A-6. The fill layer was 1.5 feet thick at the TP12A-5 location and 1.8 feet thick at the TP12A-6 location. The sources of the localized EM-31 anomalies associated to test pits TP12A-5 through TP12A-8 were not identified, however, the area of elevated apparent ground conductivity defined as EM anomaly Area 4 (discussed in section 3.3.2.2) may be associated to a difference in the conductive properties of the fill material identified in the TP12A-5 and TP12A-6 excavations.

The excavated material was continuously screened for organic vapors with an OVM-580B and for radioactivity with a Victoreen-190 Radiation monitor (alpha-beta-gamma rate meter), a Ludlum-19 micro-R beta and gamma rate meter, and a Ludlum 2221 alpha scintillometer. With the exception of TP12A-1, no readings above background levels (0 ppm for the OVM, 10-15 micro rems per hour for the beta and gamma meters, and 6 counts per minute on the alpha meter) were observed during the excavations.

3.3.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography and the drainage ditches which lie along the north, west and east perimeters of SEAD-12A. In each of these drainage pathways, the surface water flow is ultimately to the west into a small tributary of Reeder Creek. A small, sustained, west-flowing stream lies outside of the southern boundary of SEAD-12A.

The groundwater flow direction in the overburden aquifer at SEAD-12A was toward the northwest based on ground water elevations measured in the three monitoring wells at SEAD-12A on July 6, 1994 (Table 3.3-2 and Figure 3.3-4). The distribution of ground water in the aquifer was characterized by wet to saturated till and saturated weathered shale. A thin clay horizon was observed overlying the saturated zone at two of the borings at SEAD-

TABLE 3.3-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-12A

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW12A-1	658.32	6/22/94	6.30	652.02	7/20/94	6.33	651.99	7/6/94 7/26/94	4.30 6.98	654.02 651.34
MW12A-2	657.40	6/22/94	5.25	652.15	7/20/94	5.43	651.97	7/6/94 7/26/94	3.43 6.10	653.97 651.30
MW12A-3	657.44	6/22/94	6.06	651.38	7/20/94	6.02	651.42	7/6/94 7/26/94	4.10 6.63	653.34 650.81

PADRE ROAD

GUARD POST

MW12A-1
654.02

MW12A-2
653.97 654

653

MW12A-3
653.34

BLG 813,814

BLG 815

BLG 816

BLG 805

BLG 806

SERVICE ROAD #1

SERVICE ROAD #2

SERVICE ROAD #3

E 745500

E 745250

E 745000

E 744750

E 744500

E 744250

N 1016250

N 1016000

N 1015750

N 1015500

N 1015250

N 1015000

N 1014750

N 1014500

N 1014250

N 1014000

N 1013750

N 100 0 100 200 (feet)

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENTS
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- ROAD SIGN
- FIRE HYDRANT
- DECIDOUS TREE
- MANHOLE
- GUIDE POST
- CORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MW12A-1 654.02 MONITORING WELL WITH WATER TABLE ELEVATION
- 653 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

ACAD\SENECA\EMCS\WMU\SDI2AGW.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 720518-01002

FIGURE 3.3-4
SEAD-12A RADIOACTIVE WASTE BURIAL SITE
GROUNDWATER ELEVATION MAP

SCALE 1" = 200'

DATE DECEMBER 1995

REV A

12A. Because the clay layer was thin and observed only at two locations, and because the aquifer has been demonstrated to be unconfined at most of the borings drilled across SEDA, this clay horizon probably does not act to regionally confine the aquifer. Recharge to the monitoring wells during sampling was good.

3.4 SEAD-12B: RADIOACTIVE WASTE BURIAL SITE

3.4.1 Site Geology

Till and weathered dark gray shale were the two major geologic units encountered at the three overburden borings drilled at SEAD-12B. Competent shale was not encountered at SEAD-12B. Less than 0.5 feet of topsoil was present at each of the boring locations. The depths of the borings at SEAD-12B were up to 18 feet below grade.

The till was brown or gray silt and very fine sand with minor components of clay and gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at MW12B-1 and MW12B-2 at the bottom of the till unit. Oxidation was noted in the upper and lower portions of the till strata.

The weathered shale interval that forms the transition between till and competent shale bedrock was observed in each of the three borings. The contact between the till and the weathered shale had a slightly different character at each of the borings. At MW12B-1, the bottom of the till contained fine to coarse shale fragments with the weathered shale becoming more predominant with depth. At MW12B-2, there was a distinct contact between the till and the weathered shale, however the till directly overlying the weathered shale had an increased content of shale fragments. At MW12B-3, there was also a distinct contact between the till and the weathered shale, but no change in the content of shale fragments was observed.

Due to the extent of the weathered shale interval, MW12B-3 was drilled to spoon refusal and MW12B-1 and MW12B-2 were terminated when the inspecting geologist had determined that the bottom of the saturated overburden/weather shale zone had been reached. At MW12B-1 the bottom of the overburden was determined at 14.6 feet below grade and the boring was terminated at 18.0 feet. At MW12B-2, the bottom of the overburden was determined at 12.9 feet below grade and the boring was terminated at 14.0 feet. At MW12B-3, the bottom of the overburden was determined at 13.0 feet below grade and the soil boring was terminated at 14.8 feet.

3.4.2 Geophysics

3.4.2.1 Seismic Survey

The results of the seismic refraction surveys conducted at SEAD 12, including SEAD-12B, were discussed in section 3.3.2.1. The groundwater and bedrock elevations which were used to estimate the groundwater flow direction at SEAD 12B were presented in Table 3.3-1. Figure 2.6-1 shows the locations of the seismic refraction profiles at SEAD 12. A review of the seismic refraction results, tabulated in Table 3.3-1, indicated that the bedrock surface sloped to the west in the area of SEAD-12B, generally following the slope of the surface topography. Groundwater flow was also expected to be directed to the west, following the slope of the bedrock surface.

3.4.2.2 EM-31 Survey

Figure 3.4-1 shows the results of the apparent ground conductivity survey performed at SEAD 12B. The results of the apparent ground conductivity survey showed a slight increase in the apparent ground conductivity of the soils in the south central portion of the grid. This anomaly (anomaly 12B-1) was presumably associated to the 5,000 gallon underground storage tank (UST), due to its proximity to the tank's suspected location. The suspected location was obtained during a review of historical site plans of SEAD-12B which were obtained during this field investigation. The historical site plans showed the top of the UST to be located 18 feet below grade, close to 6 feet deeper than the typical penetration depth of the EM-31 survey instrument. Therefore, the increase in the apparent ground conductivity detected at this location was likely to be associated to the material used to backfill the UST tank rather than to a response to the tank itself. The pronounced apparent ground conductivity anomalies located along the southern and northern boundaries of the EM Grid were correlated to Buildings 803 and 804/805 and to presumed under ground utilities, respectively. A pronounced circular anomaly in the northeastern portion of the EM grid was correlated to a guard post. In general, the apparent ground conductivity showed an increase of approximately 2.5 Ms/m in the western one third of the EM grid. This response may be due to an increase in the clay content of the soil or to a higher concentration of dissolved solids in the groundwater or soil moisture, or to a change in the depth to bedrock.

The in-phase response of the EM-31 survey is shown in Figure 3.4-2. A pronounced anomaly was detected 7 feet east of the 5,000 gallon UST location as shown on the historical site drawings of SEAD-12B. Based upon the expected burial depth of the tank, the horizontal

E 743000
E 743250
E 743500
E 743750
E 744000
NORTH PATROL ROAD
N 1016250
APPROXIMATE LOCATION OF DRY WASTE DISPOSAL PIT
GUARD POST
PATROL ROAD
L1160N
L1140N
L1120N
L1100N
L1080N
L1060N
L1040N
L1020N
L1000N
12B-1
N 1016000
APPROXIMATE LOCATION OF WASTEWATER STORAGE TANK 5000 GAL
BLDG 802
BLDG 803
BLDG 804
BLDG 805
BLDG 807
BLDG 806
BLDG 825
BLDG 810
DRIVE EDGE
SERVICE ROAD NO. 1
N 1015750
N 1015500
N
50 0 50 100
(feet)

QUADRATURE (mS/m)
> 23.2
22.4
21.6
20.8
20.0
19.2
18.4
17.6
16.8
16.0
15.2
14.4
13.6
12.8
12.0
11.2
10.4
< 9.6

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E GPR TRANSECT
L1200E EM TRANSECT
12B-1 EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT

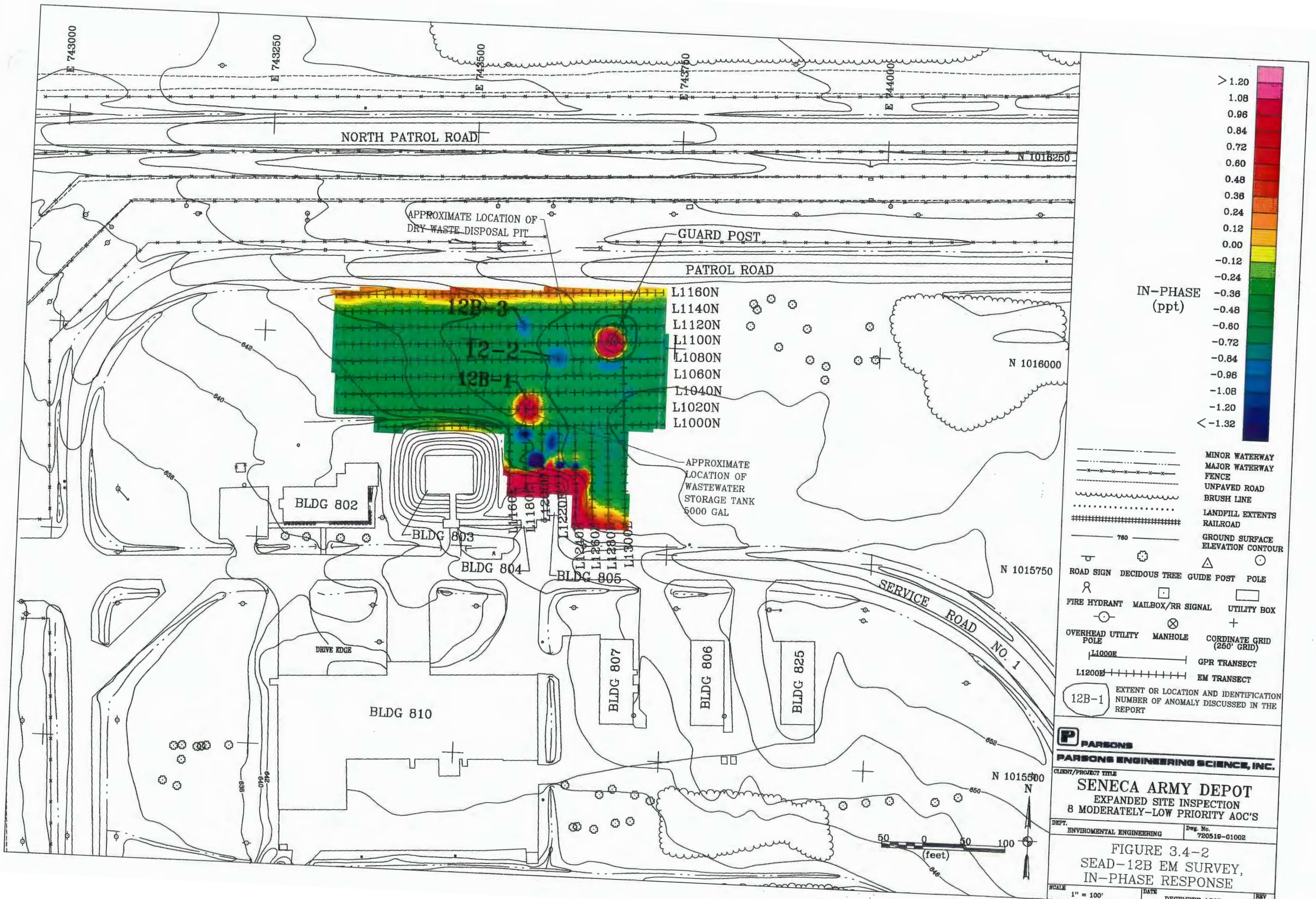
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIROMENTAL ENGINEERING
Dwg. No. 720519-01002

FIGURE 3.4-1
SEAD-12B EM SURVEY,
QUADRATURE RESPONSE

SCALE 1" = 100'
DATE DECEMBER 1995
REV A



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.4-2
SEAD-12B EM SURVEY,
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

extents of this in-phase anomaly could be correlated to a buried object having the dimensions of the 5,000 gal UST. Two localized and negative in-phase response anomalies (12B-2 and 12B-3) were detected to the north of the suspected UST location. The eastern-most of these anomalies (12B-2) roughly coincided with the location of the dry waste disposal pit shown on the historical site drawings of SEAD-12B. In-phase response anomalies were also detected from Buildings 803 and 804/805 along the southwestern boundary of the EM grid. Anomalies associated to the presumed underground utility along the northern boundary of the EM grid and the guardpost in the northeastern portion of the EM grid were also observed.

3.4.2.3 GPR Survey

A GPR Survey was performed throughout the EM grid in an attempt to resolve the exact location of the 5,000 gallon underground storage tank and to identify the locations of any disposal pits at SEAD-12B. The conductive nature of the soils at SEAD-12B limited the GPR signal penetration to 5 feet below the ground surface. Two suspected disposal areas were detected by the GPR survey at SEAD-12B. The larger of these suspected disposal areas, located 65 feet north of the suspected 5,000 gallon UST location, was 15 feet in length and 7 feet in width and was oriented in a north-south direction. The nature of the GPR signal reflections in this area indicated that several small reflectors were buried in the 1.5 to 4.2 foot depth interval. The extent and the nature of this area of GPR anomalies, as well as the lack of an associated EM response, identified this area as the most probable location of the dry waste disposal pit. This area of GPR anomalies was the object of test pit TP12B-3. A second area of GPR anomalies, measuring 10 feet in length and 4 feet in width, was located 25 feet north of the previously discussed suspected disposal area. This area also was not associated with any of the EM anomalies detected at SEAD-12B.

3.4.2.4 Test Pitting Program

Three test pits and six exploratory soil borings were performed at SEAD-12B. Test pit 12B-2 was centered over the eastern most in-phase response anomaly, test pit TP12B-3 was centered over the GPR anomaly presumably associated to the dry waste disposal area, and test pit TP12B-4 intersected the northern most EM and GPR anomalies (which were separated by a distance of 37 feet). Six exploratory soil borings were performed in the area of the 5,000 gallon underground storage tank in an attempt to collect a sample from within the tank. The test pit logs are presented in Appendix B.

The sources of the geophysical anomalies were identified in test pits TP12B-2 and TP12B-3.

The in-phase anomaly at the TP12B-2 location was attributed to several buried metal sign posts and one 3 foot square metal sign. No markings were visible on either face of the metal sign. The GPR anomaly at the TP12B-3 location was attributed to a layer of yellow-orange fine sand in the 0.3 to 2.8 foot depth interval. No evidence of buried wastes was discovered at this location. Although the source of the small GPR reflectors observed at this location were not identified, the nature of the sand material excavated from this test pit was unique to this test pit location. Naturally layered silt and silt with sand was observed throughout the excavation at test pit TP12B-4.

Six exploratory soil borings were advanced at the suspected location of the 5,000 gallon underground storage tank in an attempt to sample the contents of the tank. At each location, the boring was augered to refusal. A penetrometer point was then used to hammer the base of the boring in an attempt to breach the 5,000 gallon UST. After the penetrometer point had descended approximately 3 inches, the penetrometer point was removed from the boring and a decontaminated split spoon was used to collect a sample of the material from the bottom of each soil boring. Competent shale was collected in the base of the split spoons from each of the six exploratory borings, indicating that the borings had not been placed over the UST. Sand and gravel from the 18 foot to 20 foot depth interval were collected from the boring located between the center of the in-phase response anomaly associated with the UST and the location of the UST shown on the historical site drawings for SEAD-12B. This subsurface soil sample location was identified as SB12B-1. The location of soil boring SB12B-1 is shown on Figure 2.6-2.

The excavated material was continuously screened for organic vapors with an OVM-580B and for radioactivity with a Victoreen-190 Radiation monitor (alpha-beta-gamma rate meter), a Ludlum-19 micro-R beta and gamma rate meter and a Ludlum 2221 alpha scintillometer. No readings above background levels (0 ppm for the OVM , 10-15 micro rems per hour for the beta and gamma meters, and 6 counts per minute on the alpha meter) were observed during the excavations.

3.4.3 Site Hydrology and Hydrogeology

Surface water flow at SEAD-12B is to the west and is controlled by local topography (which slopes to the west) and two shallow west-flowing drainage ditches. One drainage ditch parallels Patrol Road which borders SEAD-12B to the north, the second drainage ditch borders SEAD-12B to the south. Runoff in each of the two ditches ultimately flows to a small tributary of Reeder Creek. There are no sustained surface water bodies at SEAD-12B.

The in-phase anomaly at the TP12B-2 location was attributed to several buried metal sign posts and one 3 foot square metal sign. No markings were visible on either face of the metal sign. The GPR anomaly at the TP12B-3 location was attributed to a layer of yellow-orange fine sand in the 0.3 to 2.8 foot depth interval. No evidence of buried wastes was discovered at this location. Although the source of the small GPR reflectors observed at this location were not identified, the nature of the sand material excavated from this test pit was unique to this test pit location. Naturally layered silt and silt with sand was observed throughout the excavation at test pit TP12B-4.

Six exploratory soil borings were advanced at the suspected location of the 5,000 gallon underground storage tank in an attempt to sample the contents of the tank. At each location, the boring was augered to refusal. A penetrometer point was then used to hammer the base of the boring in an attempt to breach the 5,000 gallon UST. After the penetrometer point had descended approximately 3 inches, the penetrometer point was removed from the boring and a decontaminated split spoon was used to collect a sample of the material from the bottom of each soil boring. Competent shale was collected in the base of the split spoons from each of the six exploratory borings, indicating that the borings had not been placed over the UST. Sand and gravel from the 18 foot to 20 foot depth interval were collected from the boring located between the center of the in-phase response anomaly associated with the UST and the location of the UST shown on the historical site drawings for SEAD-12B. This subsurface soil sample location was identified as SB12B-1. The location of soil boring SB12B-1 is shown on Figure 2.6-2.

The excavated material was continuously screened for organic vapors with an OVM-580B and for radioactivity with a Victoreen-190 Radiation monitor (alpha-beta-gamma rate meter), a Ludlum-19 micro-R beta and gamma rate meter and a Ludlum 2221 alpha scintillometer. No readings above background levels (0 ppm for the OVM , 10-15 micro rems per hour for the beta and gamma meters, and 6 counts per minute on the alpha meter) were observed during the excavations.

3.4.3 Site Hydrology and Hydrogeology

Surface water flow at SEAD-12B is to the west and is controlled by local topography (which slopes to the west) and two shallow west-flowing drainage ditches. One drainage ditch parallels Patrol Road which borders SEAD-12B to the north, the second drainage ditch borders SEAD-12B to the south. Runoff in each of the two ditches ultimately flows to a small tributary of Reeder Creek. There are no sustained surface water bodies at SEAD-12B.

TABLE 3.4-1
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-12B

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW12B-1	653.36	6/25/94	10.22	643.14	7/19/94	10.54	642.82	7/6/94 7/26/94	9.06 11.21	644.30 642.15
MW12B-2	649.93	6/23/94	7.15	642.78	7/19/94	7.18	642.75	7/6/94 7/26/94	5.73 7.82	644.20 642.11
MW12B-3	650.03	6/26/94	6.70	643.33	7/19/94	7.25	642.78	7/6/94 7/26/94	5.68 7.91	644.35 642.12

NORTH PATROL ROAD

PATROL ROAD

SERVICE ROAD NO. 1

GUARD POST

644.35
MW12B-3

644.40

644.30

MW12B-2
644.20

MW12B-1
644.30

644.20

BLDG 802

BLDG 803

BLDG 804

BLDG 805

BLDG 806

BLDG 807

BLDG 810

BLDG 825

DRIVE EDGE

N 1016000

N 1015750

N 1015500

N

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

MW12B-1
644.30 — MONITORING WELL WITH WATER TABLE ELEVATION

644.40 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(Feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg No. 720518-01002

FIGURE 3.4-3
SEAD-12B RADIOACTIVE WASTE BURIAL SITE
GROUNDWATER ELEVATION MAP

SCALE 1" = 100' | DATE 4/13/95 | REV A

I:\SWMU\ACAD\FIG\SD12BGW.DWG

ACAD:SENE

Boring Location	Depth to Bottom of Overburden (feet)	Thickness of Weathered Shale (feet)	Estimated Depth to Bedrock (feet)	Depth to Bottom of Boring (feet)
MW43-1	9.6	5.4	15.0	15.0
MW43-2	8.8	9.2	18.0	18.4
MW43-3	11.0	7.8	18.8	18.8
MW43-4	10.8	2.6	13.4	13.4
SB43-1	16.0	ND	ND	16.4
SB43-2	13.5	4.0	17.5	17.5
SB43-3	12.6	ND	ND	14.3
SB43-4	13.4	0	13.4	13.4
SB56-1	13.0	1.0	14.0	15.0
SB56-2	13.6	ND	ND	15.1
SB56-3	12.5	ND	ND	16.6
SB69-1	8.6	7.4	16.0	16.0
SB69-2	12.0	ND	ND	19.1
SB69-3	12.7	ND	ND	19.5

ND= Not Determined

3.5.2 Geophysics

3.5.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEADs 43,56, and 69 are shown in Table 3.5-1. The seismic refraction results indicated that 4.9 to 6.6 feet of unconsolidated overburden (1,000 ft./sec.) overlaid bedrock (8,500 to 10,700 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

Bedrock velocities of 8,500 and 9,000 ft./sec., detected beneath profiles P3 and P4, respectively, indicated that a layer of weathered bedrock, having a thickness of 20 feet or more, was present above competent bedrock in the areas of these two profiles.

TABLE 3.5-1
SEAD-43,56 and 69
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	2.5	112.4	6.6	105.8
	57.5	113.4	5.8	107.6
	112.5	114.0	5.9	108.1
P2	2.5	116.0	5.3	110.7
	57.5	116.3	5.3	111.0
	112.50	116.7	5.6	111.1
P3	2.5	116.1	5.6	110.5
	57.5	117.2	6.3	110.9
	112.5	117.9	6.6	111.3
P4	2.5	121.3	6.0	115.3
	57.5	120.4	4.9	115.5
	112.5	120.3	5.3	115.0

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-44B seismic profile P4.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

3.5.2.2 EM-31 Survey

Figure 3.5-1 shows the results of the apparent ground conductivity survey performed at SEADs 43 and 69. An area of elevated apparent ground conductivity (anomaly 43-1) is clearly evident in the southeastern portion of the EM grid. This area is situated immediately south and west of the mound presumably associated with the septic system being investigated as SEAD-43. A second area of elevated ground conductivity (43-2) was detected in the area of the drainage swale surrounding the pesticide/herbicide rinse pad. These two areas of elevated apparent ground conductivity may be due to an increase in the clay content of the soils or to and increase in the content of dissolved solids in the ground water or soil moisture. Since the most conductive soils coincided with drainage swales along the access roads around SEAD 43, road salt should be considered a possible explanation for these increases in apparent ground conductivity.

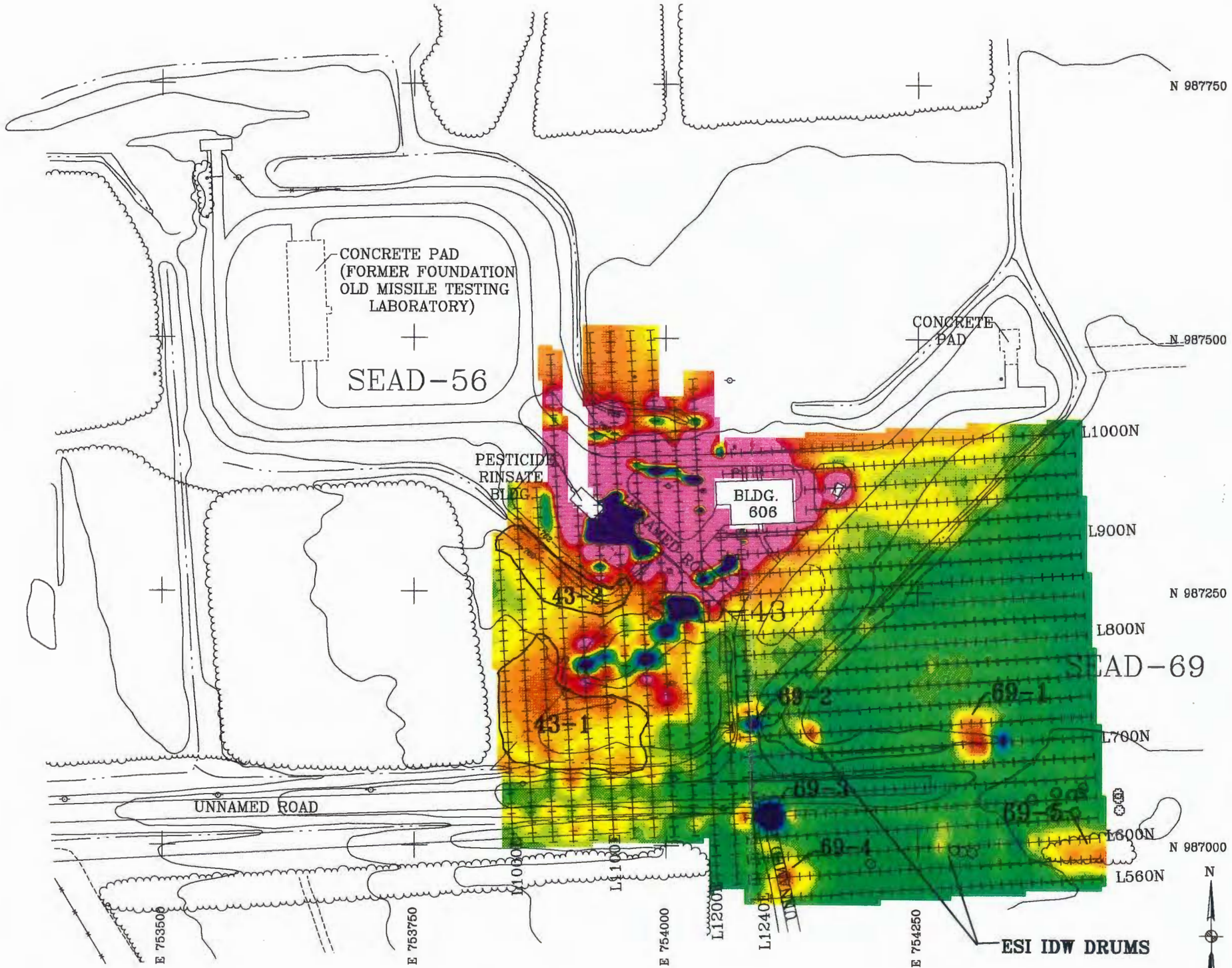
The apparent ground conductivity measured in the remaining areas of SEADs 43 and 69 showed a relatively featureless response with only 4 localized anomalies (anomalies 69-1 through 69-4) being detected. One of these anomalies (69-1) (situated in the west-central portion of SEAD-69) was associated to metallic construction debris on the ground surface. This area was later identified by SEDA personnel as being the location of a small waste disposal trench which had been excavated and filled during the 1970's. The three remaining localized anomalies, as well as a low intensity anomaly (anomaly 69-5) detected in the southeastern corner of SEAD 69, were related to cultural effects.

Figure 3.5-2 shows the results of the in-phase response survey performed at SEADs 43 and 69. The results of the in-phase response survey showed a generally featureless response. Several isolated anomalies were detected in the southern one half of the EM grid and were correlated to the cultural effects observed in the apparent ground conductivity results.

3.5.2.3 GPR Survey

A GPR survey was conducted at SEAD-43 to characterize the suspected septic system associated with Building 606 and at SEAD-69 to identify areas which may have received wastes generated from the former activities conducted in Building 606.

No evidence of disturbed soil was found at either SEAD-43 or SEAD-69. With the exception of the GPR data acquired over the disposal trench discussed in Section 3.5.2.2,no anomalies showing discontinuities in subsurface layers or characteristic reflections from buried wastes or objects were detected.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

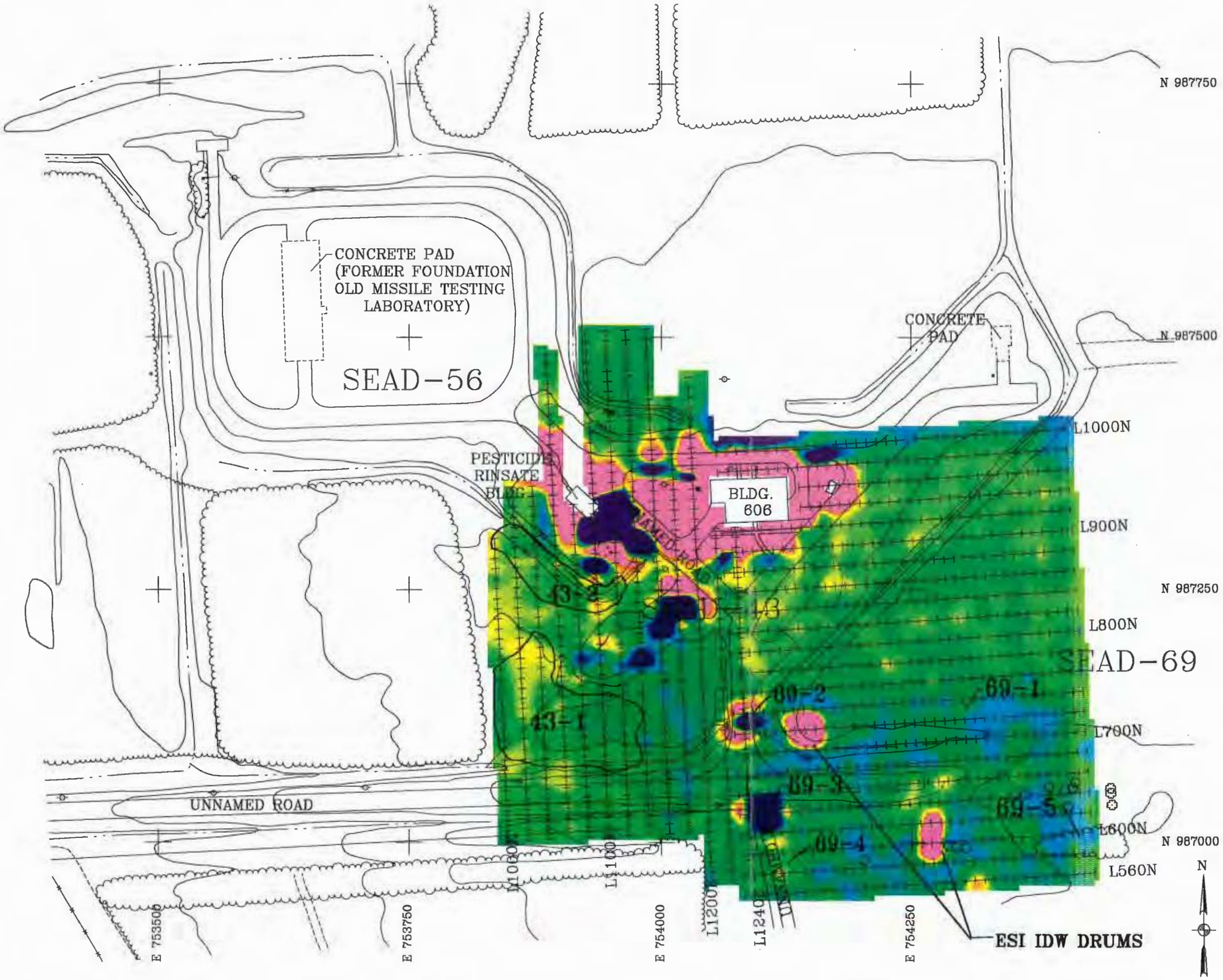
SENECA ARMY DEPOT

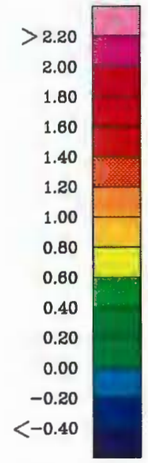
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.5-1
SEAD-43,56,69 EM SURVEY,
QUADRATURE SURVEY

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A





MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E GPR TRANSECT
L1200E EM TRANSECT
43-2 EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.5-2
SEAD-43,56,69 EM SURVEY,
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

Several small reflectors, presumably associated to buried pipes and/or conduits, were detected in the proximity of Building 606. One of the reflectors was traced over a short distance from the southern wall of Building 606 towards the mound presumably associated with the septic system. It was hoped that this pipe/conduit would lead to the leach field of the septic system (or the mound presumably associated to it), however, asphalt and compacted soils to the south of the building 606 completely attenuated all subsurface GPR signals. Further GPR investigation around the mound at SEAD-43 revealed one series of reflectors which could be associated to a buried pipe or conduit, however its axis was not in-line with that of the pipe or conduit traced from building 606. One localized reflector was detected 85 feet northwest of the mound at SEAD-43, and was found to be associated with a partially exposed buried concrete structure. A detailed GPR investigation in the area of this structure revealed several distinct reflectors at depths of 1.5 to 3 feet below grade.

A series of GPR profiles acquired over the mound at SEAD 43 indicated the presence of several irregular shaped reflectors, varying from 5 to 15 feet in length. These reflectors were located between 2.1 and 2.4 feet below the ground surface. A continuous reflector, at a depth of 4.3 feet, was detected over the entire length of the mound. The detection of this deeper reflector indicated that the shallower reflectors were definitely non-metallic in nature and greatly reduced the probability that they were reflections from concrete structures.

3.5.2.4 Test Pitting Program

A total of three test pits were excavated in SEAD 69. Test pit TP69-3 was centered over the debris trench discussed in Section 3.5.2.2. Test pits TP-69-1 and TP69-2 were centered over 2 small piles on the ground surface. The test pit logs are presented in Appendix B.

The material excavated from test pit TP 69-3 consisted of fence posts with cement bases, chain link fence and metal construction debris. The excavation was stopped at a depth of 3 feet due to water within the fill layer. The excavation at test pit TP69-2 bisected a 6 foot diameter by a 2 foot high surface pile. The only foreign materials found were cement blocks, small pieces of gyprock wall board and a metal pipe. The base of fill was coincident with the natural ground surface surrounding the pile. The excavation at test pit 69-3 revealed naturally layered soils to a depth of 5.8 feet. A 6 inch outside diameter clay pipe was intersected at a depth of 2.0 feet. The inside of the pipe was dry and free of deposits. The pipe appeared to be oriented towards building 606.

The excavated material was continuously screened for organic vapors and radioactivity with

an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro rems per hour of radiation) were observed during the excavation.

3.5.3 Site Hydrology and Hydrogeology

Surface water flow at SEADs-43, 56, and 69 is controlled by drainage ditches. All surface water flow is ultimately channeled into one of three drainage ditches which flow across the site. One drainage flows to the north from the northeast corner of the site, a second drainage ditch flows to the west from the northwest corner of the site, and a third drainage ditch flows southwest corner of the site. Surface water flow from SEAD-43 leaves the site in all three drainages ditches; surface water flow from SEAD-56 leaves the site in the northwest drainage ditch; and the surface water flow from SEAD-69 leaves the site in the northeast and the southwest drainages ditches. There are no sustained surface water bodies on-site, but the eastern and the northern portions of SEAD-43 are poorly drained and develop standing water during heavy precipitation.

The groundwater flow direction in the overburden aquifer at SEADs-43, 56, and 69 was toward the west-northwest, based on ground water elevations measured in the four monitoring wells on July 6, 1994 (Table 3.5-2 and Figure 3.5-3). Except at MW43-2, the distribution of groundwater in the overburden aquifer was characterized by moist to saturated soil within the till directly overlying the weathered or competent shale. In most cases, the weathered shale was also saturated to bedrock. At MW43-2, only minor zones of saturation were observed in the upper portion of the till and then in the upper portion of the weathered shale. Recharge to the monitoring wells during sampling was good for MW43-1, MW43-3, and MW43-4, but the recharge to MW43-2 was fair to poor.

3.6 SEAD-44A: QUALITY ASSURANCE TEST LAB

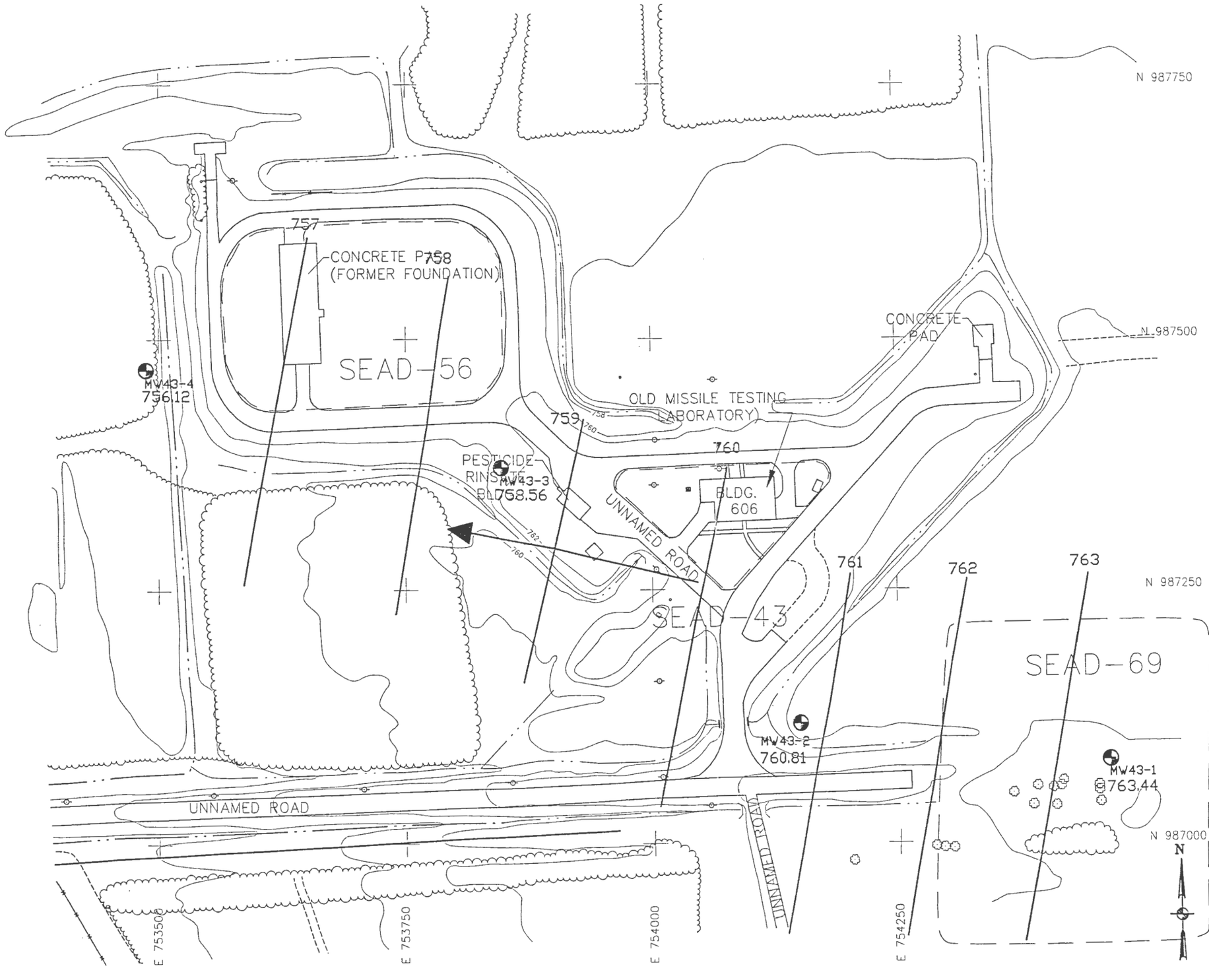
3.6.1 Site Geology

Till and weathered dark gray shale were the two major geologic units present at the three overburden borings drilled at SEAD-44A. Competent shale was not encountered at SEAD-44A. Topsoil was present at each of the borings within 1.2 feet of the surface. MW44A-1 and MW44A-3 were drilled to 10.6 and 13.5 feet below grade, respectively, and MW44A-2, which was located between the other two borings, was drilled to 30.1 feet below grade.

TABLE 3.5-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-43

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW43-1	765.96	3/20/94	2.46	763.50	7/19/94	4.08	761.88	7/6/94 7/25/94	2.52 4.68	763.44 761.28
MW43-2	763.32	3/21/94	2.16	761.16	7/19/94	2.98	760.34	7/6/94 7/25/94	2.51 3.59	760.81 759.73
MW43-3	762.20	3/18/94	2.78	759.42	3/28/94	2.46	759.74	7/6/94 7/25/94	3.64 4.93	758.56 757.27
MW43-4	758.10	3/19/94	1.7	756.40	3/28/94	1.40	756.70	7/6/94 7/25/94	1.98 3.08	756.12 755.02



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

SEAD 43: BLDG.806 OLD MISSLE PROPELLANT TEST LABORATORY
SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA
SEAD 69: DISPOSAL AREA

MW43-1
763.44 MONITORING WELL WITH WATER TABLE ELEVATION

761 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/8/94

50 0 50 100
(Feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT: ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 3.5-3
SEAD-43,56 AND 69
GROUNDWATER ELEVATION MAP

SCALE 1" = 100'
DATE DECEMBER 1995
REV A

The till was brown or gray silt and clay with minor components of very fine sand and gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at MW44A-1 near the bottom of the boring. The till in the bottom eight feet of the boring at MW44A-2 contained an uncharacteristically large amount of shale fragments and the bottom 20 feet of the boring was unusually dense, suggesting that 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 upper till, as measured by blow counts during sampling, are generally 20 blows per 6 inches of penetration of the spoon, and for the lower till are between 42 and 100 blows or spoon refusal. 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.

Competent shale was not encountered at any of the borings at SEAD-44A, but weathered shale was encountered at all of the borings. The top of the weathered shale interval at MW44A-1 was determined at 8.7 feet below grade. The boring was terminated at spoon refusal (10.9 feet below grade) after drilling through 4.6 feet of the weathered shale. At the MW44A-2 soil boring, the top of the weathered shale interval was determined at 27.0 feet below grade. The boring at MW44A-2 was terminated 30.1 feet below grade. At MW44A-3, a distinct till/weathered shale contact was observed at 10.9 feet below grade, however, but due to poor recovery, only 0.1 foot of the weathered shale was observed. MW44A-3 was terminated at spoon refusal (13.5 feet below grade).

3.6.2 Site Hydrology and Hydrogeology

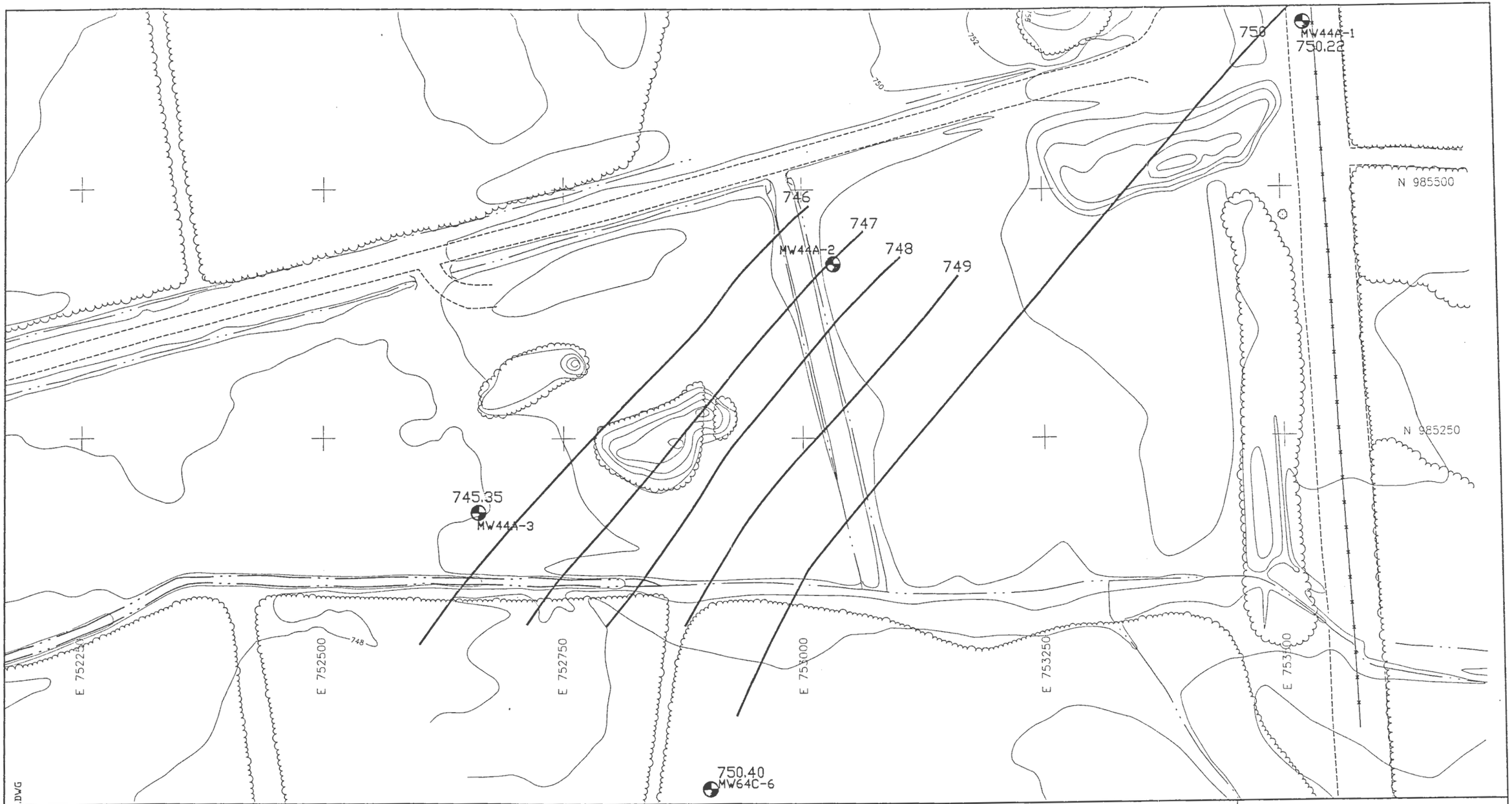
Surface water flow at SEAD-44A is to the west and is controlled by shallow ditches along both sides of the east-west running dirt road in the center of SEAD-44A. A small sustained stream enters the southeastern corner of SEAD-44A and flows to the west along the southern edge of the site. This stream channels much of the flow from the southern half of SEAD-44A.

The groundwater flow direction in the overburden aquifer at SEAD-44A was toward the west, based on groundwater elevations measured in two monitoring wells at SEAD-44A, and one monitoring well from SEAD-64C on July 25, 1994 (Table 3.6-1 and Figure 3.6-1). Water levels measured in MW44A-2 suggest an anomalous low in the water table in the immediate vicinity of MW44A-2.

TABLE 3.6-1
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-44A

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW44A-1	753.77	3/5/94	2.12	751.65	7/12/94	2.92	750.85	7/6/94	2.03	751.74
								7/25/94	3.55	750.22
MW44A-2	751.71	6/20/94	15.68	736.03	7/12/94	15.08	736.63	7/6/94	16.55	735.16
								7/25/94	15.08	736.63
MW44A-3	749.81	6/20/94	3.72	746.09	7/12/94	3.76	746.05	7/6/94	2.90	746.91
								7/25/94	4.46	745.35
MW64C-6	754.57							7/25/95	4.17	750.40



GROUNDWATER LEVEL MEASURED AT MW44A-2 WAS NOT USED TO CREATE GROUNDWATER ELEVATION CONTOURS. GROUNDWATER LEVEL MEASUREMENTS FROM SEAD 62 AND SEAD 64C WERE USED INSTEAD TO SUPPLEMENT INFORMATION FROM SEAD44A.

LEGEND

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

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

LEGEND

MW60-1
744.44
MONITORING WELL WITH WATER TABLE ELEVATION

744
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/25/94

N

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 3.6-1
SEAD-44A QUALITY ASSURANCE TEST LABORATORY
GROUNDWATER ELEVATION MAP

SCALE 1" = 100'
DATE DECEMBER 1995
REV A

ACAD\SENECA\BHLSVMU\ACADFIG\SD44AGW.DWG

The distribution of ground water in the aquifer was characterized by moist to saturated till directly overlying the weathered shale, and the till/weathered shale contact tended to be dry to moist in each of the borings. Recharge to the monitoring wells during sampling was good at MW44A-1 and MW44A-3, but fair to poor at MW44A-2.

3.7 SEAD-44B: QUALITY ASSURANCE TEST LABORATORY

3.7.1 Site Geology

Till, weathered dark gray shale, and competent gray-black shale were the three major geologic units encountered at three overburden borings drilled at SEAD-44B. In each of the borings, a topsoil horizon was present within 1.5 feet of the ground surface. The depths of the borings at SEAD-44B were up to 14.85 feet below grade.

The till was light brown or gray-brown silt and clay with minor components of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at MW44B-2 and MW44B-3 near the till-weathered shale contact. Oxidation was observed in the upper portion of the till strata as well as the upper portion of the weathered shale.

The contact between the till and the bedrock at each boring location was characterized by weathered shale. The top of the weathered shale was encountered at 8.4 feet below grade at MW44B-1, and continued for 3.75 feet to the point of auger refusal. The weathered shale was first encountered at a depth of 10.2 feet at MW44B-2, and continued for 2.3 feet before competent bedrock was encountered. At MW44B-3, the top of the weathered shale was observed at 9.0 feet below grade and continued for 5.7 feet before competent bedrock was encountered.

Competent shale was not encountered at MW44B-1. Competent gray-black shale was observed in split spoon samples at MW44B-2 and MW44B-3 at depths of 12.2 feet and 14.7 feet below grade, respectively.

3.7.2 Geophysics

3.7.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 44B are shown in Table 3.7-1. The seismic refraction profiles detected 11 to 18 feet of unconsolidated overburden (1,150

TABLE 3.7-1
SEAD-44B
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	2.5	102.7	16.8	85.9
	57.5	104.5	15.6	88.9
	112.5	104.3	16.9	87.4
P2	2.5	96.2	15.0	81.2
	57.5	96.5	18.4	78.1
	112.50	96.7	13.2	83.5
P3	2.5	97.4	12.2	85.2
	57.5	98.2	13.2	85.0
	112.5	98.8	14.1	84.7
P4	2.5	97.9	11.0	86.9
	57.5	98.6	12.4	86.2
	112.5	99.8	13.2	86.6

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-44B seismic profile P4.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

to 3,400 ft./sec.) overlying bedrock (10,500 to 12,600 ft./sec.). In particular, the unconsolidated material included loose, unsaturated overburden (1,150 to 1,180 ft./sec.) and compacted, unsaturated overburden (3,000 to 3,400 ft./sec.). Saturated overburden was not detected by the seismic refraction method used at SEAD 44B. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

A review of the bedrock elevations presented in Table 3.7-1 suggested that the bedrock surface sloped to the west, following the surface topography. Groundwater flow was also expected to be to the west, following the slope of the bedrock.

3.7.3 Site Hydrology and Hydrogeology

Surface water flow at SEAD-44B is controlled by local topography which gently slopes to the west. A shallow east-west trending swale of unknown origin drains the central western edge of SEAD-44B, but the drainage is poor and standing water forms during heavy precipitation. An intermittent south-flowing ditch bordering SEAD-44B to the east drains the site immediately adjacent to the ditch, but most surface water flow leaves SEAD-44B to the west. There are no sustained bodies of water at SEAD-44B.

The groundwater flow direction in the overburden aquifer at SEAD-44B was toward the west, based on ground water elevations measured in the three monitoring wells on July 6, 1994 (Table 3.7-2 and Figure 3.7-1). The distribution of ground water in the aquifer was characterized by moist to saturated till directly overlying the weathered shale interval. The weathered shale intervals in MW44B-2 and MW44B-3 were saturated to bedrock. The weathered shale interval at MW44B-1 was wet to the bottom of the boring. Recharge to the monitoring wells during sampling was fair to good.

3.8 SEAD-50: TANK FARM

3.8.1 Site Geology

Till, weathered dark gray shale, and competent shale were the three major geologic units encountered at the three overburden borings drilled at SEAD-50. Topsoil waspresent within 1.8 feet of the surface at each boring. The depths of the borings at SEAD-50 were up to 10.2 feet below grade.

TABLE 3.7-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-44B

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW44B-1	746.66	4/1/94	1.85	744.81	7/12/94	3.58	743.08	7/6/94	2.56	744.10
								7/25/94	5.06	741.60
MW44B-2	742.57	3/15/94	1.14	741.43	7/29/94	1.38	741.19	7/6/94	2.53	739.98
								7/25/94	4.23	738.28
MW44B-3	743.08	3/22/94	1.72	741.36	7/12/94	3.83	739.25	7/6/94	2.86	740.22
								7/25/94	4.59	738.49

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

MW44B-1
744.1 — MONITORING WELL WITH WATER TABLE ELEVATION

741 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.7-1
SEAD-44B QUALITY ASSURANCE TEST LABORATORY
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 100'	4/14/95	A

The till was brown silt and gray-black shale fragments with minor components of very fine sand and clay. Larger shale fragments (rip-up clasts) were observed at the MW50-3 soil boring near the till-weathered shale contact. Oxidation was noted in the upper portion of the till strata and in the weathered shale.

The contact between the overburden and the bedrock was characterized by a transitional weathered shale interval in MW50-1 and MW50-3. At MW50-1, the top of the weathered shale was determined to be at 4.6 feet below grade, and continued for 3.6 feet before the till boring was terminated. At MW50-2, till directly overlaid competent shale. At MW50-3, a distinct till/weathered shale contact occurred at 2.7 feet below grade. The boring was terminated after drilling through 6.3 feet of the weathered shale, but due to poor recovery, less than a foot of weathered shale was actually observed in the split spoon samples.

Of the three borings drilled at SEAD-50, competent shale was encountered only at MW50-2. The bedrock was not observed, but was inferred from the point of auger refusal at a depth of 6.9 feet below grade. Competent shale was not encountered at MW50-1 and MW50-3. Due to the extent of the weathered shale these two borings were terminated at spoon refusal. Soil boring MW50-1 was terminated 10.2 feet below grade and soil boring MW50-3 was terminated at 8.0 feet below grade.

3.8.2 Geophysics

3.8.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 50 are shown in Table 3.8-1. The seismic refraction profiles revealed between 5 and 14 feet of unconsolidated overburden (900 to 5,000 ft./sec.) overlying bedrock (9,500 to 12,000 ft./sec.). In particular, the unconsolidated material included loose, unsaturated overburden (900 to 1,850 ft./sec.); compact unsaturated overburden (2,200 to 3,500 ft./sec.); and saturated overburden (4,400 to 5,000 ft./sec.). Saturated overburden was detected only beneath the impact points at distance 2.5 feet on profile P1 and distances 2.5 and 57.5 feet on profile P3. In addition, a compact unsaturated overburden layer (3,500 ft./sec.) was detected beneath the mid-spread impact point (distance 57.5 feet) of profile P4.

A review of the seismic refraction results, tabulated in Table 3.8-1, suggested that groundwater flow would be directed towards the northeast, generally following both the surface and bedrock topographies.

TABLE 3.8-1
SEAD-50
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Water Table		Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]	Depth	Elevation[2]
P1	2.5	105.4	5.8	99.6	12.6	92.8
	57.5	104.9			9.2	95.7
	112.5	104.3			7.9	96.4
P2	2.5	95.3			7.3	88.0
	57.5	96.0			6.5	89.5
	112.50	96.3			7.8	88.5
P3	2.5	101.0	5.1	95.9	13.8	87.2
	57.5	100.8	4.5	96.3	12.3	88.5
	112.5	100.5			9.5	91.0
P4	57.5	95.0			8.6	86.4
	112.5	95.8			7.4	88.4

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-50 seismic profile P3.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

3.8.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by drainage ditches throughout SEAD-50. East-flowing drainage ditches are spaced every 65 feet from the northern end of the site to the southern end of the site. A dirt road bisects SEAD-50, running east-west, and has drainage ditches running along both sides which drain the central portion of SEAD-50 to the east. All of the east-flowing ditches to the north of the central road flow into a larger ditch which runs northwest to southeast between SEAD-50 and East Patrol Road. This larger ditch ultimately flows under East Patrol Road and off of the SEDA property boundary to join the drainage ditches which run alongside Route 96. The east-flowing drainage ditches to the south of the central road join another drainage ditch which separates SEAD-50 from East Patrol Road. This drainage flows into a small sustained stream which flows under East Patrol Road through a culvert, exits the SEDA property boundary adjacent to the southeast corner of SEAD-50 and ultimately flows to the north in Hicks Gully. Hicks Gully flows through the Town of Romulus and eventually drains into Cayuga Lake.

The groundwater flow direction in the overburden aquifer at SEAD-50 was toward the northwest based on ground water elevations measured in the three monitoring wells on July 6, 1994 (Table 3.8-2 and Figure 3.8-1). The distribution of ground water in the aquifer was characterized by moist to saturated till. The weathered shale encountered at each of the borings tended to be moist to dry. Recharge to the monitoring wells during sampling was fair to poor.

3.9 SEAD-58: BOOSTER STATION (BUILDING 2131)

3.9.1 Site Geology

Till, weathered dark gray shale, and competent shale were the three major geologic units encountered at seven overburden borings drilled at SEAD-58. In each of the borings, a topsoil horizon was present within 1.5 feet of the ground surface. The depths of the borings at SEAD-58 were up to 11.0 feet below grade.

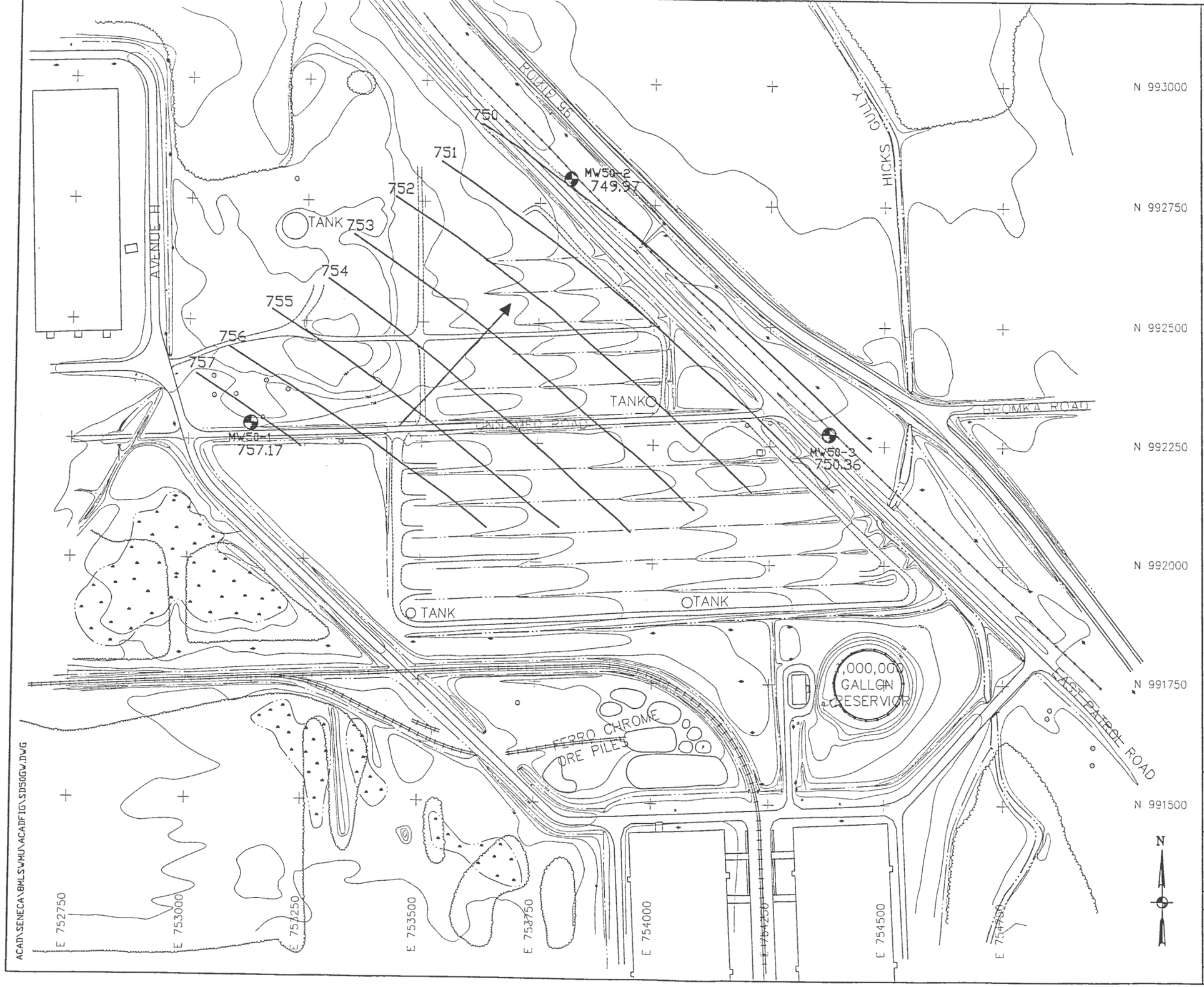
The till was light to dark brown silt, sand, and clay, with minor amounts of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at the bottom of the till at MW58-4 and at SB58-1.

The contact between the till and competent bedrock was characterized in each of the borings by an interval of weathered shale. At MW58-1 and SB58-4, the bottom of till was marked by the presence of fine to coarse shale fragments, and at MW58-2, SB58-2, and SB58-3 the

TABLE 3.8-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-50

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW50-1	761.31	3/30/94	2.76	758.55	7/12/94	5.13	756.18	7/6/94 7/25/94	4.14 5.80	757.17 755.51
MW50-2	752.93	3/30/94	1.98	750.95	7/18/94	3.88	749.05	7/6/94 7/25/94	2.96 3.82	749.97 749.11
MW50-3	755.36	3/14/94	3.54	751.82	7/18/94	6.12	749.24	7/6/94 7/25/94	5.00 6.04	750.36 749.32



ACAD\SENECA\BMLSW\MU\ACADFIG\SD50GW.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

MW50-1
757.17 — MONITORING WELL WITH WATER TABLE ELEVATION

754 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

100 0 100 200
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.8-1
SEAD-50 TANK FARM AREA
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 200'	DECEMBER 1995	A

contact between till and weathered shale was distinct. At MW58-3, a granite boulder was encountered 4.9 to 8.0 feet below grade. The sample recovered at 8.0 feet was weathered shale, and the bottom of the overburden was presumed to be at 8.0 feet. Depths to the bottom of the overburden and thicknesses of the weathered shale are presented below.

Competent shale was encountered at six of the seven borings at depths between 7.5 and 11.0 feet below grade. Competent shale was inferred by the point of auger or spoon refusal. Competent shale was not encountered at MW58-3. This boring was terminated in the weathered shale at the point of spoon refusal (10.5 feet below grade). Depths to bedrock and total boring depths are presented below.

Boring Location	Depth to Bottom of Overburden (feet)	Thickness of Weathered Shale (feet)	Depth to Bedrock (feet)	Depth to Bottom of Boring (feet)
MW58-1	8.0	3.0	11.0	11.0
MW58-2	8.0	1.6	9.6	9.6
MW58-3	8.0	ND	ND	10.5
MW58-4	4.7	4.8	9.5	9.5
SB58-1	6.2	2.3	8.5	8.5
SB58-2	7.3	0.7	8.0	8.0
SB58-3	7.2	0.3	7.5	7.5

ND = Not Determined

3.9.2 Geophysics

3.9.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 58 are shown in Table 3.9-1. The seismic refraction profiles detected 10.5 to 15 feet of compact, unconsolidated overburden (2,300 to 3,100 ft./sec.) overlying bedrock (9,650 to 11,200 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

TABLE 3.9-1
SEAD-58
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	-5	100.3	10.5	89.8
	57.5	100.2	12.5	87.7
	120	100.0	12.6	87.4
P2	-5	103.4	13.5	89.9
	57.5	104.0	15.1	88.9
	120	105.0	16.6	88.4
P3	-5	107.1	11.5	95.6
	57.5	106.6	11.0	95.6
	120	106.0	10.5	95.5
P4	-5	103.0	15.0	88.0
	57.5	103.9	14.4	89.5
	120	104.7	12.0	92.7

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-58 seismic profile P1.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

A review of the bedrock elevations, tabulated in Table 3.9-1, suggested that the bedrock surface sloped to the west-northwest. Groundwater flow was also expected to be directed to the west-northwest, following the slope of the bedrock.

3.9.2.2 EM-31 Survey

The results of the apparent ground conductivity survey as SEAD 58 are shown in Figure 3.9-1. An area of low apparent ground conductivity (11.2 m s/m) was detected in the central portion of SEAD-58. The central location of this area of low apparent ground conductivity roughly coincided with the area of stressed vegetation observed at SEAD-58. This conductivity feature may be attributed to a decrease in the depth to bedrock or to a decrease in the clay content of the soil. A prominent lineament observed along the southern boundary of the EM grid was presumably associated to an underground utility. Several localized areas of low conductivity measurements were observed to the north of the presumed underground utility which were correlated to areas with surface debris.

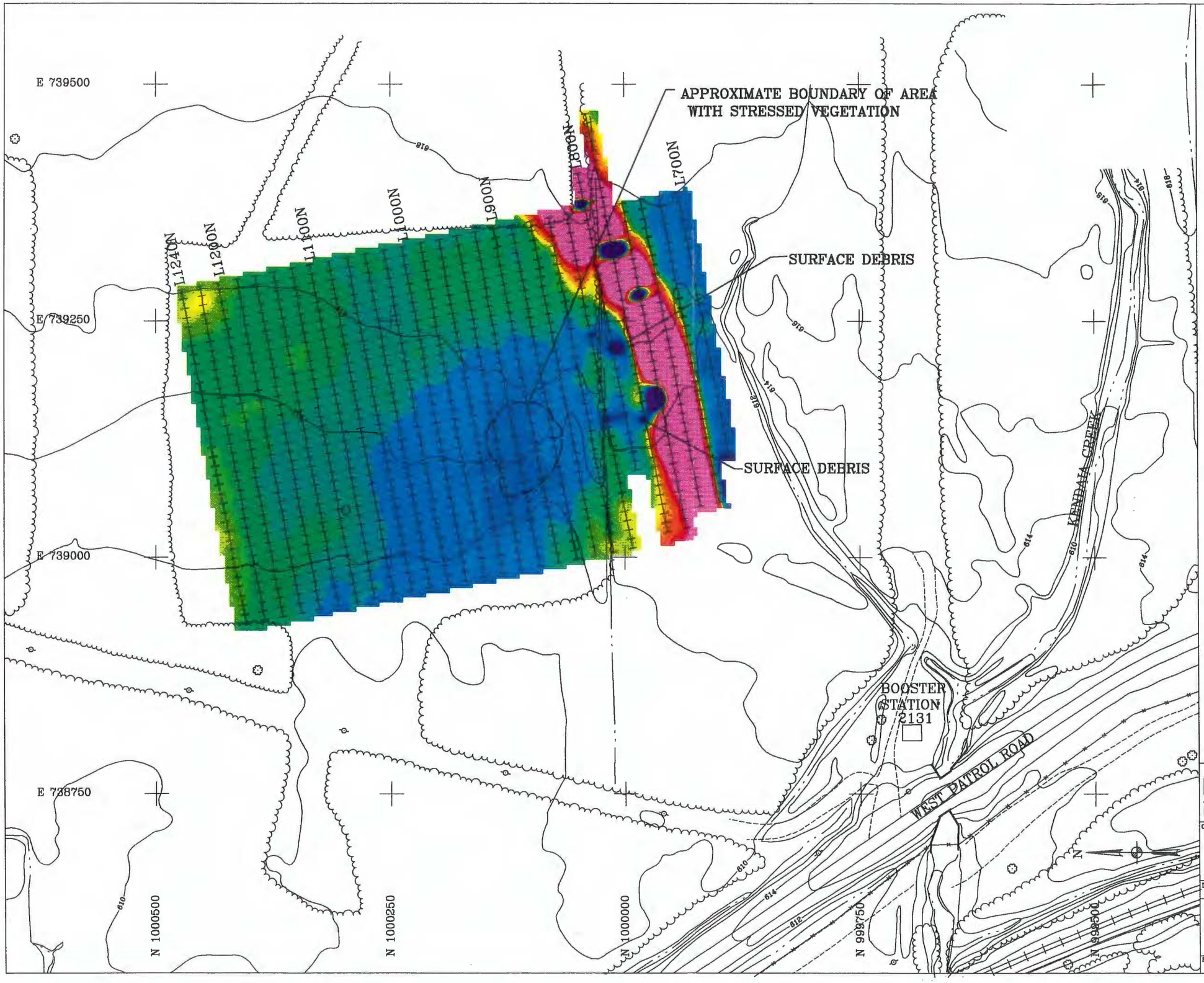
Figure 3.9-2 shows the in-phase response of the EM-31 survey conducted at SEAD 58. Anomalies associated with the suspected buried utility and the surface debris in the southern portion of the EM grid were observed. The in-phase response data collected over the remainder of SEAD-58 showed a generally featureless response.

3.9.2.3 GPR Survey

The GPR survey conducted at SEAD 58 revealed homogeneous layered soils to depths of 4 to 5 feet below grade. Several irregular hyperbolic reflections were observed within the soil layer indicating the presence of large boulders. No anomalies were detected which could be associated to buried metallic objects. An area of attenuated reflections was detected in the central portion of the survey grid. The extent of this area of attenuated reflections was identical to that of the area of low apparent ground conductivity identified by the EM-31 survey.

3.9.2.4 Test Pitting Program

A total of six test pits were excavated at SEAD 58 to characterize the sources of the geophysical anomalies and to characterize the nature of the soils in the area of stressed vegetation. Three test pits (TP58-1, TP58-2, and TP58-3) were situated throughout the area of stressed vegetation and low apparent ground conductivity. Test pits TP58-4, TP58-5 and



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

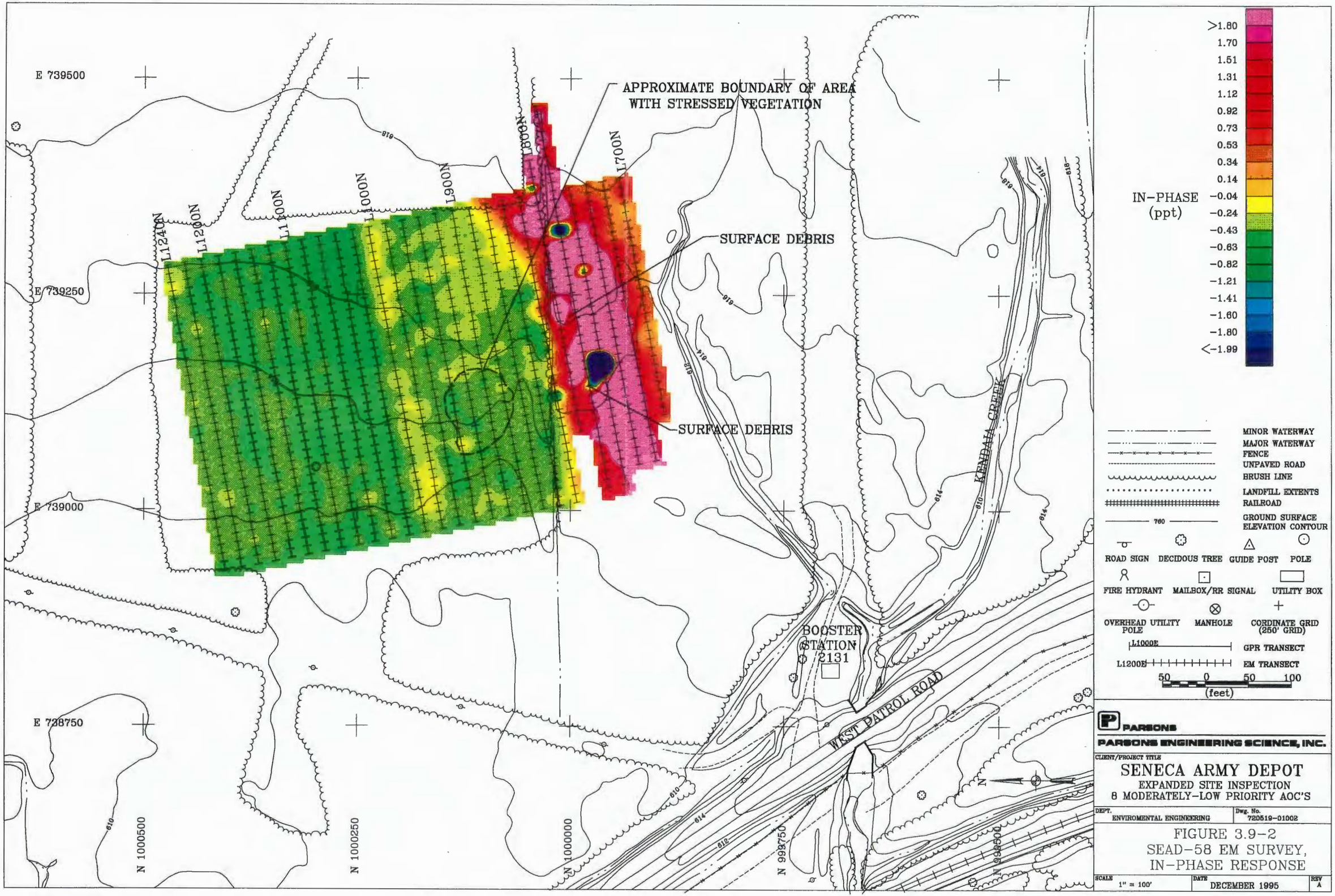
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.9-1
SEAD-58 EM SURVEY, QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.9-2
SEAD-58 EM SURVEY,
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

TP58-6 were located in the southern portion of SEAD-58 and were centered over the EM anomalies which were correlated to areas with surface debris. The test pit logs are presented in Appendix B. Naturally layered soils were observed at all six test pit locations. No evidence of previous excavations or disposal activities were found in any of the test pit excavations.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro rems per hour of radiation) were observed during the excavations.

3.9.3 Site Hydrology and Hydrogeology

Surface water flow at SEAD-58 is controlled by local topography which slopes gently to the west. A sustained stream bordering SEAD-58 to the south flows east to west and discharges to Kendaia Creek (approximately 200 feet to the south of SEAD-58). Approximately 400 feet to the south of SEAD-58, Kendaia Creek flows under West Patrol Road and exits the SEDA property. A small, intermittent drainage swale runs east to west divides SEAD-58 in half. This drainage swale it flows west and drains to a powerline clear-cut which drains to the south into another small drainage swale which flows west and discharges to Kendaia Creek. Surface water flow that does not reach either of these on-site drainages eventually flows into the ditch which runs along West Patrol Road and then into Kendaia Creek where it exits the SEDA property.

The groundwater flow direction in the overburden aquifer at SEAD-58 was toward the southwest, based on ground water elevations measured in the four monitoring wells on July 6, 1994 (Table 3.9-2 and Figure 3.9-3). The distribution of ground water in the overburden aquifer was characterized by wet to saturated soil within the till, and weathered shale was saturated to bedrock at most locations. No saturation of the overburden was observed at SB58-2 which is a located in the center of the northern half of SEAD-58. Recharge to the monitoring wells during sampling was fair to good.

3.10 SEAD-59: FILL AREA (WEST OF BUILDING 135)

3.10.1 Site Geology

Fill material, till, weathered dark gray shale, and competent gray-black shale were the four major geologic units encountered at the nine overburden borings drilled at SEAD-59. Very little topsoil was present at most of the boring locations. Several of the borings were drilled on a gravel surface, and no topsoil was encountered at these locations. The depths of the

TABLE 3.9-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-58

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW58-1	618.92	5/15/94	2.14	616.78	7/11/91	3.78	615.14	7/6/94 7/26/94	3.07 4.40	615.90 614.57
MW58-2	616.18	5/15/94	1.85	614.33	7/11/94	3.28	612.90	7/6/94 7/26/94	2.20 3.66	613.98 612.52
MW58-3	611.98	5/16/94	2.09	609.89	7/12/94	4.13	607.85	7/6/94 7/26/94	2.85 5.66	609.13 606.32
MW58-4	614.05	5/16/94	3.07	610.98	7/11/94	5.30	608.75	7/6/94 7/26/94	4.43 6.66	609.62 607.39

E 739500

E 739250

E 739000

E 738750

N 1000500

N 1000250

N 1000000

N 999750

616

615

614

613

612

611

610

609

615.90
MW58-1

613.98
MW58-2

609.62
MW58-4

MW58-3
609.13

KENDAIA CREEK

BOOSTER STATION 2131

WEST PATROL ROAD

ACAD\SENECA\SHLS\WHUAAC\DFIG\SDSBGW.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

MW58-1
615.90 — MONITORING WELL WITH WATER TABLE ELEVATION

616 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 3.9-3
SEAD-58 DEBRIS AREA NEAR BOOSTER STA. 2131
GROUNDWATER ELEVATION MAP

SCALE 1" = 100'
DATE DECEMBER 1995
REV A

borings at SEAD-59 were between 8.0 and 20.5 feet below grade. Fill material was encountered at seven of the nine boring locations. The only borings where fill was not encountered were the two downgradient monitoring well locations, MW59-1 and MW59-2. The fill was lithologically similar to the till in that it was characterized by silt with minor components of sand and shale fragments, but was differentiated from the till by its color, which tended to be gray brown or tan, and the presence of gravel, asphalt, wood and other organic material. The fill overlaid till at each boring location except at SB59-1 where fill material directly overlaid bedrock. The fill was deepest at soil borings SB59-1 and SB59-4, at 10.5 feet and 10.4 feet below grade, respectively. The average depth to the bottom of the fill was 6.5 feet below grade.

Boring MW59-3A was the first boring drilled in an attempt to install the upgradient monitoring well. Because fill material was encountered down to 8.0 feet at MW59-3A, that boring was terminated at 8.0 feet below grade. The well location was moved further upgradient and was installed at the MW59-3 boring location.

The till was light brown silt, very fine sand, and clay, with minor components of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at some locations at the bottom of the till unit.

The weathered shale that forms the transition between till and competent shale was encountered at five of the nine boring locations. At boring locations MW59-3 and SB59-2, the contact between till and weathered shale was distinct. At the remaining three boring locations the fine to medium shale fragments were observed at the bottom of the till. The depths to the bottom of the overburden and the thicknesses of the weathered shale are presented in the table below.

Boring Location	Depth to Bottom of Fill (feet)	Depth to Bottom of Overburden (feet)	Thickness of Weathered Shale (feet)	Depth to Bedrock (feet)
MW59-1	NA	8.9	1.2	10.1
MW59-2	NA	11.4	0	11.4
MW59-3	3.5	6.6	2.15	8.75
MW59-3A	8.0	ND	ND	ND

SB59-1	10.5	10.5	NA	12.5
SB59-2	4.5	9.1	0.9	10.0
SB59-3	2.0	7.8	1.7	9.5
SB59-4	10.4	17.7	2.8	20.5
SB59-5	7.0	15.6	ND	ND

NA = Not Applicable
ND = Not Determined

Competent gray-black shale was observed at MW59-3 and SB59-1 at 8.0 and 10.5 feet below grade, respectively. At the remainder of the boring locations, except for MW59-3A and SB59-5, bedrock was inferred from the point of auger or spoon refusal at depths ranging from 8.75 to 20.5 feet below grade. Competent shale was not encountered at MW59-3A or SB59-5. Depths to bedrock are presented in the table above.

3.10.2 Geophysics

3.10.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 59 are shown in Table 3.10-1. The seismic refraction profiles detected 5 to 10 feet of unconsolidated overburden (1,050 to 1,730 ft./sec.) overlying bedrock (10,500 to 15,500 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

The overburden velocities of profile P1 were slightly elevated (1,730 ft/sec.) in comparison to the overburden velocities typically measured at SEDA (in the range of 1000 ft./sec. to 1400 ft./sec.). This seismic transect was located in an area of high traffic. Compaction of the soils in this area should be considered as the probable cause of the elevated overburden velocities observed at SEAD 59. The locations of the seismic profiles surveyed at SEAD 59 are shown in Figure 2.12-1.

The elevations of the bedrock surface, tabulated in Table 3.10-1, indicated that the bedrock sloped to the west, generally following the surface topography. Groundwater flow was also expected to be directed to the west, following the slope of the bedrock.

TABLE 3.10-1
SEAD-59
EXPANDED SITE INSPECTION
RESULTS OF SEISMIC REFRACTION SURVEY

			Bedrock	
Profile	Distance[1]	Ground Elevation[2]	Depth	Elevation[2]
P1	2.5	100.4	10.0	90.4
	57.5	100.5	9.7	90.8
	112.5	101.5	11.2	90.3
P2	2.5	96.3	7.1	89.2
	57.5	96.3	7.1	89.2
	112.5	96.6	6.1	90.5
P3	2.5	96.1	2.9	93.2
	57.5	96.7	4.8	91.9
	112.5	96.4	6.4	90.0
P4	2.5	96.7	6.2	90.5
	57.5	96.2	5.3	90.9
	112.5	97.2	6.2	91.0

[1]All distances are in feet along the axis of the seismic profile and were measured from geophone #1 of each profile.

[2]All elevations are relative to an arbitrary datum established at geophone #1 of the SEAD-5 seismic profile P1.

NOTE: Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (less than 2 feet) overlying the bedrock surface would be undetectable.

3.10.2.2 EM-31 Survey

Figure 3.10-1 shows the results of the apparent ground conductivity survey at SEAD 59. Several zones of high apparent ground conductivity anomalies (anomalies 59-1, 59-2, and 59-3) were observed in the northeastern portion of the EM grid which coincided with areas used for site access and equipment storage. A large area of elevated ground conductivity (59-4) also located in the northeastern portion of the EM grid could be attributed to an increase in the clay content of the fill material or to the presence of dissolved solids in the groundwater or soil moisture. A north-south trending lineament was detected near the western boundary of the EM grid and was correlated to a drainage swale having a large quantity of clay sediment along its length.

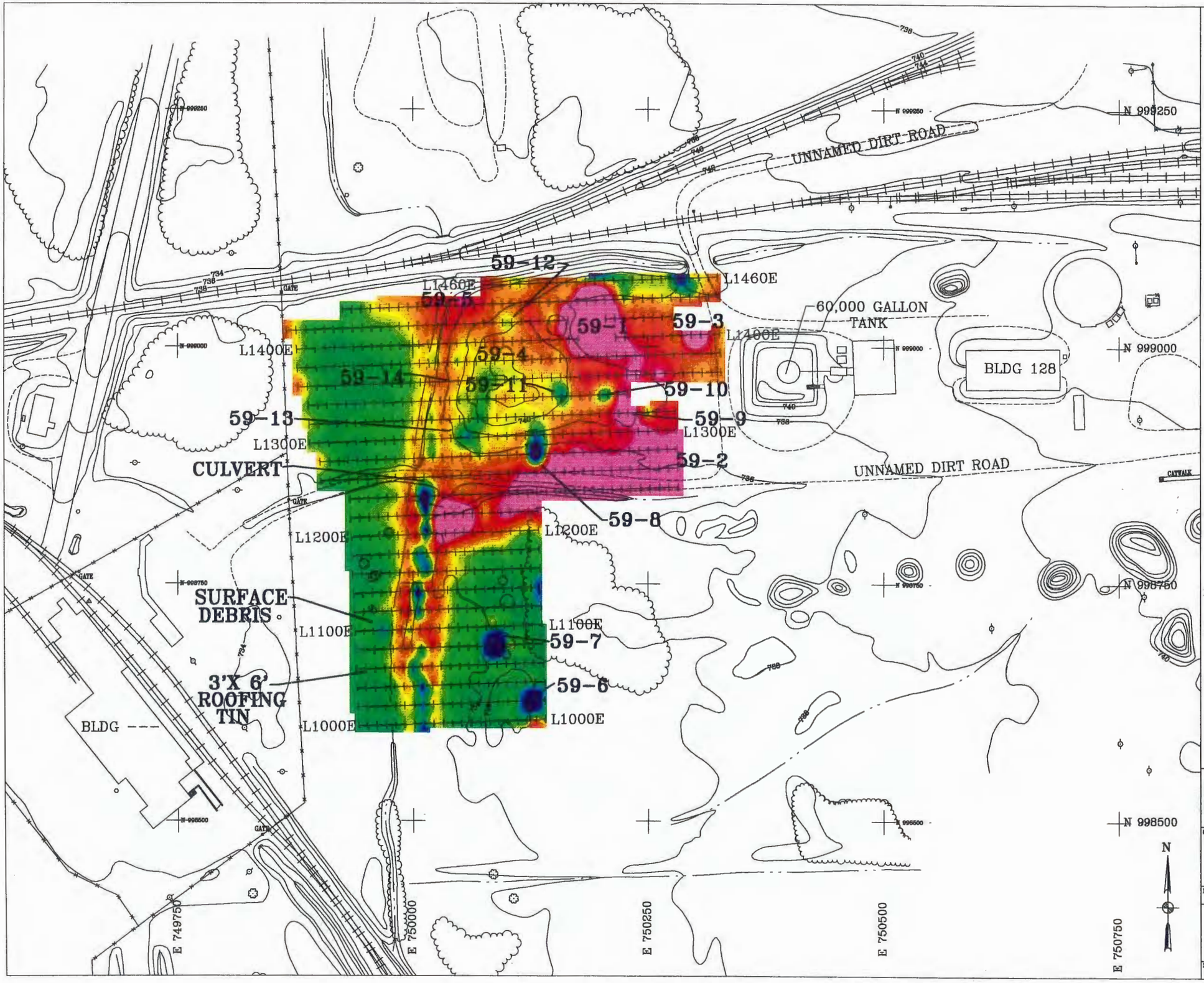
Nine localized anomalies (anomalies 59-5 through 59-13) were detected throughout the EM grid at SEAD-59. One of the 9 localized anomalies was correlated to surface features: anomaly 59-5 was attributed to a drainage culvert located under the railroad spur along the northern boundary of the EM grid, and the second was correlated to an area of surface debris located in the southwestern portion of the EM grid. The sources of the remaining 8 localized anomalies could not be attributed to surface features.

The results of the in-phase response are shown in Figure 3.10-2. Eight localized in-phase response anomalies were associated to the eight apparent ground conductivity anomalies of unknown origin (59-6 through 59-13). Several larger anomaly areas were detected in the northeastern quadrant of the EM grid and were associated to cultural features (anomalies 59-1,2 and 3). The in-phase response measured throughout the remainder of the EM grid showed a relatively featureless response, including the north-eastern portion of the EM grid where the disposal of construction debris was evident on the ground surface.

Although many anomalies were observed in both the apparent ground conductivity and in-phase data, no clearly defined boundaries of the large fill area in the northeastern portion of the EM grid could be determined.

3.10.2.3 GPR Survey

The GPR profiles acquired at SEAD-59 revealed 17 locations where buried metallic objects were suspected. A small disposal pit was also detected in the southeastern portion of the area investigated. Twelve of the buried metallic object locations were situated within the suspected disposal area in the northeastern quadrant of SEAD-59. Ten of the GPR anomaly



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

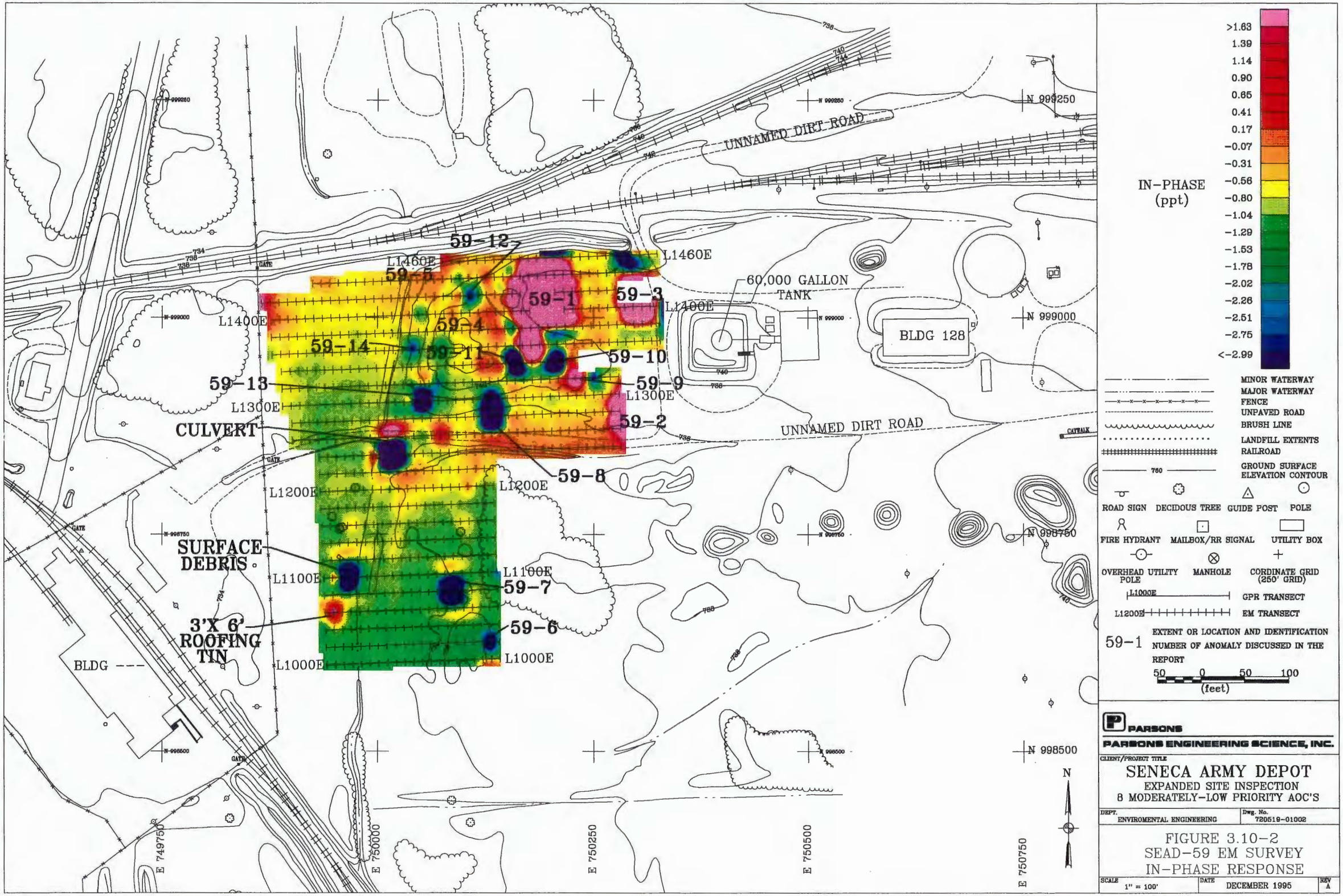
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 3.10-1
SEAD-59 EM SURVEY,
QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A


59-12
59-5
59-1
59-3
59-4
59-14
59-11
59-10
59-13
59-9
59-2
59-8
59-7
59-6
L1460E
L1400E
L1300E
L1200E
L1100E
L1000E
CULVERT
SURFACE DEBRIS
3'X 6' ROOFING TIN
BLDG ---
60,000 GALLON TANK
BLDG 128
UNNAMED DIRT ROAD
UNNAMED DIRT ROAD
N 999250
N 999000
N 998750
N 998500
E 749750
E 750000
E 750250
E 750500
E 750750
GATE
CATWALK
N
IN-PHASE (ppt)
>1.63
1.39
1.14
0.90
0.65
0.41
0.17
-0.07
-0.31
-0.56
-0.80
-1.04
-1.29
-1.53
-1.78
-2.02
-2.26
-2.51
-2.75
<-2.99
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760
GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E
GPR TRANSECT
L1200E
EM TRANSECT
59-1
EXTENT OR LOCATION AND IDENTIFICATION NUMBER OF ANOMALY DISCUSSED IN THE REPORT
50 0 50 100
(feet)
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S
DEPT.
ENVIROMENTAL ENGINEERING
Dwg. No.
720519-01002
FIGURE 3.10-2
SEAD-59 EM SURVEY
IN-PHASE RESPONSE
SCALE
1" = 100'
DATE
DECEMBER 1995
REV
A

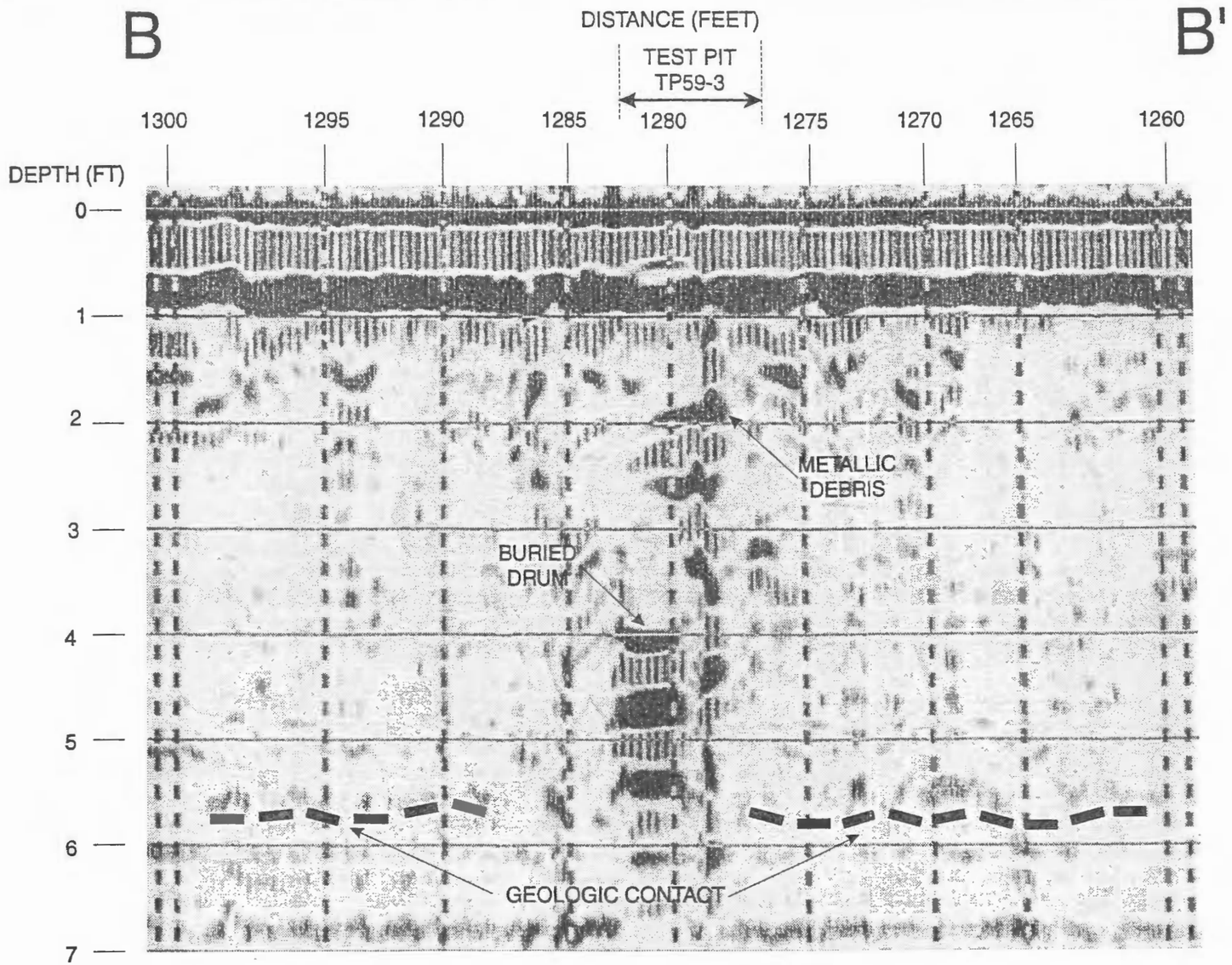
locations were either situated over a localized EM anomaly or within 15 feet of a localized EM anomaly. Figure 3.10-3 shows one of the GPR profiles acquired over the EM/GPR anomaly which was later investigated as Test Pit TP59-3. The small disposal pit located in the southeastern portion of SEAD-59 was associated to both in-phase response and apparent ground conductivity anomalies. Figure 3.10-4 shows one of the GPR profiles acquired over this disposal pit. Four suspected buried metallic object locations were also located in close proximity (within 60 feet) to the small disposal pit.

3.10.2.4 Test Pitting Program

Five test pits were performed at SEAD-59. Test pit TP59-1 was centered over the small disposal pit located in the southern portion of SEAD-59. Test pit TP59-5 was located in the surface debris pile associated with the western-most negative in-phase anomaly. Test pits TP59-3 and TP59-4 were centered over areas of EM and GPR anomalies located in the fill area. TP59-2 was also located in the fill area. The test pit logs are presented in Appendix B.

Construction debris was excavated from test pits TP59-2, TP59-4 and TP59-5. A layer of petroleum hydrocarbon stained silt (having a distinct diesel odor) was intersected in the 1.4 to 1.8 feet depth interval of test pit TP59-4. This layer was screened with a PID organic vapor meter and a maximum reading of 132 ppm of organic vapors was recorded. Soil sample TP59-4 was collected from this depth interval. The excavation at TP59-1 revealed a large quantity of filled 2 gallon paint cans approximately 1 foot below the ground surface. Several zones of paint stained soil were observed and screened with a PID organic vapor meter. Soil and paint from the zone with the highest organic vapor reading (560 ppm) were collected and submitted for chemical analysis as soil sample TP59-1. A 0.6 foot thick layer of construction debris had been disposed of over the paint cans. This debris included a crushed, yellow, 20 gallon waste can and chain link fencing. A 5 inch thick layer of crushed shale gravel overlaid the construction debris.

Three 55 gallon drums were found 3 feet below grade at the TP59-3 location. One drum had been buried in an upright position and the two others were found in a horizontal position. The excavation was halted when these drums were unearthed, therefore, the existence of additional drums at greater depths remained unknown. Soils from the spaces between the drums were collected and identified as soil sample TP59-3. One end of one of the horizontally positioned drums was separated from the body of the drum, revealing a white, flexible, plastic-like substance. Some areas of this white substance showed a dark-yellow



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	720519-02000

FIGURE 3.10-3
SEAD 59
GPR PROFILES B-B'

SCALE	DATE
	NOVEMBER 1994

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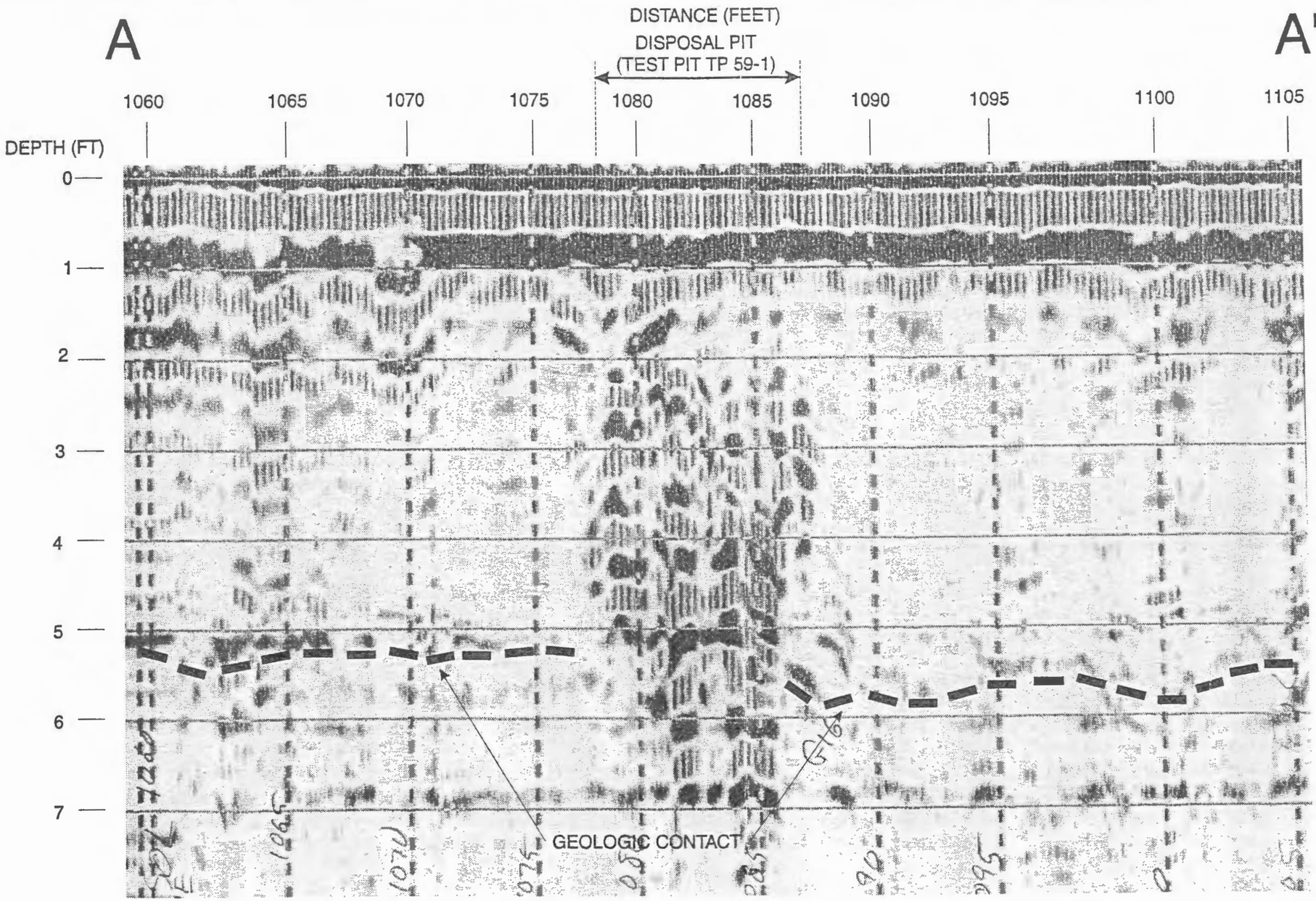


PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-02000

FIGURE 3.10-4
SEAD 59
GPR PROFILE A-A'

SCALE | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\RADAR\19-310-4.CDR

staining. A small amount of this substance was collected in a VOC vial and submitted for VOC analysis as sample number TP59-3X.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a victoreen-190, respectively. With the exception of the readings from the petroleum stained soil layer at TP59-4 and the paint stained soil from TP59-1, no other readings above background levels (0 ppm of organic vapors and 10-15 microrems per hour of radiation) were observed during the excavations.

3.10.3 Site Hydrology and Hydrogeology

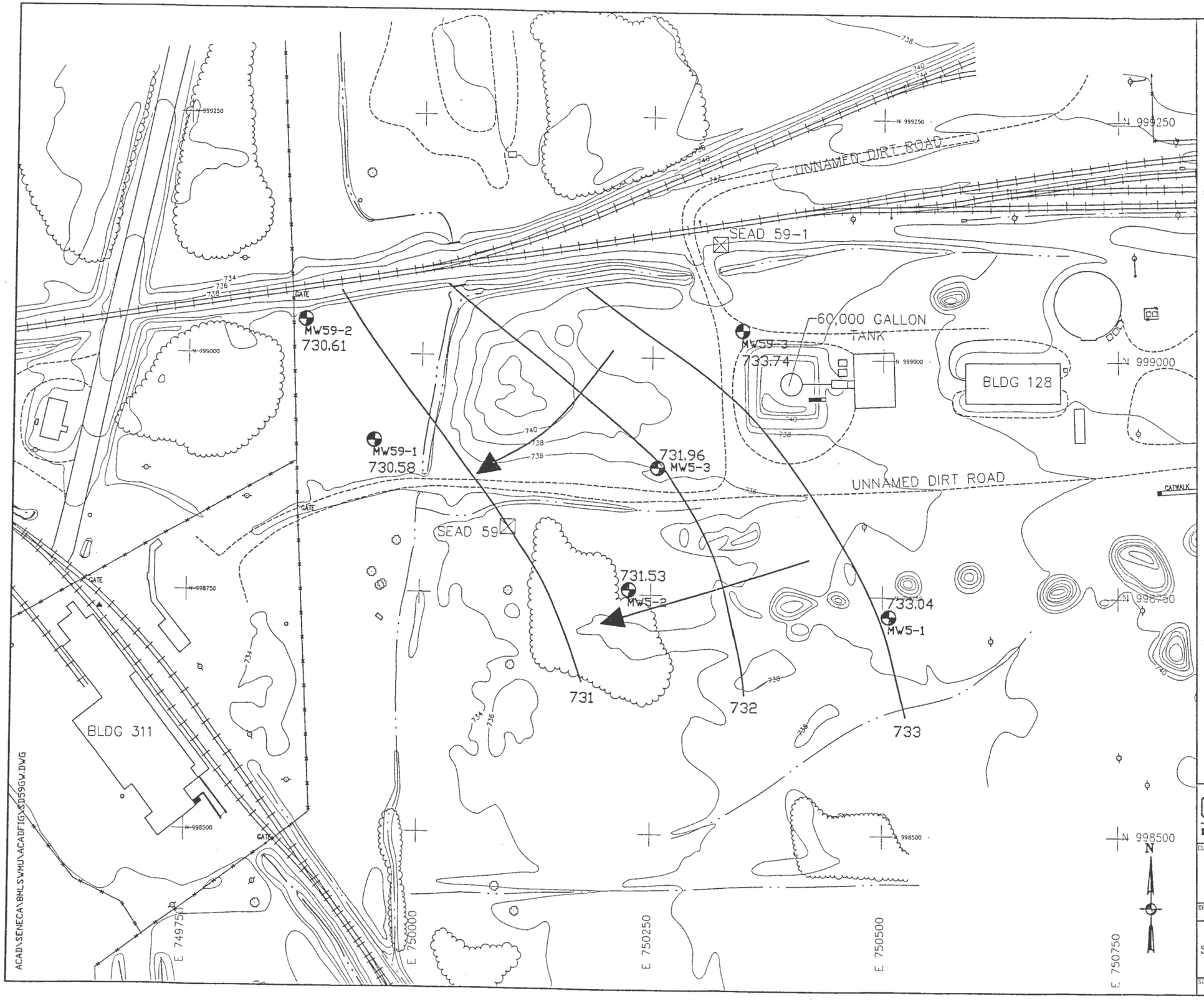
Surface water flow from precipitation events is to the west and is controlled by local topography. The southwestern portion of SEAD-59 gently slopes to the west, but the most significant topographic feature at SEAD-59 is the hill composed of fill material in the northeastern portion of SEAD-59. To the east, the hill slopes to a graded gravel surface used for storing large equipment. To the west, the hill slopes steeply to a drainage swale which flows north under the SEDA railroad spur reading to Building 127. To the north, the hill slopes to a sustained drainage ditch approximately two feet deep which flows to the west and then under the same railroad spur previously discussed. This ditch which drains the equipment storage area which borders SEAD-59 to the east and the railroad spur which borders SEAD-59 to the north. The hill slopes to the south to a dirt and gravel road which runs through the central portion of SEAD-59. Two drainage swales border this road and drain the central portion of SEAD-59. These drainage ditches direct flow to the west and also drain SEAD-5. All surface runoff from the south to north flowing drainage swale located immediately west of the fill area.

The groundwater flow direction in the overburden aquifer at SEAD-59 was toward the southwest based on ground water elevations measured in the three monitoring wells at SEAD-59 and the three monitoring wells at SEAD-5 on July 6, 1994 (Table 3.10-2 and Figure 3.10-5). The distribution of ground water in the overburden aquifer was characterized by saturated soil in the lower till strata and the weathered shale. At SB59-1 where the fill directly overlaid bedrock, the lower portion of the fill material was saturated. Recharge to the monitoring wells during sampling was good.

TABLE 3.10-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-59

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW59-1	734.86	3/21/94	1.72	733.14	3/30/94	1.60	733.26	7/6/94 7/26/94	4.28 4.44	730.58 330.42
MW59-2	736.20	3/8/94	3.40	732.80	7/21/94	6.55	729.65	7/6/94 7/26/94	5.59 5.58	730.61 730.62
MW59-3	737.61	3/20/94	1.44	736.17	7/21/94	5.20	732.41	7/6/94 7/26/94	3.87 3.91	733.74 733.70



ACAD\SENECA\BHLSWMU\ACADFIG\SD59GW.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

MW59-1
730.61 — MONITORING WELL WITH WATER TABLE ELEVATION

731 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.10-5
SEAD-59 FILL AREA WEST OF BLDG. 135
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 100'	DECEMBER 1995	A

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.

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-94-4046) issued in January 1994. 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 Grounds site, the 10 AOCs investigated in the previous ESI, and the 15 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: arsenic, barium, beryllium, cadmium, cobalt, copper, lead, mercury, selenium, and vanadium. The SEDA background soil concentrations were used for the following metals: aluminum, antimony, calcium, chromium, 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:

	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 Federal Primary Drinking Water Maximum Contaminant Levels and NYSDEC Class GA Standards and Guidelines. Because New York State has promulgated the Class GA standards, they are legally enforceable.

Surface water criteria were from the NYSDEC Water Quality Regulations for Surface Water and Groundwaters (6NYCRR Parts 700-705).

Some NYSDEC criteria are based on the hardness of the surface water. The average water hardness for the SEDA site (217 mg/L) was calculated using data from two upstream surface water samples: 232 mg/L at SW-801 from the Ash Landfill remedial investigation and 201 mg/L at SW-196 from the OB Grounds remedial investigation. Hardness was used to calculate NYSDEC criteria for the following metals: cadmium, chromium, copper, lead, nickel, silver, and zinc.

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 lowest effect level and severe effect level. A sediment is considered contaminated if either the lowest effect level or severe effect level is exceeded. If both criteria are exceeded, the sediment is considered to be severly impacted.

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 that were analyzed, are included in Appendix E.

4.1 SEAD-5 SEWAGE SLUDGE WASTE PILE

4.1.1 Introduction

A total of five soil samples and three groundwater samples were collected as part of the SEAD-5 investigation. The following sections describe the nature and extent of contamination identified at SEAD-5.

4.1.2 Soil

The analytical results for the 5 test pit soil samples collected as part of the SEAD-5 investigation are presented in Table 4.1-1. The following sections describe the nature and extent of contamination in the soils at SEAD-5. The sample locations are shown in Figure 2.3-2.

4.1.2.1 Volatile Organic Compounds

No Volatile organic compounds were found in the soil samples collected at SEAD-5.

4.1.2.2 Semivolatile Organic Compounds

A total of 23 semivolatile organic compounds were found at varying concentrations in the soil samples collected at SEAD-5. Six PAH's exceeded their associated TAGM values. The highest concentrations of benzo(a)anthracene (2,200 μg/kg), chrysene (2,600 μg/kg), benzo(b)fluoranthene (2,300 μg/kg), and benzo(k)fluoranthene (2,100 μg/kg), were all found in sample TP5-1. Dibenz(a,h)anthracene was found at a concentration of 250J μg/kg in sample TP5-3. 4-chloroaniline was detected in soil sample TP5-2 (530 μg/kg) above the associated TAGM value. The remaining 16 SVOs were detected at concentrations which were below their respective TAGM values. Figure 4.1-1 shows the distribution of PAHs in the sludge piles at SEAD-5.

4.1.2.3 Pesticides and PCBs

A total of 13 Pesticides/PCBs were detected in the soil samples collected at SEAD-5. All of the detected pesticides and PCB compounds were found at concentrations ranging from 1.9 μg/Kg to 25 μg/Kg and all were found at concentrations which were well below their respective TAGM values.

4.1.2.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-5.

TABLE 4.1-1

SENECA ARMY DEPOT
SEAD-5 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-5 7 02/20/94 TP5-1 212039 42494	SOIL SEAD-5 3 02/17/94 TP5-2 211730 42460	SOIL SEAD-5 3 02/18/94 TP5-3 211731 42460	SOIL SEAD-5 3 02/18/94 TP5-4 211732 42460	SOIL SEAD-5 3 02/18/94 TP5-5 211733 42460
SEMIVOLATILE ORGANICS										
Phenol	ug/Kg	31	20%	330	0	1000 U	31 J	390 U	380 U	4500 U
Naphthalene	ug/Kg	120	40%	13000	0	120 J	380 U	20 J	380 U	4500 U
4-Chloroaniline	ug/Kg	530	80%	330	1	1000 U	530	24 J	42 J	300 J
2-Methylnaphthalene	ug/Kg	28	20%	36400	0	1000 U	28 J	390 U	380 U	4500 U
Acenaphthylene	ug/Kg	110	40%	41000	0	110 J	380 U	54 J	380 U	4500 U
Acenaphthene	ug/Kg	270	40%	50000*	0	270 J	380 U	27 J	380 U	4500 U
Dibenzofuran	ug/Kg	120	40%	6200	0	120 J	380 U	20 J	380 U	4500 U
Fluorene	ug/Kg	230	40%	50000*	0	230 J	380 U	39 J	380 U	4500 U
Phenanthrene	ug/Kg	2700	80%	50000*	0	2700	76 J	520	29 J	4500 U
Anthracene	ug/Kg	440	40%	50000*	0	440 J	380 U	120 J	380 U	4500 U
Carbazole	ug/Kg	780	40%	50000*	0	780 J	380 U	50 J	380 U	4500 U
Fluoranthene	ug/Kg	5100	100%	50000*	0	5100	120 J	1400	56 J	240 J
Pyrene	ug/Kg	3700	100%	50000*	0	3700	150 J	1200	50 J	300 J
Butylbenzylphthalate	ug/Kg	43	20%	50000*	0	1000 U	43 J	390 U	380 U	4500 U
Benzo(a)anthracene	ug/Kg	2200	80%	220	2	2200	85 J	800	27 J	4500 U
Chrysene	ug/Kg	2600	100%	400	2	2600	110 J	840	33 J	230 J
bis(2-Ethylhexyl)phthalate	ug/Kg	5600	100%	50000*	0	1400	720	890	860	5600
Benzo(b)fluoranthene	ug/Kg	2300	100%	1100	1	2300	120 J	900	35 J	230 J
Benzo(k)fluoranthene	ug/Kg	2100	80%	1100	1	2100	89 J	710	33 J	4500 U
Benzo(a)pyrene	ug/Kg	2500	100%	61	4	2500	110 J	840	32 J	220 J
Indeno(1,2,3-cd)pyrene	ug/Kg	1300	80%	3200	0	1300	80 J	580	21 J	4500 U
Dibenz(a,h)anthracene	ug/Kg	250	40%	14	2	1000 U	34 J	250 J	380 U	4500 U
Benzo(g,h,i)perylene	ug/Kg	1100	80%	50000*	0	1100 J	92 J	600	26 J	4500 U
PESTICIDES/PCB										
beta-BHC	ug/Kg	1.9	20%	200	0	1.9 U	2 U	4 U	2 U	1.9 J
gamma-BHC (Lindane)	ug/Kg	4.3	20%	60	0	1.9 U	2 U	4 U	2 U	4.3 J
Heptachlor	ug/Kg	7.5	20%	100	0	1.9 U	2 U	4 U	2 U	7.5 J
Aldrin	ug/Kg	2.4	20%	41	0	1.9 U	2.4 J	4 U	2 U	2.3 U
Heptachlor epoxide	ug/Kg	2.7	20%	20	0	1.9 U	2 U	4 U	2 U	2.7 J
4,4'-DDE	ug/Kg	25	80%	2100	0	8 J	25	16 J	3.8 U	9.1
Endrin	ug/Kg	3.8	20%	100	0	3.8 J	3.8 U	7.8 U	3.8 U	4.5 U
Endosulfan II	ug/Kg	9.2	40%	900	0	8.4	3.8 U	9.2	3.8 U	4.5 U
4,4'-DDD	ug/Kg	27	60%	2900	0	3.6 U	27	5.7 J	3.8 U	12
4,4'-DDT	ug/Kg	15	60%	2100	0	15	1.9 J	10	3.8 U	4.5 U
Endrin aldehyde	ug/Kg	7.3	60%	NA	NA	6.8 J	7.3	7.8 U	3.8 U	6.6 J
alpha-Chlordane	ug/Kg	13	80%	540	0	1.9 U	11	3.8 J	8.8	13
gamma-Chlordane	ug/Kg	8.7	60%	540	0	1.9 U	8.7	4 U	7.5	7.9

TABLE 4.1-1

SENECA ARMY DEPOT
SEAD-5 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-5 7 02/20/94 TP5-1 212039 42494	SOIL SEAD-5 3 02/17/94 TP5-2 211730 42460	SOIL SEAD-5 3 02/18/94 TP5-3 211731 42460	SOIL SEAD-5 3 02/18/94 TP5-4 211732 42460	SOIL SEAD-5 3 02/18/94 TP5-5 211733 42460
METALS										
Aluminum	mg/Kg	13900	100%	14593	0	7360 J	5660 J	13100 J	13900 J	7060 J
Antimony	mg/Kg	9.1	80%	3.59	3	0.55 J	9.1 J	8.1 J	6.5 J	4.3 UJ
Arsenic	mg/Kg	5.4	100%	7.5	0	5.4 J	4.4 J	4.2 J	3.8 J	3.4 J
Barium	mg/Kg	166	100%	300	0	148 J	136 J	84.8 J	101 J	166 J
Beryllium	mg/Kg	0.64	100%	0.73	0	0.31 J	0.26 J	0.58 J	0.64 J	0.24 J
Cadmium	mg/Kg	1.7	60%	1	2	0.35 J	1.7	0.44 U	0.49 U	1.4
Calcium	mg/Kg	191000	100%	101904	2	191000 J	107000 J	34700 J	55600 J	48700 J
Chromium	mg/Kg	21.3	100%	22	0	12.3 J	12.6	21.3	19.5	11.6
Cobalt	mg/Kg	11	100%	30	0	6.7 J	4.8 J	11	9.6 J	4.6 J
Copper	mg/Kg	285	100%	25	5	28.2 J	233	39.5	47.3	285
Iron	mg/Kg	25700	100%	26627	0	15800 J	13500 J	25700 J	23900 J	13300 J
Lead	mg/Kg	59.7	100%	21.9	4	47.4 J	59.7	42.4	15.1	38.2
Magnesium	mg/Kg	31100	100%	12222	4	14800 J	31100 J	11700 J	21800 J	13200 J
Manganese	mg/Kg	816	20%	669	1	816 J	436 R	514 R	534 R	277 R
Mercury	mg/Kg	1.6	100%	0.1	4	0.03 J	0.88 J	0.2 J	0.92 J	1.6 J
Nickel	mg/Kg	33.5	100%	34	0	21.1 J	17	33.5	25.6	14.2
Potassium	mg/Kg	1750	100%	1762	0	1400 J	940 J	1440	1750	1020
Selenium	mg/Kg	1.1	60%	2	0	0.14 U	0.8 J	0.34 J	0.19 UJ	1.1 J
Silver	mg/Kg	8	60%	0.4	3	0.15 U	4.7	0.88 U	1.7 J	8
Sodium	mg/Kg	202	100%	104	4	140 J	202 J	77.4 J	127 J	162 J
Vanadium	mg/Kg	23.2	100%	150	0	16.1 J	14	21.7	23.2	11.5
Zinc	mg/Kg	304	100%	83	5	101 J	304 J	197 J	91.8 J	242 J
Cyanide	mg/Kg	0.79	20%	0.3	1	0.53 U	0.79	0.59 U	0.57 U	0.64 U
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/Kg	220	100%	NA	NA	3.3	1.49	8.4	4.1	220
Total Solids	%W/W				~	90.4	86.6	85	86.1	72.6

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

4.1.2.5 Metals

A total of 23 metals were detected in the soil samples collected at SEAD-5. Tweleve were found at concentrations which exceeded their associated TAGM values. Maximum concentrations of copper (285 mg/kg), mercury (1.6J mg/kg), silver (4.7 mg/kg), and zinc (304J mg/kg) were 11, 16, 11, and 60 times their associated TAGM values, respectively. Antimony, calcium, cadmium, cyanide, lead, magnesium, manganese and sodium were found at concentrations which exceeded their respective TAGM values by a factor of 2.5 or less. Figure 4.1-1 shows the distribution of zinc in the sludge piles at SEAD-5.

4.1.2.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-5.

4.1.2.7 Indicator Compounds

Indicator compounds were found in all 5 test pit soil samples. Concentrations of nitrate/nitrite nitrogen ranged from a low of 3.3 mg/kg in sample TP5-1 to a high of 220 mg/kg in sample TP5-5.

4.1.3 Groundwater

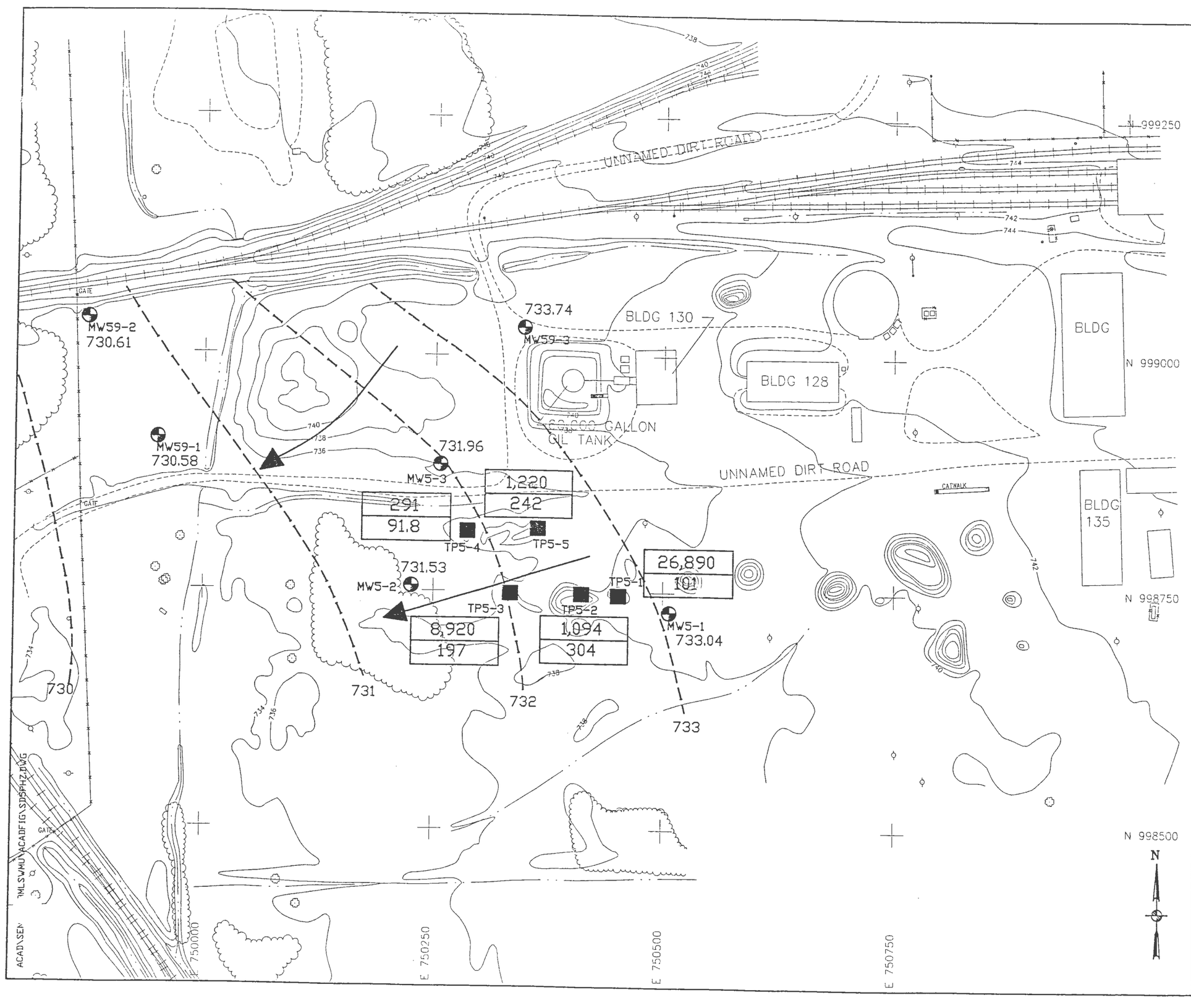
The analytical results for the three groundwater samples collected at SEAD-5 are presented in Table 4.1-2. The following sections described the nature and extent of the groundwater contamination identified at SEAD-5.

4.1.3.1 Volatile Organic Compounds

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

4.1.3.2 Semivolatile Organic Compounds

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



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- SOIL BORING
- 26,890 / 101 — TOTAL PAHs (ug/kg) / ZINC(mg/kg) IN SOIL
- MW5-1 / 733.04 — MONITORING WELL WITH WATER TABLE ELEVATION
- 733 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	720516-01002

FIGURE 4.1-1

SEAD-5 SEWAGE SLUDGE WASTE PILES
PAHs AND ZINC IN SOILS

SCALE	DATE	REV
1" = 100'	4/11/95	A

ACADISEN 'ML\SWMU\ACADFIG\SD5PHZ.DWG

TABLE 4.1-2

SENECA ARMY DEPOT
SEAD-5 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (j)	NUMBER ABOVE CRITERIA	WATER SEAD-5 07/11/94 MW5-1 226660 45282	WATER SEAD-5 03/30/94 MW5-2 216045 43179	WATER SEAD-5 07/11/94 MW5-3 226661 45282
METALS									
Aluminum	ug/L	2810	100%	NA	NA	NA	1310	1090	2810
Arsenic	ug/L	2.8	33%	25	50	0	2 U	1.5 U	2.8 J
Barium	ug/L	128	100%	1000	2000	0	42.2 J	71.3 J	128 J
Beryllium	ug/L	0.16	33%	NA	4	0	0.1 U	0.06 U	0.16 J
Calcium	ug/L	240000	100%	NA	NA	NA	240000	110000	132000
Chromium	ug/L	5.7	100%	50	100	0	2.5 J	2.3 J	5.7 J
Cobalt	ug/L	8.4	100%	NA	NA	NA	2.8 J	1.6 J	8.4 J
Copper	ug/L	8.2	100%	200	1300(h)	0	2.2 J	3.2 J	8.2 J
Iron	ug/L	5500	100%	300	NA	3	2670	2100	5500
Lead	ug/L	6.5	33%	25	15(i)	0	0.89 U	0.8 U	6.5
Magnesium	ug/L	43200	100%	NA	NA	NA	43200	18200	21200
Manganese	ug/L	5230	100%	300	NA	2	450	62.5	5230
Nickel	ug/L	12.7	100%	NA	100	0	5.3 J	4 J	12.7 J
Potassium	ug/L	4650	100%	NA	NA	NA	4650 J	2090 J	2400 J
Sodium	ug/L	210000	100%	20000	NA	3	73500	80000	210000
Thallium	ug/L	1.9	33%	NA	2	0	1.9 U	1.6 U	1.9 J
Vanadium	ug/L	5.3	100%	NA	NA	NA	2.6 J	2.3 J	5.3 J
Zinc	ug/L	45.8	100%	300	NA	0	11.5 J	10 J	45.8
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	1.33	67%	10	10	0	0.24	1.33	0.02 U
pH	Standard Units			-			6.9	7.2	6.7
Conductivity	umhos/cm						1220	550	NA
Temperature	°C						13.1	3.4	19.5
Turbidity	NTU						40	70.6	>100

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.
j) Federal Primary Drinking Water Maximum Contaminant Levels

4.1.3.3 Pesticides/PCBs

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

4.1.3.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-5.

4.1.3.5 Metals

A total of 18 metals were detected in the groundwater samples collected at SEAD-5. Iron, manganese, and sodium were the only metals detected at concentrations which exceeded the lowest associated federal or state criteria. The highest concentrations of iron (5,500 μg/L), manganese (5,230 μg/L), and sodium (210,000 μg/L) were all found in groundwater sample MW5-3. These high concentrations may be due to silt in the groundwater sample as evidenced by the turbidity reading greater than 100 NTUs. The NY AWQS Class GA groundwater criteria are 300 μg/L for iron, 20,000 for sodium and 300 μg/L for manganese. The concentrations of iron, manganese, and sodium were considerably lower in groundwater samples MW5-1 and MW5-2. However, all of the reported values for these elements were above their respective criteria for Class GA groundwater except for the concentration of manganese in MW5-2 (62.5 μg/L).

4.1.3.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-5.

4.1.3.7 Indicator Compounds

Nitrate/nitrite-nitrogen was detected in two of the three groundwater samples collected a SEAD-5. Concentrations of 0.24 mg/L and 1.33 mg/L detected in samples MW5-1 and MW5-2, respectively. Both reported concentrations were below the federal or state criteria of 10 mg/L.

4.1.4 Tentatively Identified Compounds

Total TIC concentrations exceeding 50 mg/kg were found in only one sample, test pit soil sample TP5-5. A total TIC concentration of 105.4 mg/kg was reported in this sample. The primary TIC identified was pentadecane, 2,6,10,14-tetra.

4.2 SEAD-9 OLD SCRAP WOOD PILE

4.2.1 Introduction

A total of 9 soil samples and three groundwater samples were collected as part of the SEAD-9 investigation. The following sections describe the nature and extent of contamination identified at SEAD-9.

4.2.2 Soil

The analytical results for the 9 soil boring samples collected as part of the SEAD-9 investigation are presented in Table 4.2-1. The following sections describe the nature and extent of contamination at SEAD-9. The sample locations are shown in Figure 2.4-2.

4.2.2.1 Volatile Organic Compounds

A total of 4 volatile organic compounds (toluene, chlorobenzene, ethylbenzene, and xylene (total) were detected in the 9 soil samples collected at SEAD-9. All four compounds were found at low concentrations, well below their respective TAGM values. Toluene was reported at a concentration of 1J μg/kg in soil samples SB9-1-03 and SB9-2-03. Chlorobenzene was reported at a concentration of 2J μg/kg in soil sample SB9-2-03. Ethylbenzene was reported at a concentration of 1J μg/kg in soil sample SB9-1-03. The fourth VOC, xylene (total) was reported at a concentration of 2J μg/kg in soil sample SB9-1-03.

4.2.2.2 Semivolatile Organic Compounds

A total of 20 semivolatile organic compounds were detected at varying concentrations in the soil samples collected at SEAD-9. Five PAH compounds exceeded their associated TAGM values. Maximum concentrations of benzo(a)anthracene (2,600 μg/kg), chrysene (2,300

µg/kg), benzo(b)fluoranthene (4,700 µg/kg), benzo(a)pyrene (2,100 µg/kg), and dibenz(a,h)anthracene (670J µg/kg) were found in soil sample SB9-1-03, which was collected 4 to 6 feet below ground surface. Although all of the maximum PAH concentrations were found in soil sample SB9-1-03, most of the remaining occurrences of SVOs were found in the soil samples collected from 0 to 0.2 feet below ground surface. Figure 4.2-1 shows the sum of the PAH compounds detected in the surface soil samples collected at SEAD-9.

4.2.2.3 Pesticides and PCBs

A total of 9 pesticides and 1 PCB compound (Aroclor-1254) were detected in the 9 soil samples collected at SEAD-9. All of the reported concentrations of pesticides and the PCB were below their respective TAGM values.

4.2.2.4 Metals

A total of 21 metals were detected in the soil samples collected at SEAD-9. Sixteen metals were detected in one or more samples at concentrations which exceeded their respective TAGM values. Exceedances were reported in 7 of the 9 soil samples, and in all instances, the exceedances were less than 3 times their respective TAGM values.

4.2.2.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (TPH) were detected in all but one of the 9 soil samples. The reported concentrations of TPH ranged from 33 mg/kg in soil sample SB9-3-04 to 15,900 mg/kg in soil sample SB9-2-03. Currently, no TAGM value exists for concentrations of TPH in soils.

4.2.3 Groundwater

The analytical results for the two groundwater samples collected at SEAD-9 are presented in Table 4.2-2. The upgradient monitoring well, MW9-1, was not sampled due to a lack of water in the well at the time of sampling. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-9. The locations of the monitoring wells are shown in Figure 2.4-2.

TABLE 4.2-1

SENECA ARMY DEPOT
SEAD-9 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-9 0-0.2 05/24/94 SB9-1-00 222207 44345	SOIL SEAD-9 4-6 05/24/94 SB9-1-03 222208 44345	SOIL SEAD-9 8-9 05/24/94 SB9-1-05 222209 44345	SOIL SEAD-9 0-0.2 05/24/94 SB9-2-00 222210 44345	SOIL SEAD-9 4-6 05/24/94 SB9-2-03 222211 44345
VOLATILE ORGANICS										
Toluene	ug/Kg	1	22%	1500	0	11 U	1 J	12 U	11 U	1 J
Chlorobenzene	ug/Kg	2	11%	1700	0	11 U	12 U	12 U	11 U	2 J
Ethylbenzene	ug/Kg	1	11%	5500	0	11 U	1 J	12 U	11 U	11 U
Xylene (total)	ug/Kg	2	11%	1200	0	11 U	2 J	12 U	11 U	11 U
SEMIVOLATILE ORGANICS										
Naphthalene	ug/Kg	360	56%	13000	0	23 J	360 J	380 U	32 J	20 J
2-Methylnaphthalene	ug/Kg	140	33%	36400	0	27 J	140 J	380 U	470 U	33 J
Acenaphthylene	ug/Kg	40	44%	41000	0	28 J	40 J	380 U	29 J	350 U
Acenaphthene	ug/Kg	790	44%	50000*	0	90 J	790 J	380 U	130 J	350 U
Dibenzofuran	ug/Kg	360	44%	6200	0	39 J	360 J	380 U	39 J	350 U
Fluorene	ug/Kg	610	44%	50000*	0	67 J	610 J	380 U	85 J	350 U
Phenanthrene	ug/Kg	4300	67%	50000*	0	720	4300	380 U	1200	280 J
Anthracene	ug/Kg	1100	56%	50000*	0	210 J	1100	380 U	260 J	88 J
Carbazole	ug/Kg	860	44%	50000*	0	150 J	860	380 U	240 J	350 U
Di-n-butylphthalate	ug/Kg	70	56%	8100	0	55 J	70 J	380 U	470 U	350 U
Fluoranthene	ug/Kg	6200	78%	50000*	0	1700	6200	380 U	2500	540
Pyrene	ug/Kg	5100	78%	50000*	0	1400	5100	380 U	2400	570
Benzo(a)anthracene	ug/Kg	2600	56%	220	5	680	2600	380 U	1200	380
Chrysene	ug/Kg	2300	56%	400	5	720	2300	380 U	1200	440
bis(2-Ethylhexyl)phthalate	ug/Kg	240	67%	50000*	0	88 J	240 J	20 J	84 J	350 U
Benzo(b)fluoranthene	ug/Kg	4700	56%	1100	4	1600 JN	4700 JN	380 U	2400 JN	590 JN
Benzo(a)pyrene	ug/Kg	2100	56%	61	5	670	2100	380 U	990	350 J
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	44%	3200	0	430	1100	380 U	570	350 U
Dibenz(a,h)anthracene	ug/Kg	670	44%	14	4	190 J	670 J	380 U	290 J	350 U
Benzo(g,h,i)perylene	ug/Kg	760	44%	50000*	0	310 J	760 J	380 U	460 J	350 U
PESTICIDES/PCB										
delta-BHC	ug/Kg	0.94	11%	300	0	3.6 U	4.1 U	2 U	1.8 U	1.8 U
gamma-BHC (Lindane)	ug/Kg	1.3	11%	60	0	3.6 U	4.1 U	2 U	1.8 U	1.3 J
Heptachlor	ug/Kg	5.7	11%	100	0	3.6 U	4.1 U	2 U	1.8 U	5.7
Aldrin	ug/Kg	2.4	11%	41	0	2.4 J	4.1 U	2 U	1.8 U	1.8 U
Heptachlor epoxide	ug/Kg	1.1	11%	20	0	3.6 U	4.1 U	2 U	1.8 U	1.1 J
Dieldrin	ug/Kg	3	11%	44	0	7 U	8 U	3.8 U	3.5 U	3.5 U
4,4'-DDE	ug/Kg	55	67%	2100	0	55	13 J	3.8 U	25	25
4,4'-DDD	ug/Kg	16	67%	2900	0	14 J	8.1 J	3.8 U	16	14
4,4'-DDT	ug/Kg	73	67%	2100	0	73 J	33 J	3.8 U	37	45 J
alpha-Chlordane	ug/Kg	16	56%	540	0	8	4.7 J	2 U	1.8 U	16 J
gamma-Chlordane	ug/Kg	19	33%	540	0	3.6 U	4.1 U	2 U	1.7 J	19
Aroclor-1254	ug/Kg	140	11%	1000/10000(a)	0	140 J	80 U	38 U	35 U	35 U

TABLE 4.2-1

SENECA ARMY DEPOT
SEAD-9 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-9 0-0.2 05/24/94 SB9-1-00 222207 44345	SOIL SEAD-9 4-6 05/24/94 SB9-1-03 222208 44345	SOIL SEAD-9 8-9 05/24/94 SB9-1-05 222209 44345	SOIL SEAD-9 0-0.2 05/24/94 SB9-2-00 222210 44345	SOIL SEAD-9 4-6 05/24/94 SB9-2-03 222211 44345
METALS										
Aluminum	mg/Kg	15000	100%	14593	2	12700	12600	13600	8130	5230
Antimony	mg/Kg	0.71	56%	3.59	0	0.34 J	0.13 UJ	0.19 UJ	0.45 J	0.31 J
Arsenic	mg/Kg	8.5	100%	7.5	1	5.7	5.4	5.9	8.5	3.9
Barium	mg/Kg	101	100%	300	0	76.9	73.1	51.2	91.4	38.3
Beryllium	mg/Kg	0.78	100%	.73	0	0.61 J	0.6 J	0.62 J	0.46 J	0.34 J
Cadmium	mg/Kg	1.1	100%	1	1	0.97	0.69	0.44 J	1.1	0.61 J
Calcium	mg/Kg	217000	100%	101904	2	63000	40900	2790	120000	217000
Chromium	mg/Kg	22.8	100%	22	2	22.4	17.6	21.3	19.9	12.3
Cobalt	mg/Kg	12	100%	30	0	12	10.2	7.8 J	10.5	5.8 J
Copper	mg/Kg	33	100%	25	3	33	20.3	23.3	27.4	19.1
Iron	mg/Kg	28600	100%	26627	2	24200	22400	25400	16400	10200
Lead	mg/Kg	85.1	100%	21.9	4	50.3 J	21.7 J	10.4 J	85.1 J	43 J
Magnesium	mg/Kg	13000	100%	12222	1	9240	8310	4140	13000	10900
Manganese	mg/Kg	984	100%	669	3	524	635	313	984	320
Mercury	mg/Kg	0.26	100%	0.1	1	0.05 J	0.08 J	0.26	0.1	0.07 J
Nickel	mg/Kg	41.6	100%	34	3	35.1	25.1	35.7	41.6	15.6
Potassium	mg/Kg	2140	100%	1762	3	2140 J	1430 J	1730 J	1790 J	1490 J
Selenium	mg/Kg	0.9	78%	2	0	0.58 J	0.23 J	0.9 J	0.25 U	0.31 U
Sodium	mg/Kg	185	89%	104	4	115 J	65 J	64.7 J	139 J	166 J
Vanadium	mg/Kg	26.8	100%	150	0	24.5	21.1	23.7	22.7	21.1
Zinc	mg/Kg	126	100%	83	3	126	75.7	82.7	102	59.7
OTHER ANALYSES										
Total Petroleum Hydrocarbons	mg/Kg	15900	89%	NA	NA	245	1170	30 U	580	15900
Total Solids	%W/W					93.9	83.1	85.8	93	93.4

TABLE 4.2-1

SENECA ARMY DEPOT
SEAD-9 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

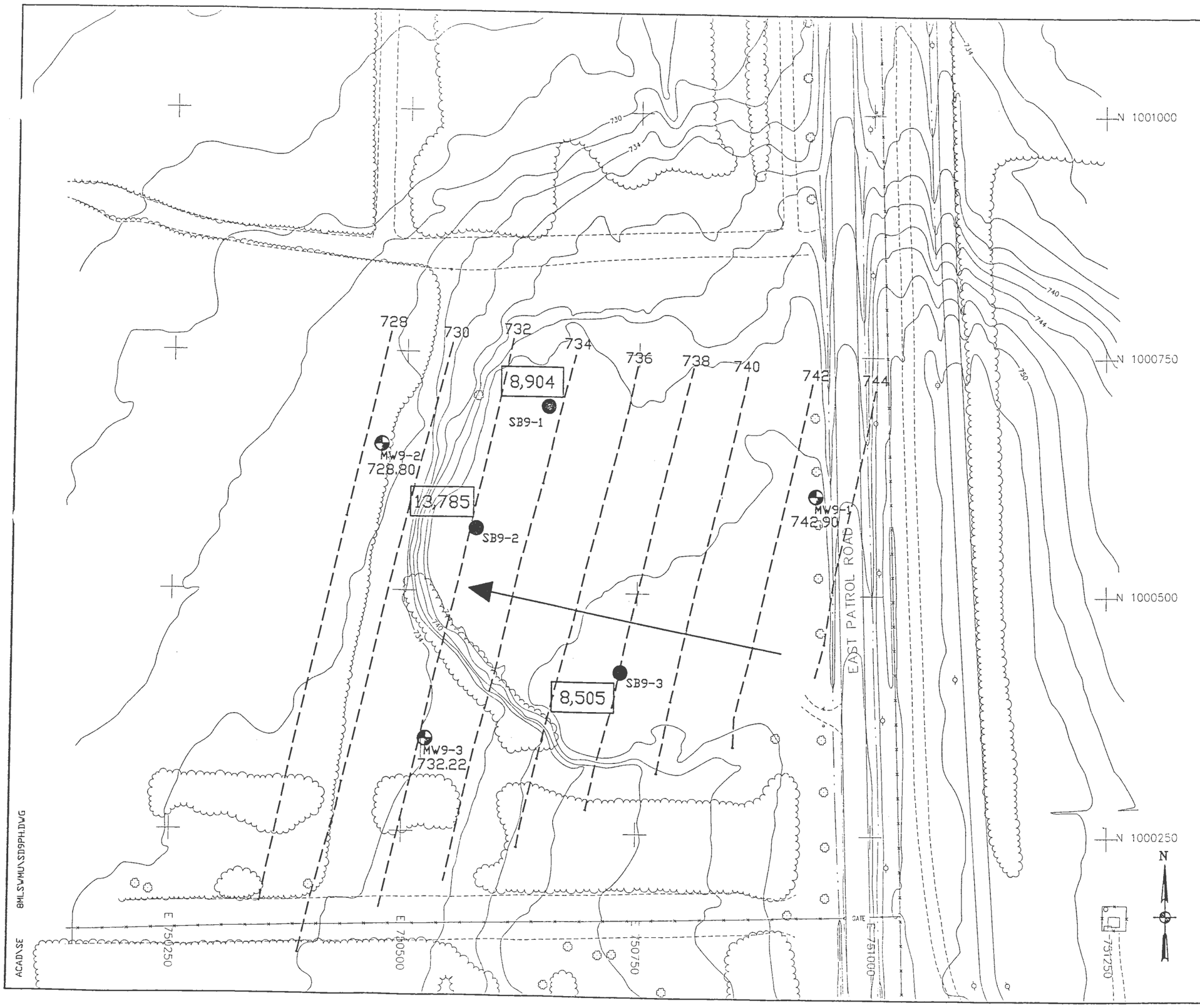
COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-9 8-9 05/24/94 SB9-2-05 222212 44345	SOIL SEAD-9 0-0.2 05/24/94 SB9-3-00 222213 44345	SOIL SEAD-9 4-6 05/24/94 SB9-3-03 222214 44345	SOIL SEAD-9 6-8 05/24/94 SB9-3-04 222215 44345
VOLATILE ORGANICS									
Toluene	ug/Kg	1	22%	1500	0	12 U	12 U	12 U	12 U
Chlorobenzene	ug/Kg	2	11%	1700	0	12 U	12 U	12 U	12 U
Ethylbenzene	ug/Kg	1	11%	5500	0	12 U	12 U	12 U	12 U
Xylene (total)	ug/Kg	2	11%	1200	0	12 U	12 U	12 U	12 U
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	360	56%	13000	0	410 U	31 J	400 U	370 U
2-Methylnaphthalene	ug/Kg	140	33%	36400	0	410 U	390 U	400 U	370 U
Acenaphthylene	ug/Kg	40	44%	41000	0	410 U	24 J	400 U	370 U
Acenaphthene	ug/Kg	790	44%	50000*	0	410 U	87 J	400 U	370 U
Dibenzofuran	ug/Kg	360	44%	6200	0	410 U	36 J	400 U	370 U
Fluorene	ug/Kg	610	44%	50000*	0	410 U	87 J	400 U	370 U
Phenanthrene	ug/Kg	4300	67%	50000*	0	79 J	910	400 U	370 U
Anthracene	ug/Kg	1100	56%	50000*	0	410 U	220 J	400 U	370 U
Carbazole	ug/Kg	860	44%	50000*	0	410 U	160 J	400 U	370 U
Di-n-butylphthalate	ug/Kg	70	56%	8100	0	65 J	56 J	43 J	370 U
Fluoranthene	ug/Kg	6200	78%	50000*	0	97 J	1200	25 J	370 U
Pyrene	ug/Kg	5100	78%	50000*	0	160 J	1400	39 J	370 U
Benzo(a)anthracene	ug/Kg	2600	56%	220	5	410 U	670	400 U	370 U
Chrysene	ug/Kg	2300	56%	400	5	410 U	680	400 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	240	67%	50000*	0	410 U	95 J	400 U	60 J
Benzo(b)fluoranthene	ug/Kg	4700	56%	1100	4	410 U	1600 JN	400 U	370 U
Benzo(a)pyrene	ug/Kg	2100	56%	61	5	410 U	750	400 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	44%	3200	0	410 U	420	400 U	370 U
Dibenz(a,h)anthracene	ug/Kg	670	44%	14	4	410 U	160 J	400 U	370 U
Benzo(g,h,i)perylene	ug/Kg	760	44%	50000*	0	410 U	230 J	400 U	370 U
PESTICIDES/PCB									
delta-BHC	ug/Kg	0.94	11%	300	0	2.1 U	0.94 J	2 U	1.9 U
gamma-BHC (Lindane)	ug/Kg	1.3	11%	60	0	2.1 U	2 U	2 U	1.9 U
Heptachlor	ug/Kg	5.7	11%	100	0	2.1 U	2 U	2 U	1.9 U
Aldrin	ug/Kg	2.4	11%	41	0	2.1 U	2 U	2 U	1.9 U
Heptachlor epoxide	ug/Kg	1.1	11%	20	0	2.1 U	2 U	2 U	1.9 U
Dieldrin	ug/Kg	3	11%	44	0	4.1 U	3 J	4 U	3.7 U
4,4'-DDE	ug/Kg	55	67%	2100	0	4 J	23	4 U	3.7 U
4,4'-DDD	ug/Kg	16	67%	2900	0	2.6 J	4.2 J	4 U	3.7 U
4,4'-DDT	ug/Kg	73	67%	2100	0	4 J	27	4 U	3.7 U
alpha-Chlordane	ug/Kg	16	56%	540	0	1.2 J	1.9 J	2 U	1.9 U
gamma-Chlordane	ug/Kg	19	33%	540	0	1.4 J	2 U	2 U	1.9 U
Aroclor-1254	ug/Kg	140	11%	1000/10000(a)	0	41 U	39 U	40 U	37 U

TABLE 4.2-1

SENECA ARMY DEPOT
SEAD-9 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-9 8-9 05/24/94 SB9-2-05 222212 44345	SOIL SEAD-9 0-0.2 05/24/94 SB9-3-00 222213 44345	SOIL SEAD-9 4-6 05/24/94 SB9-3-03 222214 44345	SOIL SEAD-9 6-8 05/24/94 SB9-3-04 222215 44345
METALS									
Aluminum	mg/Kg	15000	100%	14593	2	14600	14000	15000	13300
Antimony	mg/Kg	0.71	56%	3.59	0	0.27 J	0.71 J	0.21 UJ	0.13 UJ
Arsenic	mg/Kg	8.5	100%	7.5	1	6.9	5.4	5.3	4.6
Barium	mg/Kg	101	100%	300	0	64.9	88.3	101	70.8
Beryllium	mg/Kg	0.78	100%	.73	0	0.62 J	0.67 J	0.78 J	0.65
Cadmium	mg/Kg	1.1	100%	1	1	0.68 J	0.76 J	0.65 J	0.65
Calcium	mg/Kg	217000	100%	101904	2	17100	20600	4780	19800
Chromium	mg/Kg	22.8	100%	22	2	19.9	21	22.8	20.5
Cobalt	mg/Kg	12	100%	30	0	10.4	11.4	12	11.5
Copper	mg/Kg	33	100%	25	3	15.2	29.5	23.1	24.9
Iron	mg/Kg	28600	100%	26627	2	27700	25800	28600	26100
Lead	mg/Kg	85.1	100%	21.9	4	20.6 J	47.4 J	16.2 J	11.5 J
Magnesium	mg/Kg	13000	100%	12222	1	4840	9360	4700	6860
Manganese	mg/Kg	984	100%	669	3	467	710	681	472
Mercury	mg/Kg	0.26	100%	0.1	1	0.07 J	0.06 J	0.09 J	0.08 J
Nickel	mg/Kg	41.6	100%	34	3	21.4	24	28.4	23
Potassium	mg/Kg	2140	100%	1762	3	1250 J	2070 J	1420 J	1300 J
Selenium	mg/Kg	0.9	78%	2	0	0.62 J	0.76 J	0.52 J	0.42 J
Sodium	mg/Kg	185	89%	104	4	185 J	29 U	48.2 J	65 J
Vanadium	mg/Kg	26.8	100%	150	0	21.8	26.8	25.5	21.7
Zinc	mg/Kg	126	100%	83	3	72	96.8	70.3	54.4
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/Kg	15900	89%	NA	NA	1520	145	47	33
Total Solids	%W/W					80.2	84.7	83.4	88.2

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.
h) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)fluoranthene.



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- SOIL BORING
- 8,904 TOTAL PAHs (ug/kg) IN SURFACE SOILS
- MW9-1 / 742.90 MONITORING WELL WITH WATER TABLE ELEVATION
- 742 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(Feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	D.W.G. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.2-1
SEAD-9 OLD SCRAP WOOD SITE
TOTAL PAHs IN SURFACE SOILS

SCALE	DATE	REV
1" = 100'	4/11/95	A

ACADNSE 8MLSWMUNSD9PH1.DWG

TABLE 4.2-2

SENECA ARMY DEPOT
SEAD-9 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-9 03/30/94 MW9-2 216046 43179	WATER SEAD-9 07/19/94 MW9-3 227439 45332
METALS								
Aluminum	ug/L	5000	100%	NA	NA	NA	5000	1570 J
Arsenic	ug/L	1.6	50%	25	50	0	1.6 J	2 U
Barium	ug/L	105	100%	1000	2000	0	102 J	105 J
Beryllium	ug/L	0.13	50%	NA	4	0	0.13 J	0.1 U
Calcium	ug/L	192000	100%	NA	NA	NA	192000	186000
Chromium	ug/L	8.4	100%	50	100	0	8.4 J	2.6 J
Cobalt	ug/L	5.6	100%	NA	NA	NA	5.6 J	2.1 J
Copper	ug/L	5.4	100%	200	1300 (h)	0	5.4 J	2.3 J
Iron	ug/L	9350	100%	300	NA	2	9350	2950
Lead	ug/L	1.7	50%	25	15 (i)	0	1.7 J	0.89 U
Magnesium	ug/L	30900	100%	NA	NA	NA	26000	30900
Manganese	ug/L	411	100%	300	NA	1	411	222
Nickel	ug/L	13	100%	NA	100	0	13 J	4.9 J
Potassium	ug/L	2700	100%	NA	NA	NA	1700 J	2700 J
Silver	ug/L	1	50%	50	NA	0	0.69 U	1 J
Sodium	ug/L	106000	100%	20000	NA	2	26600	106000
Vanadium	ug/L	7	100%	NA	NA	NA	7 J	2.6 J
Zinc	ug/L	29.1	100%	300	NA	0	29.1	13 J
OTHER ANALYSES								
Total Petroleum Hydrocarbons	mg/L	3	100%	-NA	NA	NA	0.59	3
pH	Standard Units						7.7	7.4
Conductivity	umhos/cm						550	1100
Temperature	°C						3.9	14.1
Turbidity	NTU						309	160

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) Federal Primary Drinking Water Maximum Contaminant Levels
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.

4.2.3.1 Volatile Organic Compounds

No volatile organic compounds were found in the groundwater samples collected at SEAD-9.

4.2.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the groundwater samples collected at SEAD-9.

4.2.3.3 Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-9.

4.2.3.4 Metals

A total of 18 metals were detected in the groundwater samples collected at SEAD-9. Three metals were detected at concentrations which were above the lowest associated federal or state criteria. The detected concentrations of iron and sodium were above their respective TAGM values in both of the groundwater samples collected at SEAD-9. Manganese was detected at a concentration which was above its TAGM only in groundwater sample MW9-2.

4.2.3.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (TPH) were detected in both of the groundwater samples collected at SEAD-9. A concentration of 3 mg/L was detected in sample MW9-3 and a concentration of 0.59 mg/L was detected in sample MW9-2. Currently, no TAGM value exists for detected concentrations of TPH in groundwater.

4.2.4 Tentatively Identified Compounds

The total concentrations of tentatively identified compounds (TIC) were below 50 mg/kg in all of the samples collected at SEAD-9.

4.3 SEAD-12A RADIOACTIVE WASTE BURIAL SITE

4.3.1 Introduction

A total of 16 soil samples, 3 groundwater samples, 3 surface water samples, and 4 sediment samples were collected as part of the SEAD-12A investigation. The following sections describe the nature and extent of contamination identified at SEAD-12A.

The media investigated at SEAD-12A was analyzed for chemical and radiochemical parameters. The results of the radiolochemical analyses were reported in concentrations of pico curries per gram of soil or sediment and in concentrations of pico curries per liter of water. The radiochemical results of the soil analyses are compared to a New York State TAGM crtitria and a proposed 10 CFR 834 criteria. Each of these criteria is expressed as an annual dose rate, in milllirems per year (mrem/yr), that is based upon the site background annual dose rate. As part of this ESI, three background samples were collcted at one location, MW12A-1, and the radiochemical results from each of these three samples were used to calculate three annual dose rates due to the radionuclides found at SEAD-12A. A background annual dose rate was then established as the average of these three annual dose rates. A computer model was utilized to calculate the radiation dose due to the exposure of the radionuclides detected at SEAD-12A. This model considered nine exposure pathways to a residential population occupying SEAD-12A. Dose rates were calculated on a per-sample basis assuming a contaminated zone of 37,730 feet square, centered about each sample location. Calculating dose rates on a per sample basis was chosen because a statistically representative source term for the amount of radionuclides in SEAD-12A soils could not be determined with the data available from this ESI. The contaminated zone was assumed to have a vertical thickness of 1 meter. The entire zone of contamination was modeled to have a uniform concentration of six principal radionuclides. A principal radionuclide is a radionuclide with a half-life longer than one-half year. Radionuclides with a half-life of one-half year or less are treated as associated radionuclides. Radionuclides which are "associated" with a principal radionuclide consist of all decay products down to, but not including, the next principal radionuclide of a decay chain. The principal radionuclides identified at SEAD-12A and utilized in the dose calculation model were lead-210, radium-226, radium-228, thorium-228, uranium-235, and uranium-238. At each sample location, these principal radionuclides were assumed to be in secular equilibrium with their associated radionuclides. Secular equilibrium describes a state of radioactive equilibrium between a principal radionuclide and its associated decay products. That is to say, the number of associated radionuclide atoms

disintegrating per second is the same as the number being created by disintegrations of the principal radionuclide atoms. Under this condition, it is possible to determine the amount of a principal radionuclide in a sample by measuring the amount of one or more of the succeeding members of the decay chain. For the purposes of dose calculations, the principal radionuclides which were inferred to be present (based upon a state of secular equilibrium with their associated radionuclides) were radium-228, thorium-228, and uranium-238. These principal radionuclides are undetectable by gamma spectral analysis when present at low concentrations. In addition, these radionuclides produce primarily alpha and/or beta emissions during their nuclear disinitegrations. The concentrations of gross alpha and gross beta radiation reported from the samples collected at SEADs 12A and 12B were at sufficiently low levels to support the assumptions that radium-228, thorium-228, and uranium-238 were present at concentrations equal to those of their associated radionuclides. If any of these principal radionuclides had occurred at significant concentrations, their presence would have increased the reported concentrations of gross alpha and/or gross beta radiation, as well as significantly increasing the concentrations of their associated radionuclides.

The same residential scenario was utilized in calculating the dose from the radionuclides detected in the surface sediments. However, the zone of contamination was considered to be only the area of the drainage swale along the southern perimeter of SEAD-12A (the full length of the swale and 1 meter to either side) with a vertical contamination extent of 0.15 meters.

Exposure doses from gross beta radiation in groundwater and surface water samples were calculated to provide comparisons to proposed MCL and federal health advisory exposure values. A single pathway model was utilized to calculate the annual dose from the concentrations of beta radiation reported for the groundwater and surface water samples. Water ingestion was the pathway considered, and a total daily water consumption of 2 liters per day was assumed. The radionuclides utilized in the dose calculations were K-40 and the following radionuclides of the Ra-226 decay chain: Lead-214, bismuth-214, Lead-210, and bismuth-210. Ra-226 is a surface seeker (approximately 85 percent of Ra-226 is present in the skeleton) and, therefore, the dose calculations involving Ra-226 only considered dose to bone. Potassium is maintained throughout the body at a relatively constant level. Therefore, the dose due to K-40 was calculated for a whole body exposure.

A description of the dose models utilized, as well as model constraints and model input data, is presented in appendix H.

4.3.2 Soil

The analytical results for the 16 soil samples collected as part of the SEAD-12A investigation are presented in Table 4.3-1. The following sections describe the nature and extent of contamination identified at SEAD-12A. The sample locations are shown in Figure 2.5-2.

4.3.2.1 Volatile Organic Compounds

Four VOCs were detected in 6 of the 13 test pit soil samples collected at SEAD-12A. Trichloroethene was detected at concentrations of 26, 3J, and 2J μg/kg in soil samples TP12A-1-2, TP12A-1-1, and TP12A-4-1, respectively. Methylene chloride was detected at a concentration of 1J μg/kg in soil samples TP12A-3-1 and TP12A-3-2. Chlorobenzene was detected at a concentration of 5J μg/kg in soil sample TP12A-4-1 and at a concentration of 1J μg/kg in soil sample TP12A-4-2. Toluene was found only in soil sample TP12A-4-1 at a concentration of 2J μg/kg. All of the reported concentrations of VOCs were at least an order of magnitude below their respective TAGM values.

4.3.2.2 Semivolatile Organic Compounds

A total of 22 semivolatile organic compounds were detected at varying concentrations in 8 of the 16 soil samples collected at SEAD-12A. Two PAH compounds (benzo(a)pyrene and dibenz(a,h)anthracene) were detected at concentrations which exceeded their associated TAGM values. Concentrations of benzo(a)pyrene and dibenz(a,h)anthracene which exceeded their associated TAGMs of 61 and 14 μg/kg, respectively, were found in each of soil samples TP12A-1-2, TP12A-6-1, and TP12A-7-1. The maximum concentration of benzo(a)pyrene (200J μg/kg) was found in soil sample TP12A-12. This soil sample also had the highest reported concentrations of 13 of the 20 SVOs which were detected at concentrations that were below their respective TAGM values. The highest concentration of dibenz(a,h)anthracene (99J μg/kg) was found in soil sample TP12A-7-1 which was collected at a depth of 4 feet.

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

	MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION								SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
	DEPTH (FEET)								2.5	3	6	5	2.5	6
	SAMPLE DATE								06/24/94	06/24/94	06/22/94	06/22/94	06/22/94	06/22/94
	ES ID		FREQUENCY		NUMBER		FREQUENCY		NUMBER	TP12A-1-1	TP12A-1-2	TP12A-2-1	TP12A-2-2	TP12A-3-1	TP12A-3-2
	LAB ID		OF		ABOVE		OF		ABOVE	225531	225532	225398	225399	225400	225401
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	MAXIMUM	DETECTION	TAGM	TAGM	45048	45048	44799	44799	44799	44799
COMPOUND	UNITS														
Methylene Chloride	ug/Kg	1	13%	100	0	1	13%	100	0	12 U	11 U	14 U	12 U	1 J	1 J
Trichloroethene	ug/Kg	26	19%	700	0	26	19%	700	0	3 J	26	14 U	12 U	13 U	11 U
Toluene	ug/Kg	2	6%	1500	0	2	6%	1500	0	12 U	11 U	14 U	12 U	13 U	11 U
Chlorobenzene	ug/Kg	5	13%	1700	0	5	13%	1700	0	12 U	11 U	14 U	12 U	13 U	11 U
SEMIVOLATILE ORGANICS															
Phenol	ug/Kg	300	13%	330	0	300	13%	330	0	300 J	48 J	4500 U	390 U	430 U	370 U
4-Methylphenol	ug/Kg	140	6%	900	0	140	6%	900	0	140 J	380 U	4500 U	390 U	430 U	370 U
2,4-Dimethylphenol	ug/Kg	25	6%	NA	NA	25	6%	NA	NA	25 J	380 U	4500 U	390 U	430 U	370 U
2-Methylnaphthalene	ug/Kg	21	6%	36400	0	21	6%	36400	0	400 U	21 J	4500 U	390 U	430 U	370 U
Acenaphthylene	ug/Kg	33	6%	41000	0	33	6%	41000	0	400 U	33 J	4500 U	390 U	430 U	370 U
Acenaphthene	ug/Kg	44	6%	50000*	0	44	6%	50000*	0	400 U	380 U	4500 U	390 U	430 U	370 U
Fluorene	ug/Kg	52	13%	50000*	0	52	13%	50000*	0	400 U	52 J	4500 U	390 U	430 U	370 U
Phenanthrene	ug/Kg	340	25%	50000*	0	340	25%	50000*	0	27 J	340 J	4500 U	390 U	430 U	370 U
Anthracene	ug/Kg	96	19%	50000*	0	96	19%	50000*	0	400 U	96 J	4500 U	390 U	430 U	370 U
Carbazole	ug/Kg	40	6%	50000*	0	40	6%	50000*	0	400 U	380 U	4500 U	390 U	430 U	370 U
Di-n-butylphthalate	ug/Kg	1700	44%	8100	0	1700	44%	8100	0	79 J	1700	4500 U	390 U	430 U	370 U
Fluoranthene	ug/Kg	420	25%	50000*	0	420	25%	50000*	0	40 J	420	4500 U	390 U	430 U	370 U
Pyrene	ug/Kg	380	25%	50000*	0	380	25%	50000*	0	37 J	380	4500 U	390 U	430 U	370 U
Benzo(a)anthracene	ug/Kg	180	25%	220	0	180	25%	220	0	21 J	180 J	4500 U	390 U	430 U	370 U
Chrysene	ug/Kg	240	25%	400	0	240	25%	400	0	28 J	240 J	4500 U	390 U	430 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	860	19%	50000*	0	860	19%	50000*	0	230 J	860	4500 U	390 U	430 U	370 U
Benzo(b)fluoranthene	ug/Kg	320	25%	1100	0	320	25%	1100	0	28 J	190 J	4500 U	390 U	430 U	370 U
Benzo(k)fluoranthene	ug/Kg	160	19%	1100	0	160	19%	1100	0	32 J	160 J	4500 U	390 U	430 U	370 U
Benzo(a)pyrene	ug/Kg	200	25%	61	3	200	25%	61	3	30 J	200 J	4500 U	390 U	430 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	140	19%	3200	0	140	19%	3200	0	400 U	120 J	4500 U	390 U	430 U	370 U
Dibenz(a,h)anthracene	ug/Kg	99	19%	14	3	99	19%	14	3	400 U	57 J	4500 U	390 U	430 U	370 U
Benzo(g,h,i)perylene	ug/Kg	120	19%	50000*	0	120	19%	50000*	0	400 U	120 J	4500 U	390 U	430 U	370 U

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 2.5 06/24/94 TP12A-1-1 225531 45048	SOIL SEAD-12 3 06/24/94 TP12A-1-2 225532 45048	SOIL SEAD-12 6 06/22/94 TP12A-2-1 225398 44799	SOIL SEAD-12 5 06/22/94 TP12A-2-2 225399 44799	SOIL SEAD-12 2.5 06/22/94 TP12A-3-1 225400 44799	SOIL SEAD-12 6 06/22/94 TP12A-3-2 225401 44799
PESTICIDES/PCB															
Aldrin	ug/Kg	0.79	6%	41	0	0.79	6%	41	0	0.79 J	2 U	4.7 U	2 U	2.2 U	1.9 U
4,4'-DDE	ug/Kg	6.4	19%	2100	0	6.4	19%	2100	0	4 U	2.2 J	9 U	3.9 U	4.3 U	3.7 U
Endrin	ug/Kg	20	13%	100	0	20	13%	100	0	4 U	3.8 U	20 J	3.8 J	4.3 U	3.7 U
4,4'-DDD	ug/Kg	5.1	6%	2900	0	5.1	6%	2900	0	4 U	3.8 U	9 U	3.9 U	4.3 U	3.7 U
4,4'-DDT	ug/Kg	3.8	13%	2100	0	3.8	13%	2100	0	4 U	3.8 U	9 U	2.1 J	4.3 U	3.7 U
alpha-Chlordane	ug/Kg	2.6	13%	540	0	2.6	13%	540	0	2.1 U	1.5 J	4.7 U	2 U	2.2 U	1.9 U
gamma-Chlordane	ug/Kg	2.3	13%	540	0	2.3	13%	540	0	2.1 U	2 U	4.7 U	2.1 J	2.2 U	1.9 U
Aroclor-1254	ug/Kg	2300	25%	1000/10000(a)	0	2300	25%	1000/10000(a)	0	49	73	2300	500	43 U	37 U
Aroclor-1260	ug/Kg	150	13%	1000/10000(a)	0	150	13%	1000/10000(a)	0	40 U	38 U	150	31 J	43 U	37 U
METALS															
Aluminum	mg/Kg	18700	100%	14593	3	18700	100%	14593	3	11400	11400	10900	17100	13200	9720
Antimony	mg/Kg	7.2	44%	3.59	1	7.2	44%	3.59	1	0.31 J	1.9 J	7.2 J	1.9 J	0.25 UJ	0.27 UJ
Arsenic	mg/Kg	7.7	100%	7.5	1	7.7	100%	7.5	1	3.8	5.2	4.7	4.9	5	3.7
Barium	mg/Kg	135	100%	300	0	135	100%	300	0	96.3	93.3	81	73.6	89	73.6
Beryllium	mg/Kg	0.83	100%	.73	4	0.83	100%	.73	4	0.5 J	0.62 J	0.74 J	0.74 J	0.71 J	0.49 J
Cadmium	mg/Kg	94.3	100%	1	5	94.3	100%	1	5	7.8	94.3	27.3	37.3	3.8	0.68 J
Calcium	mg/Kg	86700	100%	101904	0	86700	100%	101904	0	38900 J	81800 J	77700	10900	5600	85400
Chromium	mg/Kg	83.3	100%	22	5	83.3	100%	22	5	27.5	83.3	16.5	32.4	18.1	14.8
Cobalt	mg/Kg	28.5	100%	30	0	26.5	100%	30	0	9.9	9.4 J	13.1	26.5	10.2	8.3 J
Copper	mg/Kg	215	100%	25	6	215	100%	25	6	25.7	215	43.6	128	18.6	18
Iron	mg/Kg	34500	100%	26627	2	34500	100%	28627	2	20100	24200	19000	27500	24100	19400
Lead	mg/Kg	431	100%	21.9	5	431	100%	21.9	5	18.9 J	368 J	20	20.2	25.7	10
Magnesium	mg/Kg	36100	100%	12222	5	36100	100%	12222	5	8390	9310	5360	5290	4530	12700
Manganese	mg/Kg	939	100%	669	2	939	100%	669	2	518	495	502	428	490	429
Mercury	mg/Kg	0.11	100%	0.1	1	0.11	100%	0.1	1	0.04 J	0.05 J	0.04 J	0.03 J	0.06 J	0.02 J
Nickel	mg/Kg	201	100%	34	4	201	100%	34	4	25.3	29.9	39	201	27.2	25
Potassium	mg/Kg	3670	100%	1762	7	3670	100%	1762	7	1640 J	1490 J	1530 J	1370 J	1290 J	1700 J
Selenium	mg/Kg	1.9	69%	2	0	1.9	69%	2	0	1.1	0.6 J	1.2	1	1.9	0.65 J
Silver	mg/Kg	11.9	19%	0.4	2	11.9	19%	0.4	2	0.1 U	11.9	0.49 J	0.33 J	0.1 U	0.1 U
Sodium	mg/Kg	136	88%	104	8	136	88%	104	6	45.2 J	101 J	46.2 J	66.8 J	30.3 J	129 J
Thallium	mg/Kg	0.98	56%	0.28	9	0.98	56%	0.28	9	0.37 U	0.44 J	0.98 J	0.59 J	0.58 J	0.7 J
Vanadium	mg/Kg	36.4	100%	150	0	36.4	100%	150	0	17.9	19.2	17.9	19.6	22.5	15.4
Zinc	mg/Kg	424	100%	83	7	424	100%	83	7	95.4	285	93.3	424	112	53.8
OTHER ANALYSES															
Total Solids	%W/W									82.2	86.6	72.9	84.8	76.4	89.1

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 4 06/21/94 TP12A-4-1 224878 44799	SOIL SEAD-12 4 06/21/94 TP12A-4-2 224879 44799	SOIL SEAD-12 3 06/23/94 TP12A-5-1 225539 45048	SOIL SEAD-12 1 06/23/94 TP12A-6-1 225540 45048	SOIL SEAD-12 7 06/23/94 TP12A-6-2 225541 45048	SOIL SEAD-12 4 06/23/94 TP12A-7-1 225543 45048
Methylene Chloride	ug/Kg	1	13%	100	0	12 U	12 U	11 U	11 U	11 U	15 UJ
Trichloroethene	ug/Kg	26	19%	700	0	2 J	12 U	11 U	11 U	11 U	15 UJ
Toluene	ug/Kg	2	6%	1500	0	2 J	12 U	11 U	11 U	11 U	15 UJ
Chlorobenzene	ug/Kg	5	13%	1700	0	5 J	1 J	11 U	11 U	11 U	15 UJ
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	300	13%	330	0	390 U	400 U	370 U	380 U	370 U	540 U
4-Methylphenol	ug/Kg	140	6%	900	0	390 U	400 U	370 U	380 U	370 U	540 U
2,4-Dimethylphenol	ug/Kg	25	6%	NA	NA	390 U	400 U	370 U	380 U	370 U	540 U
2-Methylnaphthalene	ug/Kg	21	6%	36400	0	390 U	400 U	370 U	380 U	370 U	540 U
Acenaphthylene	ug/Kg	33	6%	41000	0	390 U	400 U	370 U	380 U	370 U	540 U
Acenaphthene	ug/Kg	44	6%	50000*	0	390 U	400 U	370 U	44 J	370 U	540 U
Fluorene	ug/Kg	52	13%	50000*	0	390 U	400 U	370 U	35 J	370 U	540 U
Phenanthrene	ug/Kg	340	25%	50000*	0	390 U	400 U	370 U	280 J	370 U	120 J
Anthracene	ug/Kg	98	19%	50000*	0	390 U	400 U	370 U	63 J	370 U	43 J
Carbazole	ug/Kg	40	6%	50000*	0	390 U	400 U	370 U	40 J	370 U	540 U
Di-n-butylphthalate	ug/Kg	1700	44%	8100	0	390 U	400 U	28 J	47 J	32 J	50 J
Fluoranthene	ug/Kg	420	25%	50000*	0	390 U	400 U	370 U	300 J	370 U	320 J
Pyrene	ug/Kg	380	25%	50000*	0	390 U	400 U	370 U	230 J	370 U	230 J
Benzo(a)anthracene	ug/Kg	180	25%	220	0	390 U	400 U	370 U	99 J	370 U	150 J
Chrysene	ug/Kg	240	25%	400	0	390 U	400 U	370 U	130 J	370 U	210 J
bis(2-Ethylhexyl)phthalate	ug/Kg	860	19%	50000*	0	390 U	400 U	370 U	380 U	370 U	540 U
Benzo(b)fluoranthene	ug/Kg	320	25%	1100	0	390 U	400 U	370 U	95 J	370 U	320 J
Benzo(k)fluoranthene	ug/Kg	160	19%	1100	0	390 U	400 U	370 U	76 J	370 U	540 UJ
Benzo(a)pyrene	ug/Kg	200	25%	61	3	390 U	400 U	370 U	92 J	370 U	180 J
Indeno(1,2,3-cd)pyrene	ug/Kg	140	19%	3200	0	390 U	400 U	370 U	69 J	370 U	140 J
Dibenz(a,h)anthracene	ug/Kg	99	19%	14	3	390 U	400 U	370 U	43 J	370 U	99 J
Benzo(g,h,i)perylene	ug/Kg	120	19%	50000*	0	390 U	400 U	370 U	29 J	370 U	98 J

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 4 06/21/94 TP12A-4-1 224878 44799	SOIL SEAD-12 4 06/21/94 TP12A-4-2 224879 44799	SOIL SEAD-12 3 06/23/94 TP12A-5-1 225539 45048	SOIL SEAD-12 1 06/23/94 TP12A-6-1 225540 45048	SOIL SEAD-12 7 06/23/94 TP12A-6-2 225541 45048	SOIL SEAD-12 4 06/23/94 TP12A-7-1 225543 45048
PESTICIDES/PCB											
Aldrin	ug/Kg	0.79	6%	41	0	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U
4,4'-DDE	ug/Kg	6.4	19%	2100	0	3.9 U	4 U	3.7 U	6.4	3.7 U	2.3 J
Endrin	ug/Kg	20	13%	100	0	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U
4,4'-DDD	ug/Kg	5.1	6%	2900	0	3.9 U	4 U	3.7 U	5.1	3.7 U	5.4 U
4,4'-DDT	ug/Kg	3.8	13%	2100	0	3.9 U	4 U	3.7 U	3.8	3.7 U	5.4 U
alpha-Chlordane	ug/Kg	2.6	13%	540	0	2 U	2 U	1.9 U	2 U	1.9 U	2.6 J
gamma-Chlordane	ug/Kg	2.3	13%	540	0	2 U	2 U	1.9 U	2 U	1.9 U	2.3 J
Aroclor-1254	ug/Kg	2300	25%	1000/10000(a)	0	39 U	40 U	37 U	38 U	37 U	54 U
Aroclor-1260	ug/Kg	150	13%	1000/10000(a)	0	39 U	40 U	37 U	38 U	37 U	54 U
METALS											
Aluminum	mg/Kg	18700	100%	14593	3	9800	13400	9750	14000	8460	18600
Antimony	mg/Kg	7.2	44%	3.59	1	0.25 UJ	0.18 UJ	0.26 UJ	0.25 J	0.28 J	0.39 J
Arsenic	mg/Kg	7.7	100%	7.5	1	4.2	4.9	3.8	5.2	2.9	7.7
Barium	mg/Kg	135	100%	300	0	72	102	94.5	78.7	76.2	135
Beryllium	mg/Kg	0.83	100%	.73	4	0.48 J	0.63 J	0.45 J	0.61 J	0.4 J	0.83 J
Cadmium	mg/Kg	94.3	100%	1	5	0.57 J	0.82	0.4 J	0.7 J	0.35 J	1 J
Calcium	mg/Kg	86700	100%	101904	0	82800	39100	78800 J	22000 J	62000 J	25400 J
Chromium	mg/Kg	83.3	100%	22	5	14.1	18.5	15.1	20.7	14	25
Cobalt	mg/Kg	26.5	100%	30	0	8.6 J	9.6	8.2 J	10.1	8.8 J	15.7
Copper	mg/Kg	215	100%	25	6	21.2	24.2	19.5	21.2	16.4	38.4
Iron	mg/Kg	34500	100%	26627	2	18700	23300	18900	26100	17100	34500
Lead	mg/Kg	431	100%	21.9	5	8.9	16.8	15.5 J	22.7 J	431 J	49 J
Magnesium	mg/Kg	36100	100%	12222	5	15700	9930	19100	6840	11600	10600
Manganese	mg/Kg	939	100%	669	2	395	419	394	524	358	857
Mercury	mg/Kg	0.11	100%	0.1	1	0.03 J	0.03 J	0.04 J	0.08 J	0.03 J	0.11
Nickel	mg/Kg	201	100%	34	4	24.8	30.9	24	28.4	22	39.4
Potassium	mg/Kg	3670	100%	1762	7	1990 J	2880 J	2350 J	1430 J	1700 J	3670 J
Selenium	mg/Kg	1.9	69%	2	0	0.95 J	1.6	0.54 U	1.2	0.48 U	1.2 J
Silver	mg/Kg	11.9	19%	0.4	2	0.1 U	0.07 U	0.1 U	0.08 U	0.09 U	0.13 U
Sodium	mg/Kg	138	88%	104	6	124 J	107 J	115 J	51.5 J	95 J	26.5 U
Thallium	mg/Kg	0.98	56%	0.28	9	0.41 J	0.56 J	0.38 U	0.48 J	0.34 U	0.98 J
Vanadium	mg/Kg	36.4	100%	150	0	16.2	21.5	17.5	22.7	14.1	36.4
Zinc	mg/Kg	424	100%	83	7	79.3	281	51.1	78.8	53.8	155
OTHER ANALYSES											
Total Solids	%W/W					84.8	83.4	88.7	87.1	89.1	61.4

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 7 06/24/94 TP12A-8-1 225533 45048	SOIL SEAD-12 0-0.2 06/10/94 MW12A-1-00 223886 44725	SOIL SEAD-12 4-6 06/10/94 MW12A-1-03 223887 44725	SOIL SEAD-12 8-9.5 06/10/94 MW12A-1-05 223888 44725
Methylene Chloride	ug/Kg	1	13%	100	0	11 U	13 U	11 U	11 U
Trichloroethene	ug/Kg	26	19%	700	0	11 U	13 U	11 U	11 U
Toluene	ug/Kg	2	6%	1500	0	11 U	13 U	11 U	11 U
Chlorobenzene	ug/Kg	5	13%	1700	0	11 U	13 U	11 U	11 U
SEMIVOLATILE ORGANICS									
Phenol	ug/Kg	300	13%	330	0	370 U	430 U	370 U	350 U
4-Methylphenol	ug/Kg	140	6%	900	0	370 U	430 U	370 U	350 U
2,4-Dimethylphenol	ug/Kg	25	6%	NA	NA	370 U	430 U	370 U	350 U
2-Methylnaphthalene	ug/Kg	21	6%	36400	0	370 U	430 U	370 U	350 U
Acenaphthylene	ug/Kg	33	6%	41000	0	370 U	430 U	370 U	350 U
Acenaphthene	ug/Kg	44	6%	50000*	0	370 U	430 U	370 U	350 U
Fluorene	ug/Kg	52	13%	50000*	0	370 U	430 U	370 U	350 U
Phenanthrene	ug/Kg	340	25%	50000*	0	370 U	430 U	370 U	350 U
Anthracene	ug/Kg	96	19%	50000*	0	370 U	430 U	370 U	350 U
Carbazole	ug/Kg	40	6%	50000*	0	370 U	430 U	370 U	350 U
Di-n-butylphthalate	ug/Kg	1700	44%	8100	0	52 J	430 U	370 U	350 U
Fluoranthene	ug/Kg	420	25%	50000*	0	370 U	430 U	370 U	350 U
Pyrene	ug/Kg	380	25%	50000*	0	370 U	430 U	370 U	350 U
Benzo(a)anthracene	ug/Kg	180	25%	220	0	370 U	430 U	370 U	350 U
Chrysene	ug/Kg	240	25%	400	0	370 U	430 U	370 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	860	19%	50000*	0	370 U	430 U	73 J	350 U
Benzo(b)fluoranthene	ug/Kg	320	25%	1100	0	370 U	430 U	370 U	350 U
Benzo(k)fluoranthene	ug/Kg	160	19%	1100	0	370 U	430 U	370 U	350 U
Benzo(a)pyrene	ug/Kg	200	25%	61	3	370 U	430 U	370 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	140	19%	3200	0	370 U	430 U	370 U	350 U
Dibenz(a,h)anthracene	ug/Kg	99	19%	14	3	370 U	430 U	370 U	350 U
Benzo(g,h,i)perylene	ug/Kg	120	19%	50000*	0	370 U	430 U	370 U	350 U

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 7 06/24/94 TP12A-8-1 225533 45048	SOIL SEAD-12 0-0.2 06/10/94 MW12A-1-00 223886 44725	SOIL SEAD-12 4-6 06/10/94 MW12A-1-03 223887 44725	SOIL SEAD-12 8-9.5 06/10/94 MW12A-1-05 223888 44725
PESTICIDES/PCB									
Aldrin	ug/Kg	0.79	6%	41	0	1.9 U	2.2 U	1.9 U	1.8 U
4,4'-DDE	ug/Kg	6.4	19%	2100	0	3.7 U	4.3 U	3.7 U	3.5 U
Endrin	ug/Kg	20	13%	100	0	3.7 U	4.3 U	3.7 U	3.5 U
4,4'-DDD	ug/Kg	5.1	6%	2900	0	3.7 U	4.3 U	3.7 U	3.5 U
4,4'-DDT	ug/Kg	3.8	13%	2100	0	3.7 U	4.3 U	3.7 U	3.5 U
alpha-Chlordane	ug/Kg	2.6	13%	540	0	1.9 U	2.2 U	1.9 U	1.8 U
gamma-Chlordane	ug/Kg	2.3	13%	540	0	1.9 U	2.2 U	1.9 U	1.8 U
Aroclor-1254	ug/Kg	2300	25%	1000/10000(a)	0	37 U	43 U	37 U	35 U
Aroclor-1260	ug/Kg	150	13%	1000/10000(a)	0	37 U	43 U	37 U	35 U
METALS									
Aluminum	mg/Kg	18700	100%	14593	3	8610	18700	11000	12400
Antimony	mg/Kg	7.2	44%	3.59	1	0.26 UJ	0.22 UJ	0.24 UJ	0.2 UJ
Arsenic	mg/Kg	7.7	100%	7.5	1	3.1	5.2	3.5	3.6
Barium	mg/Kg	135	100%	300	0	67.4	125	82.8	78.3
Beryllium	mg/Kg	0.83	100%	.73	4	0.31 J	0.8 J	0.46 J	0.58 J
Cadmium	mg/Kg	94.3	100%	1	5	0.5 J	0.86	0.52 J	0.85
Calcium	mg/Kg	86700	100%	101904	0	86700 J	3370	71200	70300
Chromium	mg/Kg	83.3	100%	22	5	10.6	23.1	15.3	19.7
Cobalt	mg/Kg	26.5	100%	30	0	7.1 J	10.9	10.1	10.8
Copper	mg/Kg	215	100%	25	6	17.7	19.1	20.6	29.6
Iron	mg/Kg	34500	100%	26627	2	14400	23500	17400	22600
Lead	mg/Kg	431	100%	21.9	5	12.3 J	21.6	7.6	10.8
Magnesium	mg/Kg	36100	100%	12222	5	36100	3880	19200	12000
Manganese	mg/Kg	939	100%	669	2	326	939	414	409
Mercury	mg/Kg	0.11	100%	0.1	1	0.02 J	0.06 J	0.02 J	0.03 J
Nickel	mg/Kg	201	100%	34	4	18.9	25.7	23.7	35.5
Potassium	mg/Kg	3670	100%	1762	7	1480 J	2660 J	3460 J	2910 J
Selenium	mg/Kg	1.9	69%	2	0	0.54 U	1.2	0.5 U	0.41 U
Silver	mg/Kg	11.9	19%	0.4	2	0.1 U	0.09 U	0.09 U	0.08 U
Sodium	mg/Kg	136	88%	104	6	112 J	16.9 U	79.9 J	138 J
Thallium	mg/Kg	0.96	56%	0.28	9	0.38 U	0.32 U	0.35 U	0.29 U
Vanadium	mg/Kg	36.4	100%	150	0	11	33.1	21.7	20.2
Zinc	mg/Kg	424	100%	83	7	42.6	77.8	41.4	82.1
OTHER ANALYSES									
Total Solids	%W/W					89.8	76.8	89.6	93

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

4.3.2.3 Pesticides and PCBs

A total of 7 pesticides and 2 PCB compounds were detected at varying concentrations in 6 of the 16 soil samples collected at SEAD-12A. All of the reported concentrations of pesticides and PCBs were below their respective TAGM values.

4.3.2.4 Metals

A total of 23 metals were detected in the soil samples collected at SEAD-12A. Eighteen metals were detected in one or more samples at concentrations which exceeded their respective TAGM values. Cadmium, lead, and silver were found at concentrations which exceeded their respective TAGMS by up to 2 orders of magnitude. Cadmium was found at concentrations of 94.3 mg/kg in sample TP12A-1-2, 37.3 mg/kg in sample TP12A-2-2, 27.3 mg/kg in sample TP12A-2-1, 7.8 mg/kg in sample TP12A-1-1, and 3.6 mg/kg in sample TP12A-3-1. The TAGM for cadmium in soil is 1 mg/kg. Lead was found at significant concentrations in soil samples TP12A-6-2 (431J mg/kg) and TP12A-1-2 (366J mg/kg). The TAGM value for lead in soil is 21.9 mg/kg. Silver was found at significant concentrations in soil samples TP12A-1-2 (11.9 mg/kg) and TP12A-2-1 (0.49J mg/kg). The TAGM value for silver in soil is 0.4 mg/kg. Significant concentrations of copper were detected in soil samples TP12A-1-2 (215 mg/kg) and TP12A-2-2 (128 mg/kg). The TAGM values for copper in soil is 25 mg/kg. Nickel (201 mg/kg) and zinc (424 mg/kg) were also found at significant concentrations in soil sample TP12A-2-2. The TAGM values for nickel and zinc in soil are 34 mg/kg and 83 mg/kg, respectively. Beryllium was detected in four soil samples slightly above the TAGM value of 0.73 mg/kg. No other significant concentrations of metals were detected in the SEAD-12A soil samples.

4.3.2.5 Radioactivity

The gamma spectral analyses of the soil samples from SEAD-12A (Table 4.3-2) showed various concentrations of principal and associated radionuclides from the thorium, uranium, and actinium decay series. The principal radionuclides lead-210, radium-226 and uranium-235 were detected in the gamma spectral analyses. The presence of the principal radionuclides radium-228, thorium-228 and uranium-238 were inferred by the presence of one or more of their associated radionuclides as discussed in section 4.3.1. The doses calculated for the radionuclide concentrations in 8 of the 16 soil samples collected at SEAD-12A exceeded the New York state TAGM value of 90 mrem/year. Significant doses were calculated for the two samples collected in test pit TP12A-1 (492 mrem/year for sample TP12A-1-1 and 1,342

TABLE 4.3-1

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 7 06/24/94 TP12A-8-1 225533 45048	SOIL SEAD-12 0-0.2 06/10/94 MW12A-1-00 223886 44725	SOIL SEAD-12 4-6 06/10/94 MW12A-1-03 223887 44725	SOIL SEAD-12 8-9.5 06/10/94 MW12A-1-05 223888 44725
PESTICIDES/PCB									
Aldrin	ug/Kg	0.79	6%	41	0	1.9 U	2.2 U	1.9 U	1.8 U
4,4'-DDE	ug/Kg	6.4	19%	2100	0	3.7 U	4.3 U	3.7 U	3.5 U
Endrin	ug/Kg	20	13%	100	0	3.7 U	4.3 U	3.7 U	3.5 U
4,4'-DDD	ug/Kg	5.1	6%	2900	0	3.7 U	4.3 U	3.7 U	3.5 U
4,4'-DDT	ug/Kg	3.8	13%	2100	0	3.7 U	4.3 U	3.7 U	3.5 U
alpha-Chlordane	ug/Kg	2.6	13%	540	0	1.9 U	2.2 U	1.9 U	1.8 U
gamma-Chlordane	ug/Kg	2.3	13%	540	0	1.9 U	2.2 U	1.9 U	1.8 U
Aroclor-1254	ug/Kg	2300	25%	1000/10000(a)	0	37 U	43 U	37 U	35 U
Aroclor-1260	ug/Kg	150	13%	1000/10000(a)	0	37 U	43 U	37 U	35 U
METALS									
Aluminum	mg/Kg	18700	100%	14593	3	6610	18700	11000	12400
Antimony	mg/Kg	7.2	44%	3.59	1	0.26 UJ	0.22 UJ	0.24 UJ	0.2 UJ
Arsenic	mg/Kg	7.7	100%	7.5	1	3.1	5.2	3.5	3.6
Barium	mg/Kg	135	100%	300	0	67.4	125	82.8	78.3
Beryllium	mg/Kg	0.83	100%	.73	4	0.31 J	0.8 J	0.46 J	0.58 J
Cadmium	mg/Kg	94.3	100%	1	5	0.5 J	0.86	0.52 J	0.85
Calcium	mg/Kg	86700	100%	101904	0	88700 J	3370	71200	70300
Chromium	mg/Kg	83.3	100%	22	5	10.6	23.1	15.3	19.7
Cobalt	mg/Kg	26.5	100%	30	0	7.1 J	10.9	10.1	10.8
Copper	mg/Kg	215	100%	25	6	17.7	19.1	20.8	29.6
Iron	mg/Kg	34500	100%	26627	2	14400	23500	17400	22600
Lead	mg/Kg	431	100%	21.9	5	12.3 J	21.6	7.6	10.8
Magnesium	mg/Kg	36100	100%	12222	5	36100	3880	19200	12000
Manganese	mg/Kg	939	100%	669	2	326	939	414	409
Mercury	mg/Kg	0.11	100%	0.1	1	0.02 J	0.06 J	0.02 J	0.03 J
Nickel	mg/Kg	201	100%	34	4	18.9	25.7	23.7	35.5
Potassium	mg/Kg	3670	100%	1762	7	1480 J	2660 J	3460 J	2910 J
Selenium	mg/Kg	1.9	69%	2	0	0.54 U	1.2	0.5 U	0.41 U
Silver	mg/Kg	11.9	19%	0.4	2	0.1 U	0.09 U	0.09 U	0.08 U
Sodium	mg/Kg	136	88%	104	6	112 J	16.9 U	79.9 J	136 J
Thallium	mg/Kg	0.98	56%	0.28	9	0.38 U	0.32 U	0.35 U	0.29 U
Vanadium	mg/Kg	36.4	100%	150	0	11	33.1	21.7	20.2
Zinc	mg/Kg	424	100%	83	7	42.6	77.8	41.4	82.1
OTHER ANALYSES									
Total Solids	%W/W					89.8	76.8	89.6	93

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

8 moderately low AOCs

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A	
					DEPTH (FT)	0-0.2		4-6		8-9.5		2.5	
					DATE SAMPLED	6/10/94		6/10/94		6/10/94		6/24/94	
					ES ID	MW12A-1-00		MW12A-1-03		MW12A-1-05		TP12A-1-1	
					LAB ID	224295		224296		224297		225663	
RADIONUCLIDE ANALYSIS	FREQUENCY OF		DOE PROPOSED	UMTRCA	NUMBER ABOVE	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
GAMMA SPECTRAL	DETECTION	TAGM	10 CFR 834	40 CFR 192	CRITERIA								
Pb-210	100%	NA	NA	NA	NA	9.8	11.1	1.8	2.05	2.1	2.4	8.3	9.5
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	1	1.1	61	1.23	68	1.6	88	8.6	480
Ra-228	100%	NA	NA	NA	NA	1.12	1.4	0.98	0.91	1.12	1.3	1.07	1
Th-228	100%	NA	NA	NA	NA	1.5	0.37	1.13	0.28	1.8	0.45	1.33	0.6
U-235	100%	NA	NA	NA	NA	0.12	0.25	0.09	0.18	0.1	0.2	0.13	0.27
U-238	100%	NA	NA	NA	NA	1.16	0.4	0.77	0.27	0.52	0.18	1.39	0.48
Total Dose		90 mrem/yr.	180 mrem/yr	NA	8		74.52		71.69		92.53		491.85
GROSS ALPHA	100%	NA	NA	NA	NA	18		12		10		25	
GROSS BETA	100%	NA	NA	NA	NA	33		26		30		39	

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A	
					DEPTH (FT)	3		6		5		2.5	
					DATE SAMPLED	6/24/94		6/22/94		6/22/94		6/22/94	
					ES ID	TP12A-1-2		TP12A-2-1		TP12A-2-2		TP12A-3-1	
					LAB ID	225664		255657		225658		225659	
RADIONUCLIDE ANALYSIS	FREQUENCY OF		DOE PROPOSED	UMTRCA	NUMBER ABOVE	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
GAMMA SPECTRAL	DETECTION	TAGM	10 CFR 834	40 CFR 192	CRITERIA								
Pb-210	100%	NA	NA	NA	NA	17	19.5	2.4	2.7	3	3.4	2.4	2.7
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	1	24	1320	2.3	127	2.6	142	1.7	94
Ra-228	100%	NA	NA	NA	NA	1.25	1.08	1.07	1	1.08	1	1.5	1.4
Th-228	100%	NA	NA	NA	NA	1.8	0.48	1.7	0.42	1.7	0.42	1.7	0.42
U-235	100%	NA	NA	NA	NA	0.31	0.64	0.37	0.77	0.13	0.27	0.18	0.37
U-238	100%	NA	NA	NA	NA	2.2	0.77	0.6	0.21	0.99	0.34	0.86	0.3
Total Dose		90 mrem/yr.	180 mrem/yr	NA	8		1342.47		132.1		147.43		99.19
GROSS ALPHA	100%	NA	NA	NA	NA	88		28		22		29	
GROSS BETA	100%	NA	NA	NA	NA	59		34		33		36	

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A	
					DEPTH (FT)	6		4		4		3	
					DATE SAMPLED	6/22/94		6/21/94		6/21/94		6/23/94	
					ES ID	TP12A-3-2		TP12A-4-1		TP12A-4-2		TP12A-5-1	
					LAB ID	225660		224946		224947		225650	
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	TAGM	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
Pb-210	100%	NA	NA	NA	NA	2.3	2.6	2	2.3	1.9	2.2	1.7	1.9
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	1	1.5	85	1.23	68	1.4	77	1.08	60
Ra-228	100%	NA	NA	NA	NA	1.22	1.7	1.22	1.7	0.94	0.88	0.97	0.9
Th-228	100%	NA	NA	NA	NA	1.55	0.38	2.3	0.57	1.22	0.3	0.9	0.22
U-235	100%	NA	NA	NA	NA	0.12	0.25	0.13	0.27	0.31	0.62	0.43	0.9
U-238	100%	NA	NA	NA	NA	0.91	0.32	1.29	0.45	0.48	0.17	0.6	0.21
Total Dose		90 mrem/yr.	180 mrem/yr	NA	8		90.25		73.29		81.17		64.13
GROSS ALPHA	100%	NA	NA	NA	NA	16		18		12		14	
GROSS BETA	100%	NA	NA	NA	NA	33		23		27		28	

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A	
					DEPTH (FT)	1		7		4		7	
					DATE SAMPLED	6/23/94		6/23/94		6/23/94		6/24/94	
					ES ID	TP12A-6-1		TP12A-6-2		TP12A-7-1		TP12A-8-1	
					LAB ID	225651		225652		225653		225665	
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	TAGM	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
Pb-210	100%	NA	NA	NA	NA	2.6	3	1.9	2.2	4.6	5.2	2	2.3
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	1	1.5	83	1.29	71	1.7	94	1.4	77
Ra-228	100%	NA	NA	NA	NA	1.28	1.2	0.91	0.85	1.13	1.05	1.01	0.94
Th-228	100%	NA	NA	NA	NA	1.35	0.33	1.42	0.35	1.16	0.29	1.06	0.26
U-235	100%	NA	NA	NA	NA	0.33	0.69	0.25	0.5	0.11	0.23	0.08	0.16
U-238	100%	NA	NA	NA	NA	1.5	0.52	0.55	0.19	0.97	0.34	0.82	0.28
Total Dose		90 mrem/yr.	180 mrem/yr	NA	8		88.74		75.09		101.11		80.94
GROSS ALPHA	100%	NA	NA	NA	NA	21		16		27		11	
GROSS BETA	100%	NA	NA	NA	NA	35		27		36		29	

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

mrem/year for sample TP12A-1-2), which also exceeded the DOE proposed 10-CFR-834 limit of 180 mrem/year. The elevated doses calculated for samples MW12A-1-05 (92.53 mrem/year), TP12A-2-1 (132.1 mrem/year), TP12A-2-2 (147.43 mrem/year), TP12A-3-1 (99.19 mrem/year), TP12A-3-2 (90.25 mrem/year), and TP12A-7-1 (101.11 mrem/year) were attributed to the concentrations of radium-226 reported in these samples. Although the doses associated to the concentrations of radium-226 in these samples were above the TAGM, the concentrations reported in these samples (between 1.1 and 2.6 pico Curries per gram (pCi/g)) are roughly equal to the average concentrations of radium-226 (0.7 pCi/g) found in the soils across the continental United States (excluding Alaska). The concentrations of radium-226 reported in all media are shown in Figure 4.3-1. Gross alpha and gross beta radiation were also detected in all of the samples collected at SEAD-12A. Elevated concentrations of both gross alpha (88 pCi/g) and gross beta radiation (59 pCi/g) were detected in soil sample TP12A-1-2. The concentrations of gross alpha and gross beta radiation in the remaining soil samples collected at SEAD-12A showed no appreciable variances in the reported values.

4.3.3 Groundwater

The analytical results for the 3 groundwater samples collected at SEAD-12A are presented in Table 4.3-3. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-12A. The locations of the monitoring wells are shown in Figure 2.5-2.

4.3.3.1 Volatile Organic Compounds

One volatile organic compound was detected in one of the groundwater samples collected at SEAD-12A. The groundwater sample from MW12A-3 contained 9J μg/L of acetone. Acetone is a common laboratory contaminant. No other VOCs were detected in the groundwater samples collected at SEAD-12A.

4.3.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the groundwater samples collected at SEAD-12A.

4.3.3.3 Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-12A.

PARSON ROAD

GUARD POST

MW12A-1
654.02

1.2	0-0.2
1.23	4-6
1.6	8-9.5

1.2	0-0.2

SD12A-4

8.6	2.5
24	3

TP12A-1

TP12A-2

2.3	6
2.6	5

MW12A-2
653.97

1.7	2.5
1.5	6

TP12A-3

1.5	1
1.3	7

1.7	4

TR12A-6

TP12A-4

1.2	4
1.4	4

TP12A-7

TP12A-5

1.1	3

TP12A-8

1.4	7

MW12A-3
653.34

SWSD12A-1

2.3	0-0.2

654

653

652

SERVICE ROAD #1

SWSD12A-2

1.3	0-0.2

SWSD12A-3

1.7	0-0.2

BLG 813,814

BLG 815

BLG 825

BLG 826

SERVICE ROAD #2

N 1016250
N 1016000
N 1015750
N 1015500
N 1015250
N 1015000
N 1014750
N 1014500
N 1014250
N 1014000

\BML\SWMU\SD12ARAD.DWG
ACAD\S'

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

- ◆ SURFACE SOIL SAMPLE
- ▲ SURFACE WATER/ SEDIMENT SAMPLE
- ■ TEST PIT

N

100 0 100 200
(feet)

LEGEND

652 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

MW12A-1 / 653.34 MONITORING WELL WITH WATER TABLE ELEVATION

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

RADIUM 226 CONCENTRATION (pCi/g) | 1.3 | 0-0.2 | SAMPLE DEPTH (feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	D&G No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.3-1
SEAD-12A RADIOACTIVE WASTE BURIAL SITE
RADIUM-226 IN SOIL AND SEDIMENT

SCALE	DATE	REV
1" = 200'	4/13/95	A

TABLE 4.3-3

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-12 07/20/94 MW12A-1 227608 45448	WATER SEAD-12 07/20/94 MW12A-2 227609 45448	WATER SEAD-12 07/20/94 MW12A-3 227610 45448
VOLATILE ORGANICS									
Acetone	ug/L	9	33%	50	NA	0	10 U	10 U	9 J
METALS									
Aluminum	ug/L	5840	100%	NA	NA	NA	5840	2910	1040
Barium	ug/L	146	100%	1000	2000	0	94.2 J	79.1 J	146 J
Calcium	ug/L	123000	100%	NA	NA	NA	123000	108000	109000
Chromium	ug/L	9.4	100%	50	100	0	9.4 J	4.1 J	1.7 J
Cobalt	ug/L	6.2	100%	NA	NA	NA	6.2 J	2.4 J	1.1 J
Copper	ug/L	11.7	100%	200	1300 (h)	0	11.7 J	4.5 J	1.3 J
Iron	ug/L	9830	100%	300	NA	3	9830 J	4030 J	2140 J
Lead	ug/L	4.5	67%	25	15(i)	0	4.5	2 J	0.89 U
Magnesium	ug/L	32800	100%	NA	NA	NA	32800	17500	29900
Manganese	ug/L	237	100%	300	NA	0	223	237	77
Mercury	ug/L	0.08	100%	2	2	0	0.08 J	0.05 J	0.06 J
Nickel	ug/L	17.3	100%	NA	100	0	17.3 J	6.9 J	2.6 J
Potassium	ug/L	4730	100%	NA	NA	NA	4180 J	2470 J	4730 J
Silver	ug/L	0.7	33%	50	NA	0	0.5 U	0.7 J	0.5 U
Sodium	ug/L	9020	100%	20000	NA	0	9020	5120	8770
Vanadium	ug/L	10	100%	NA	NA	NA	10 J	4.9 J	2.2 J
Zinc	ug/L	50.3	100%	300	NA	0	50.3	18.7 J	18.6 J
OTHER ANALYSES									
pH	Standard Units			-			7.9	7.4	7.1
Conductivity	umhos/cm						625	500	575
Temperature	°C						13.7	11.5	13.2
Turbidity	NTU						198	114	165

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) Federal Primary Drinking Water Maximum Contaminant Levels.
h) The value listed is an action level for copper at the tap, and not an MCL.

4.3.3.4 Metals

A total of 17 metals were detected in the groundwater samples collected at SEAD-12A. Iron was detected at concentrations which were above the NY AWQS Class GA groundwater criteria of 300 μg/L in all 3 groundwater samples. The detected concentrations of iron were 9,830J μg/L (MW12A-1), 4,030J μg/L (MW12A-2), and 2,140J μg/L (MW12A-3). No other significant concentrations of metals were detected in the groundwater samples collected at SEAD-12A.

4.3.3.5 Radioactivity

No radionuclides from the uranium, thorium or actinium series were detected in the 3 groundwater samples submitted for gamma spectral analysis (Table 4.3-4). Gamma radiation from potassium-40 (k-40) was detected only in sample MW12A-2. Gross alpha radiation was detected at various concentrations in all 3 groundwater samples. Exceedance of the radiological criteria for gross alpha radiation (15 pCi/L) was detected only in sample MW12A-2. Gross beta radiation was also detected in all 3 groundwater samples collected at SEAD-12A. None of the calculated annual dose from the concentrations of gross beta radiations exceeded the proposed MCL and the federal health advisory values.

4.3.4 Surface water

The analytical results for the three surface water samples collected at SEAD-12A are presented in Table 4.3-5. The following sections describe the nature and extent of contamination identified in the surface water at SEAD-12A. The locations of the surface water sampling locations are shown in Figure 2.5-2.

4.3.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the surface water samples collected at SEAD-12A.

4.3.4.2 Semivolatile Organic Compounds

A total of 7 semivolatile organic compounds were found in the surface water samples collected at SEAD-12A. Pentachlorophenol was found at a concentration of 2 μg/L in

TABLE 4.3-4

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
GROUNDWATER RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	WATER		WATER		WATER	
					SWMU	SEAD-12A		SEAD-12A		SEAD-12A	
					DATE SAMPLED	7/20/94		7/20/94		7/20/94	
					ES ID	MW12A-1		MW12A-2		MW12A-3	
					LAB ID	227883		227884		227885	
RADIONUCLIDE ANALYSIS	FREQUENCY OF DETECTION	NY AWQS CLASS GA	PROPOSED MCLs	FEDERAL HEALTH ADVISORY	NUMBER ABOVE CRITERIA	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year
GAMMA SPECTRAL											
K-40	50%	NA	NA	NA	NA	107.1U		193		110.8U	
GROSS ALPHA	100%	15 pCi/L	15 pCi/L	15 pCi/L	1	15		38		5	
GROSS BETA	100%	1000 pCi/L	4 mrem/year	4 mrem/year	0	39	1.1E-02	130	0.2	15	4.3E-03

NOTES:
1. Background gross beta radiation was 39 pCi/L as measured from the background monitoring well MW12A-1 This radiation was assumed to have originated from the decay of naturally occurring K-40.
2. It was assumed that all beta radiation above 39 pCi/L was due to the decay of Ra-226 decay products Pb-214, Bi-214, Pb-210, and Bi-210, which were considered to be in secular equilibrium with Ra-226.
3. Dose calculations from Ra-226 decay products considered only those concentrations of beta radiation whic were above 39pCi/L
4. For the purpose of dose calculations from Ra-226 decay products, the initial concentration of Ra-226 ingest d was equal to one quarter (25%) of the reported gross beta radiation (above 39 pCi/L). This factor takes into account the equilibrium beta radiation from the four Ra-226 decay product which produce 99.96% of the tot l beta radiation in the Ra-226 decay chain.
5. Dose calculations for concentrations of gross beta radiation under 39 pCi/L were based upon a whole body exposure of K-40. The annual dose calculations assumed a daily water consumption of 2L per day.
6. U=not detected above this concentration.

TABLE 4.3-5

SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS STANDARDS AND GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-12 06/24/94 SW12A-1 225429 44745	WATER SEAD-12 06/11/94 SW12A-2 223898 44745	WATER SEAD-12 06/11/94 SW12A-3 223899 44745
SEMIVOLATILE ORGANICS								
Pentachlorophenol	ug/L	2	33%	.4	1	2 J	25 U	26 U
Di-n-butylphthalate	ug/L	2	67%	NA	NA	1 J	2 J	10 U
Pyrene	ug/L	1	33%	NA	NA	1 J	10 U	10 U
Benzo(a)anthracene	ug/L	0.5	33%	NA	NA	0.5 J	10 U	10 U
Chrysene	ug/L	0.5	33%	NA	NA	0.5 J	10 U	10 U
Benzo(k)fluoranthene	ug/L	1	33%	NA	NA	1 J	10 U	10 U
Benzo(a)pyrene	ug/L	0.6	33%	.0012 (f)	1	0.6 J	10 U	10 U
METALS								
Aluminum	ug/L	879	100%	100	2	175 J	86.7 J	879
Barium	ug/L	41.2	100%	NA	NA	28.6 J	30.9 J	41.2 J
Calcium	ug/L	85700	100%	NA	NA	85700	77400	83700
Chromium	ug/L	1.5	100%	390	0	0.89 J	0.56 J	1.5 J
Cobalt	ug/L	0.81	100%	5	0	0.53 J	0.81 J	0.73 J
Copper	ug/L	2	100%	22.9	0	1.2 J	1.6 J	2 J
Iron	ug/L	966	100%	300	1	250	126	966
Magnesium	ug/L	18100	100%	NA	NA	15000	17600	18100
Manganese	ug/L	492	100%	NA	NA	20.1	492	104
Mercury	ug/L	0.11	67%	.2 (f)	0	0.11 J	0.08 J	0.03 U
Nickel	ug/L	1.3	33%	172	0	0.7 U	0.7 U	1.3 J
Potassium	ug/L	3360	100%	NA	NA	1610 J	3360 J	1650 J
Silver	ug/L	0.58	67%	0.1	2	0.57 J	0.58 J	0.5 U
Sodium	ug/L	70700	100%	NA	NA	7030	70700	6940
Thallium	ug/L	2	33%	8	0	1.9 U	2 J	1.9 U
Vanadium	ug/L	1.6	100%	14	0	0.98 J	0.86 J	1.6 J
Zinc	ug/L	12.9	100%	159.6	0	5.4 J	2.2 J	12.9 J
OTHER ANALYSES								
pH	Standard Units					7.9	6.8	5.6
Conductivity	umhos/cm					530	800	825
Temperature	°C					20.3	14	25
Turbidity	NTU					4.8	2.8	3.5

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1993).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) NYSDEC guidance value

surface water sample SW12A-1. The NYS Class C surface water criteria for pentachlorophenol is 0.4 μg/L. Benzo(a)pyrene was found at a concentration of 0.6J μg/L, which is greater than the NYSDEC guidance value of .0012 μg/L. The 5 remaining SVOs detected in the surface water samples (di-n-butylphthalate, pyrene, benzo(a)anthracene, chrysene, and benzo(k)fluoranthene, were found at concentrations which were less than or equal to their respective criteria values. All of the SVOs were detected in surface water sample SW12A-1, with the exception of di-n-butylphthalate, which was also detected in sample SW12A-2.

4.3.4.3 Pesticides and PCBs

No Pesticides or PCBs were found in the surface water samples collected at SEAD-12A.

4.3.4.4 Metals

A total of 17 metals were detected in the surface water samples collected at SEAD-12A. Iron was detected at a concentration of 966 μg/L in surface water sample SW12A-3. The NYS criteria for iron in class C surface water is 300 μg/kg. Aluminum was detected at concentrations of 175J μg/L and 879 μg/L, which are greater than the NYSDEC criteria of 100 μg/L. Silver was detected at concentrations of 0.57J μg/L and 0.58J μg/L, which are greater than the NYSDEC criteria for silver of 0.10 μg/L. The reported concentrations of cobalt, chromium, mercury, copper, nickel, thallium, vanadium, and zinc were below their respective criteria values. No criteria exist for the 6 remaining metals detected in the surface water samples collected at SEAD-12A.

4.3.4.5 Radioactivity

No transuranic gamma emmiting radionuclides from the actinium series, the thorium series, or the uranium series were detected in the 3 surface water samples collected at SEAD-12 (Table 4.3-6). Gamma radiation from k-40 was detected in all of the surface water samples at concentrations ranging from 18 to 98 pCi/L. Gross alpha and gross beta radiation also were detected in all 3 surface water samples. Gross alpha radiation was detected at concentrations ranging from 2 to 12 pCi/L and gross beta radiation was detected at concentrations ranging from 9 to 16 pCi/L. No criteria exist for detected concentrations of gross alpha or gross beta radiation in New York state class D surface waters.

TABLE 4.3-6

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SURFACE WATER RADIOACTIVITY ANALYSIS RESULTS

MEDIA				WATER		WATER		WATER		WATER
SWMU				SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A
DATE SAMPLED				6/24/94		6/24/94		6/11/94		6/11/94
ES ID				SW12A-1		SW12A-20		SW12A-2		SW12A-3
LAB ID				225648		225649 SW12A-1DUP		224301		224302
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION		NUMBER ABOVE CRITERIA	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year
K-40	100%	No criteria for detected concentrations of radionuclides in New York state class D surface waters could be determined.	NA	55		98		74		18	
GROSS ALPHA	100%		NA	11		12		2		5	
GROSS BETA	100%		NA	16		12		9		10	

4.3.5 Sediment

The analytical results for the 4 sediment samples collected at SEAD-12A are presented in Table 4.3-7. The following sections describe the nature and extent of contamination identified in the sediment samples collected at SEAD-12A. The locations of the sediment sampling locations are shown in Figure 2.5-2.

4.3.5.1 Volatile Organic Compounds

No volatile organic compounds were detected in the sediment samples collected at SEAD-12A.

4.3.5.2 Semivolatile Organic Compounds

Two semivolatile organic compounds were detected in two of the sediment samples collected at SEAD-12A. Di-n-butylphthalate was detected at a concentration of 53J μg/kg in sample SD12A-1. Fluoranthene was detected in sediment sample SD12A-3 at a concentration of 26J μg/kg. No other SVOs were detected in the sediment samples collected at SEAD-12A.

4.3.5.3 Pesticides and PCBs

No pesticides or PCBs were detected in the sediment samples collected at SEAD-12A.

4.3.5.4 Metals

A total of 21 metals were detected in the sediment samples collected at SEAD-12A. Arsenic, cadmium, chromium, copper, iron, manganese, mercury, nickel, and zinc were detected at concentrations which exceeded their respective criteria in one or more of the sediment samples collected at SEAD-12A. The maximum reported concentration of cadmium was 6.9 mg/kg in sample SD12A-4. A concentation of 3.8 mg/kg of cadmium was detected in sample SD12A-1 which was collected from the upgradient location. The lowest effect level for cadmium is 0.6 mg/kg. The maximum reported concentration of manganese was 13,500J mg/kg in sample SD12A-1 which was collected from the upgradient location. This concentration of manganese is above the lowest effect level of 460 mg/kg. No other significant concentrations of metals were detected in the sediment samples collected at SEAD-12A.

TABLE 4.3-7
SENECA ARMY DEPOT
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER 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)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-12 0-0.2 06/22/94 SD12A-1 225396 44799	SOIL SEAD-12 0-0.2 06/11/94 SD12A-2 223908 44748	SOIL SEAD-12 0-0.2 06/11/94 SD12A-3 223909 44748	SOIL SEAD-12 0-0.2 06/11/94 SD12A-4 223910 44748
SEMIVOLATILE ORGANICS													
Di-n-butylphthalate	ug/Kg	53	25%	NA	NA	NA			NA	53 J	610 U	450 U	400 U
Fluoranthene	ug/Kg	26	25%	10200 (c)	NA	NA			0	430 U	610 U	26 J	400 U
METALS													
Aluminum	mg/Kg	17400	100%				NA	NA	NA	17400	11800	13600	11700
Arsenic	mg/Kg	15.8	100%				6	33	1	15.8	4	5.8	4.1
Barium	mg/Kg	848	100%				NA	NA	NA	848	84.1	83.7	108
Beryllium	mg/Kg	1.2	100%				NA	NA	NA	1.2 J	0.62 J	0.66 J	0.54 J
Cadmium	mg/Kg	6.9	100%				.6	9	4	3.8	0.62 J	0.65 J	6.9
Calcium	mg/Kg	29800	100%				NA	NA	NA	8060	8630	18200	29800
Chromium	mg/Kg	26.3	100%				26	110	1	26.3	19.1 J	22.2 J	18.9 J
Cobalt	mg/Kg	71.3	100%				NA	NA	NA	71.3	10.3 J	12.6	9.8 J
Copper	mg/Kg	29.7	100%				16	110	4	17.5	29.7	28.9	22.3
Iron	mg/Kg	76200	100%				2% (i)	4% (i)	4	76200	21800	30400	21600
Lead	mg/Kg	22.9	25%				31	110	0	22.9	18.8 R	15.6 R	14.2 R
Magnesium	mg/Kg	7620	100%				NA	NA	NA	5210	4900	7620	6300
Manganese	mg/Kg	13500	100%				460	1100	2	13500 J	340	478	408
Mercury	mg/Kg	0.25	100%				.15	1.3	1	0.07	0.25	0.06 J	0.03 J
Nickel	mg/Kg	52.8	100%				16	50	4	52.8	31.8	38.8	26
Potassium	mg/Kg	1830	100%				NA	NA	NA	1810 J	1450 J	1830 J	1490 J
Selenium	mg/Kg	4.3	100%				NA	NA	NA	4.3	0.82 J	0.89	0.63 J
Silver	mg/Kg	0.44	25%				1	2.2	0	0.44 J	0.12 U	0.09 U	0.11 U
Sodium	mg/Kg	139	100%				NA	NA	NA	96.2 J	136 J	139 J	47.9 J
Vanadium	mg/Kg	40.1	100%				NA	NA	NA	40.1	21.7	23.7	20
Zinc	mg/Kg	222	100%				120	270	4	158	172	147	222
OTHER ANALYSES													
Total Solids	%W/W									76.8	54.2	72.9	83.2

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) Chronic toxicity sediment criteria for benthic aquatic life.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg

4.3.5.5 Radioactivity

The gamma spectral analyses of the sediment samples collected at SEAD-12A (Table 4.3-8) showed various concentrations of principal and associated radionuclides from three natural radioactive decay series including the thorium series, the uranium series and the actinium series. The principal radionuclides radium-226, lead-210 and uramium-235 were detected in the gamma spectral analyses. The presence of the principal radionuclides radium-228, thorium-228 and uranium 238 were inferred by the presence of one or more of their associated radionuclides. In the absence of specific sediment criteria, dose calculations were performed using the concentrations of these principal radionuclides in a residential exposure scenario. All calculated annual doses from the radionuclides in the sediment samples were below the proposed 10 CFR 834 value of 100 mrem/year above background exposure to radiation. Gross alpha and gross beta radiation were also detected in all of the sediment samples collected at SEAD-12A. The concentrations of gross alpha and gross beta radiation detected in these samples showed no appreciable variances in the reported values.

4.3.6 Tentatively Identified Compounds

Total TIC concentrations exceeding 50 mg/kg were found in only one sample, test pit soil sample TP12A-2-1. A total TIC concentration of 84.0 mg/kg was reported in this sample. The primary TIC identified was phosphoric acid.

4.4 SEAD-12B RADIOACTIVE WASTE BURIAL SITE

4.4.1 Introduction

A total of 7 soil samples and 3 groundwater samples were collected as part of the SEAD-12B investigation. The following sections describe the nature and extent of contamination identified at SEAD-12B.

The media investigated at SEAD-12B was analyzed for chemical and radiolochemical parameters. The results of the radiolochemical analyses were reported in concentrations of radionuclides per gram of soil or sediment and in concentrations of radionuclides per liter of water. The radiochemical results of the soil analyses are compared to a New York State TAGM crtitria and a proposed 10 CFR 834 criteria. Each of these criteria is expressed as an annual dose rate, in milllirems per year (mrem/yr), that is based upon the site background

TABLE 4.3-8

SENECA ARMY DEPOT ACTIVITY
SEAD-12A ENVIRONMENTAL SITE INSPECTION
SEDIMENT RADIOACTIVITY ANALYSIS RESULTS

				MEDIA	SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT		SEDIMENT	
				SWMU	SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A		SEAD-12A	
				DEPTH (FT)	0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
				DATE SAMPLED	6/22/94		6/22/94		6/11/94		6/11/94		6/11/94	
				ES ID	SD12A-1		SD12A-20		SD12A-2		SD12A-3		SD12A-4	
				LAB ID	225654		255656		224298		224299		224300	
							SD12A-1DUP							
RADIONUCLIDE ANALYSIS	FREQUENCY OF	DOE PROPOSED	UMTRCA	NUMBER ABOVE	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
GAMMA SPECTRAL	DETECTION	10 CFR 834	40 CFR 192	CRITERIA										
Pb-210	100%	NA	NA	NA	2.2	3.9	2.3	4.1	4.1	7.6	2.2	3.9	2.1	3.7
Ra-226	100%	NA	6.3pCi/g | 16.3pCi/g	0	2.3	19.8	2.1	18	1.34	11.5	1.7	13.5	1.28	10.1
Ra-228	100%	NA	NA	NA	1.3	8.7	1.6	10.8	0.91	6.1	1.15	7	1	6.2
Th-228	100%	NA	NA	NA	1.7	7.2	1.21	5.1	1.9	8	2.1	9	1.21	5.1
U-235	100%	NA	NA	NA	0.31	0.18	0.1	0.058	0.1	0.058	0.41	0.25	0.18	0.18
U-238	100%	NA	NA	NA	0.95	0.15	2	0.25	1.08	0.186	0.7	0.11	0.91	0.144
Total Dose		177 mrem/yr	NA	0		39.93		38.308		33.444		33.76		25.424
GROSS ALPHA	100%	NA	NA	NA	25		24		12		17		14	
GROSS BETA	100%	NA	NA	NA	33		32		34		42		33	

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
3. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

annual dose rate. As part of this ESI, three background samples were collected at one location, MW12A-1, and the radiochemical results from each of these three samples were used to calculate three annual dose rates due to the radionuclides found at SEAD-12A. A background annual dose rate was then established as the average of these three annual dose rates. A computer model was utilized to calculate the radiation dose due to the exposure of the radionuclides detected at SEAD-12B. This model considered nine exposure pathways to a residential population occupying SEAD-12B. Dose rates were calculated on a per-sample basis assuming the surface area of SEAD-12B as the contaminated zone, and that the vertical thickness of the contaminated area was 1 meter (3.28 feet). Calculating dose rates on a per sample basis was chosen because a statistically representative source term for the amount of radionuclides in SEAD-12B soils could not be determined with the data available from this ESI. The entire zone of contamination was modeled to have a uniform concentration of six principal radionuclides. A principal radionuclide is a radionuclide with a half-life longer than one-half year. Radionuclides with a half-life of one-half year or less are treated as associated radionuclides. Radionuclides which are "associated" with a principal radionuclide consist of all decay products down to, but not including, the next principal radionuclide of a decay chain. The principal radionuclides identified at SEAD 12B and utilized in the dose calculation model were lead-210, radium-226, radium-228, thorium-228, uranium-235, and uranium-238. At each sample location, these principal radionuclides were assumed to be in secular equilibrium with their associated radionuclide. Secular equilibrium describes a state of radioactive equilibrium between a principal radionuclide and its associated decay products. That is to say, the number of associated radionuclide atoms disintegrating per second is the same as the number being created by disintegrations of the principal radionuclide atoms. Under this condition, it is possible to determine the amount of a principal radionuclide in a sample by measuring the amount of one or more of the succeeding members of the decay chain. For the purposes of dose calculations, the principal radionuclides which were inferred to be present (based upon a state of secular equilibrium with their associated radionuclides) were radium-228, thorium-228, and uranium-238. These principal radionuclides are undetectable by gamma spectral analysis when present at low concentrations. In addition, these radionuclides produce primarily alpha and/or beta emissions during their nuclear disinitegrations. The concentrations of gross alpha and gross beta radiation reported from the samples collected at SEADs 12A and 12B were at sufficiently low levels to support the assumptions that radium-228, thorium-228, and uranium-238 were present at concentrations equal to those of their associated radionuclides. If any of these principal radionuclides had occurred at

significant concentrations, their presence would have increased the reported concentrations of gross alpha and/or gross beta radiation, as well as significantly increasing the concentrations of their associated radionuclides.

Exposure doses from gross beta radiation in groundwater were calculated to provide comparisons to proposed MCL and federal health advisory exposure values. A single pathway model was utilized to calculate the annual dose from the concentrations of beta radiation reported for the groundwater samples. Water ingestion was the pathway considered, and a total daily water consumption of 2 liters per day was assumed (this value took into consideration the consumption of tap water as well as water present as oxidation in foods). The radionuclides used in the dose calculations were K-40 and the following radionuclides from the Ra-226 decay chain: lead-214, bismuth-214, Lead-210, and bismuth-210. Ra-226 is a bone surface seeker (approximately 85 percent of Ra-226 is present in the skeleton) and, therefore, the dose calculations involving the Ra-226 decay products only considered dose to bone. Potassium is maintained throughout the body at a relatively constant level. Therefore, the dose due to K-40 was calculated for a whole body exposure.

A description of the dose models utilized, as well as model constraints and model input data, is presented in appendix H.

4.4.2 Soil

The analytical results for the 7 soil samples collected as part of the SEAD-12B investigation are presented in Table 4.4-1. The following sections describe the nature and extent of contamination identified at SEAD-12B. The sample locations are shown in Figure 2.6-2.

4.4.2.1 Volatile Organic Compounds

Three VOCs were detected in two of the soil samples collected at SEAD-12B. Methylene chloride was detected at a concentration of 1J μg/kg in soil sample TP12B-1. Carbon disulfide and 2-butanone were detected at a concentrations of 1J μg/kg and 3J μg/kg, respectively, in soil sample SB12B-1. All of these reported concentrations of VOCs are at least 2 orders of magnitude below their respective TAGM values.

4.4.2.2 Semivolatile Organic Compounds

A total of 10 semivolatile organic compounds were detected at varying concentrations in 5

TABLE 4.4-1

SENECA ARMY DEPOT
SEAD-12B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 4 06/25/94 TP12B-1 225582 45058	SOIL SEAD-12 2.5 06/24/94 TP12B-2-1 225550 45058	SOIL SEAD-12 2.5 06/25/94 TP12B-3 225551 45058	SOIL SEAD-12 0-0.2 06/13/94 MW12B-1-00 224233 44799
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	1	14%	100	0	1 J	12 U	11 U	11 U
Carbon Disulfide	ug/Kg	1	14%	2700	0	11 U	12 U	11 U	11 U
2-Butanone	ug/Kg	3	14%	300	0	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS									
Phenanthrene	ug/Kg	34	14%	50000*	0	360 U	380 U	370 U	34 J
Di-n-butylphthalate	ug/Kg	53	29%	8100	0	44 J	380 U	53 J	360 U
Fluoranthene	ug/Kg	64	14%	50000*	0	360 U	380 U	370 U	64 J
Pyrene	ug/Kg	51	14%	50000*	0	360 U	380 U	370 U	51 J
Benzo(a)anthracene	ug/Kg	26	14%	220	0	360 U	380 U	370 U	26 J
Chrysene	ug/Kg	32	14%	400	0	360 U	380 U	370 U	32 J
bis(2-Ethylhexyl)phthalate	ug/Kg	83	29%	50000*	0	360 U	380 U	370 U	360 U
Benzo(b)fluoranthene	ug/Kg	34	14%	1100	0	360 U	380 U	370 U	34 J
Benzo(k)fluoranthene	ug/Kg	20	14%	1100	0	360 U	380 U	370 U	20 J
Benzo(a)pyrene	ug/Kg	20	14%	61	0	360 U	380 U	370 U	20 J
PESTICIDES/PCB									
4,4'-DDE	ug/Kg	2	14%	2100	0	3.6 UJ	3.8 U	3.7 U	2 J
Aroclor-1242	ug/Kg	17	29%	1000/10000(a)	0	36 UJ	38 U	37 U	17 J
METALS									
Aluminum	mg/Kg	10800	100%	14593	0	7400	10300	6850	10800
Arsenic	mg/Kg	6.6	100%	7.5	0	4.4 J	4.6 J	3.3 J	6.6
Barium	mg/Kg	138	100%	300	0	78.3	90.5	36.5 J	102
Beryllium	mg/Kg	0.53	100%	.73	0	0.37 J	0.52 J	0.26 J	0.53 J
Cadmium	mg/Kg	0.63	100%	1	0	0.36 J	0.43 J	0.18 J	0.63 J
Calcium	mg/Kg	85300	100%	101904	0	85300	76400	45500	45900
Chromium	mg/Kg	16	100%	22	0	11.4	15.9	9.1	16
Cobalt	mg/Kg	9.7	100%	30	0	7.6 J	9.7	4.3 J	9.2
Copper	mg/Kg	30.4	100%	25	1	22.1	21.9	13.8	30.4
Iron	mg/Kg	23400	100%	26627	0	15600	20100	11700	23400
Lead	mg/Kg	17.1	100%	21.9	0	7.9	10.6	4.8	17.1
Magnesium	mg/Kg	22800	100%	12222	4	22800	16900	18300	11400
Manganese	mg/Kg	418	100%	669	0	340	383	337	418
Mercury	mg/Kg	0.5	100%	0.1	1	0.03 J	0.02 J	0.03 J	0.04 J
Nickel	mg/Kg	29	100%	34	0	19.9	29	9.2	28
Potassium	mg/Kg	2330	100%	1762	4	1940 J	2330 J	2150 J	1870 J
Selenium	mg/Kg	2.1	43%	2	1	0.48 U	0.5 U	0.54 U	1.3
Sodium	mg/Kg	252	100%	104	5	252 J	233 J	157 J	76.2 J
Thallium	mg/Kg	0.79	86%	0.28	6	0.39 J	0.79 J	0.46 J	0.41 J
Vanadium	mg/Kg	20.9	100%	150	0	14.8	18.5	15.4	20.9
Zinc	mg/Kg	62.7	100%	83	0	40.7 J	51.7 J	28.9 J	62.7
OTHER ANALYSES									
Total Solids	%W/W					91	86	88.8	91.4

TABLE 4.4-1

SENECA ARMY DEPOT
SEAD-12B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-12 4-6 06/13/94 MW12B-1-03 224234 44799	SOIL SEAD-12 12-13.5 06/13/94 MW12B-1-07 224235 44799	SOIL SEAD-12 18-21 06/29/94 SB12B-1 225902 45062
VOLATILE ORGANICS								
Methylene Chloride	ug/Kg	1	14%	100	0	11 U	11 U	11 U
Carbon Disulfide	ug/Kg	1	14%	2700	0	11 U	11 U	1 J
2-Butanone	ug/Kg	3	14%	300	0	11 U	11 U	3 J
SEMIVOLATILE ORGANICS								
Phenanthrene	ug/Kg	34	14%	50000*	0	360 U	360 U	380 U
Di-n-butylphthalate	ug/Kg	53	29%	8100	0	360 U	360 U	380 U
Fluoranthene	ug/Kg	64	14%	50000*	0	360 U	360 U	380 U
Pyrene	ug/Kg	51	14%	50000*	0	360 U	360 U	380 U
Benzo(a)anthracene	ug/Kg	26	14%	220	0	360 U	360 U	380 U
Chrysene	ug/Kg	32	14%	400	0	360 U	360 U	380 U
bis(2-Ethylhexyl)phthalate	ug/Kg	83	29%	50000*	0	45 J	83 J	380 U
Benzo(b)fluoranthene	ug/Kg	34	14%	1100	0	360 U	360 U	380 U
Benzo(k)fluoranthene	ug/Kg	20	14%	1100	0	360 U	360 U	380 U
Benzo(a)pyrene	ug/Kg	20	14%	61	0	360 U	360 U	380 U
PESTICIDES/PCB								
4,4'-DDE	ug/Kg	2	14%	2100	0	3.6 U	3.6 U	3.8 U
Aroclor-1242	ug/Kg	17	29%	1000/10000(a)	0	16 J	36 U	38 U
METALS								
Aluminum	mg/Kg	10800	100%	14593	0	8060	5940	9050 J
Arsenic	mg/Kg	6.6	100%	7.5	0	4.6	2.9	1.9 J
Barium	mg/Kg	138	100%	300	0	89.1	43.8	138 J
Beryllium	mg/Kg	0.53	100%	.73	0	0.4 J	0.27 J	0.44 J
Cadmium	mg/Kg	0.63	100%	1	0	0.52 J	0.32 J	0.29 J
Calcium	mg/Kg	85300	100%	101904	0	79400	51100	83400 J
Chromium	mg/Kg	16	100%	22	0	12.7	12	13.8 J
Cobalt	mg/Kg	9.7	100%	30	0	8.6 J	5.2 J	4.6 J
Copper	mg/Kg	30.4	100%	25	1	22.5	17.3	15.6 J
Iron	mg/Kg	23400	100%	26627	0	17200	13500	14100 J
Lead	mg/Kg	17.1	100%	21.9	0	10.3	7.3	7.5
Magnesium	mg/Kg	22800	100%	12222	4	16300	8320	12200 J
Manganese	mg/Kg	418	100%	669	0	388	244	366 J
Mercury	mg/Kg	0.5	100%	0.1	1	0.5	0.03 J	0.03 J
Nickel	mg/Kg	29	100%	34	0	23.5	19	18.2 J
Potassium	mg/Kg	2330	100%	1762	4	1660 J	1040 J	1650 J
Selenium	mg/Kg	2.1	43%	2	1	0.72 J	2.1	0.53 U
Sodium	mg/Kg	252	100%	104	5	135 J	77.3 J	115 J
Thallium	mg/Kg	0.79	86%	0.28	6	0.64 J	0.39 J	0.37 U
Vanadium	mg/Kg	20.9	100%	150	0	13.8	11.5	13.5 J
Zinc	mg/Kg	62.7	100%	83	0	50.5	36.2	46.7 J
OTHER ANALYSES								
Total Solids	%W/W					90.6	90.9	87.1

of the 7 soil samples collected at SEAD-12B. Phthalates were detected in soil samples TP12B-1, TP12B-3, and MW12B-1-03, and MW12B-1-07. The remaining SVOs, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene, were detected only in soil sample MW12B-1-00. All of the reported concentrations of SVOs were below their respective TAGM values.

4.4.2.3 Pesticides and PCBs

The pesticide 4,4'-DDE and the PCB Aroclor-1242 were detected in 2 of the 7 soil samples collected at SEAD-12B. 4,4'-DDE and Aroclor-1242 were detected at concentrations of 2J μg/kg and 17J μg/kg, respectively, in soil sample MW12B-1-00. Aroclor-1242 was also detected at a concentration of 16J μg/kg in soil sample MW12B-1-03. The TAGM value for 4,4'-DDE is 2,100 μg/kg and the TAGM value for Aroclor-1242 is 10,000 μg/kg. No other pesticides or PCBs were detected in the soil samples collected at SEAD-12B.

4.4.2.4 Metals

A total of 21 metals were detected in the soil samples collected at SEAD-12B. Seven metals (copper, magnesium, mercury, potassium, selenium, sodium, and thallium) were detected in one or more samples at concentrations which exceeded their respective TAGM values. Mercury was found at a concentration of 0.5 mg/kg in soil sample MW12B-1-03. The TAGM value for mercury in soil is 0.1 mg/kg. All of the remaining concentrations of metals, which were detected at elevated concentrations, exceeded their respective TAGM values by a factor of 3 or less.

4.4.2.5 Radioactivity

The gamma spectral analyses of the soil samples from SEAD-12B (Table 4.4-2) showed various concentrations of principal and associated radionuclides from the the thorium series, the uranium series and the actinium series. The principal radionuclides radium-226, lead-210 and uranium-235 were detected in the gamma spectral analyses. The presence of the principal radionuclides radium-228, thorium-228 and uranium-238 were inferred by the presence of one or more of their associated radionuclides as discussed in section 4.4.1. The dose calculated for soil sample MW12B-1-03 (105 mrem/year) was the only dose value which exceeded the TAGM value of 90 mrem/year. The elevated dose calculated for soil sample MW12B-1-03 was attributed to the elevated concentration of radium-226 detected in this sample. The reported concentration of 1.8 pCi/g is only slightly above the average concentration of radium-226 (0.7 pCi/g) found in the soils of the continental United States (excluding Alaska). Gross alpha and gross beta radiation were also detected in all of the

8 moderately low AOCs

TABLE 4.4-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12B ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL	SOIL	SOIL	SOIL
					SWMU	SEAD-12B	SEAD-12B	SEAD-12B	SEAD-12B
					DEPTH (FT)	4-6	4-6	12-13.5	18-21
					DATE SAMPLED	6/13/94	6/13/94	6/13/94	6/29/94
					ES ID	MW12B-1-03	MW12B-1-20	MW12B-1-07	SB12B-1
					LAB ID	224318	224320 MW12B-1-03DUP	224319	225920
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	TAGM	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g | mrem/year	pCi/g | mrem/year	pCi/g | mrem/year	pCi/g | mrem/year
Pb-210	100%	NA	NA	NA	NA	1.5 | 2.7	1.6 | 2.9	2.5 | 4.5	1.7 | 3
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	0	1.8 | 99	1.22 | 67	1.25 | 68	1.5 | 83
Ra-228	100%	NA	NA	NA	NA	1.07 | 1.6	0.92 | 1.39	0.83 | 1.25	0.99 | 1.445
Th-228	100%	NA	NA	NA	NA	0.79 | 0.29	1.44 | 0.53	1.04 | 0.38	1.03 | 0.38
U-235	100%	NA	NA	NA	NA	0.3 | 1.38	0.82 | 3.7	0.07 | 0.325	0.34 | 1.6
U-238	100%	NA	NA	NA	NA	0.52 | 0.39	0.47 | 0.35	0.76 | 0.58	0.61 | 0.46
Total Dose		90 mrem/yr.	180 mrem/yr	NA	1	105.36	75.87	75.035	89.885
GROSS ALPHA	100%	NA	NA	NA	NA	10	6	12	17
GROSS BETA	100%	NA	NA	NA	NA	23	27	31	32

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

TABLE 4.4-2

SENECA ARMY DEPOT ACTIVITY
SEAD-12B ENVIRONMENTAL SITE INSPECTION
SOIL RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL		
					SWMU	SEAD-12B		SEAD-12B		SEAD-12B		SEAD-12B		
					DEPTH (FT)	4		2.5		2.5		2.5		
					DATE SAMPLED	6/25/94		6/24/94		6/25/94		6/25/94		
					ES ID	TP12B-1		TP12B-2-1		TP12B-3		TP12B-53		
					LAB ID	225671		225666		225667		225669		
												TP12B-3D		
RADIONUCLIDE ANALYSIS	FREQUENCY OF		DOE PROPOSED	UMTRCA	NUMBER ABOVE	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	
GAMMA SPECTRAL	DETECTION	TAGM	10 CFR 834	40 CFR 192	CRITERIA									
Pb-210	100%	NA	NA	NA	NA	1.9	3.4	1.8	3.2	1.6	2.85	2.7	4.8	
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	0	1.09	60	1.28	71	0.75	41	1.29	75	
Ra-228	100%	NA	NA	NA	NA	0.82	1.23	0.95	1.42	0.74	1.1	0.75	1.13	
Th-228	100%	NA	NA	NA	NA	1.06	0.39	1.25	0.46	1.1	0.4	1.04	0.38	
U-235	100%	NA	NA	NA	NA	0.25	1.8	0.07	0.32	0.1	0.47	0.15	0.69	
U-238	100%	NA	NA	NA	NA	0.43	0.33	0.6	0.45	0.69	0.53	0.8	0.62	
Total Dose		90 mrem/yr.	180 mrem/yr	NA	1		67.15		76.85		46.35		82.62	
GROSS ALPHA	100%	NA	NA	NA	NA	14		14		12		13		
GROSS BETA	100%	NA	NA	NA	NA	31		34		26		19		

NOTES
1. The backround dose calculation was based on a residential total dose model incorporating the concentrations of the detected radionuclides from the soil boring at MW12A-1.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

samples collected at SEAD-12A. The concentrations of gross alpha and gross beta radiation detected in the soil samples collected at SEAD-12A showed no appreciable variances in the reported values.

4.4.3 Groundwater

The analytical results for the 3 groundwater samples collected at SEAD-12B are presented in Table 4.4-3. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-12B. The locations of the monitoring wells are shown in Figure 2.6-2.

4.4.3.1 Volatile Organic Compounds

No volatile organic compound were found in the groundwater samples collected at SEAD-12B.

4.4.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the groundwater samples collected at SEAD-12B.

4.4.3.3 Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-12B.

4.4.3.4 Metals

A total of 22 metals were detected in the groundwater samples collected at SEAD-12B. Iron, lead, manganese, and thallium were detected at concentrations which were above the lowest associated federal or state criteria. Iron and manganese were detected at concentrations above the NY AWQS Class GA groundwater criteria of 300 μg/L in all 3 groundwater samples. The detected concentrations of iron were 10,500 μg/L (MW12B-1), 20,700 μg/L (MW12B-2), and 14,700 μg/L (MW12B-3). The detected concentrations of manganese were 536 μg/L (MW12B-1), 800 μg/L (MW12B-2), and 522 μg/L (MW12B-3). Lead was detected at concentrations of 18.6 μg/L (MW12B-2) and 18.8 μg/L (MW12b-3) which are above the federal action level of 15 μg/L. Thallium was detected at concentrations of 2.8J μg/L and 5J μg/L which exceed the federal criteria of 2 μg/L. No other significant concentrations of metals were detected in the groundwater samples collected at SEAD-12B.

TABLE 4.4-3

SENECA ARMY DEPOT
SEAD-12B ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-12 07/19/94 MW12B-1 227442 45332	WATER SEAD-12 07/19/94 MW12B-2 227443 45332	WATER SEAD-12 07/19/94 MW12B-3 227444 45332
METALS									
Aluminum	ug/L	9880	100%	NA	NA	NA	4860 J	9880 J	6940 J
Antimony	ug/L	1.4	33%	3	6	0	1.4 J	1.3 U	1.3 U
Arsenic	ug/L	3.2	67%	25	50	0	3.2 J	3 J	2 U
Barium	ug/L	189	100%	1000	2000	0	102 J	171 J	189 J
Beryllium	ug/L	0.71	100%	NA	4	0	0.21 J	0.71 J	0.41 J
Cadmium	ug/L	0.27	67%	10	5	0	0.2 U	0.26 J	0.27 J
Calcium	ug/L	260000	100%	NA	NA	NA	183000	260000	169000
Chromium	ug/L	18.5	100%	50	100	0	9.8 J	18.5	13.5
Cobalt	ug/L	15.2	100%	NA	NA	NA	8 J	15.2 J	12 J
Copper	ug/L	25.1	100%	200	1300(h)	0	16.8 J	25.1	19 J
Iron	ug/L	20700	100%	300	NA	3	10500	20700	14700
Lead	ug/L	18.8	100%	25	15 (i)	2	11	18.6	18.8
Magnesium	ug/L	71100	100%	NA	NA	NA	46800	71100	37900
Manganese	ug/L	800	100%	300	NA	3	536	800	522
Mercury	ug/L	0.08	100%	2	2	0	0.08 J	0.05 J	0.05 J
Nickel	ug/L	38.8	100%	NA	100	0	24.4 J	38.8 J	32.5 J
Potassium	ug/L	13000	100%	NA	NA	NA	13000 J	5510 J	2900 J
Silver	ug/L	2.7	100%	50	NA	0	2.7 J	0.59 J	0.62 J
Sodium	ug/L	18500	100%	20000	NA	0	18500	16400	4510 J
Thallium	ug/L	5	67%	NA	2	2	2.8 J	1.9 U	5 J
Vanadium	ug/L	18.3	100%	NA	NA	NA	9.5 J	18.3 J	12.7 J
Zinc	ug/L	55.7	100%	300	NA	0	32.8	55.7	41.1
OTHER ANALYSES									
pH	Standard Units						5.6	6.9	8.2
Conductivity	umhos/cm						1100	875	1075
Temperature	°C						12.9	14	14.3
Turbidity	NTU						>1000	>1000	>1000

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) Federal Primary Drinking Water Maximum Contaminant Levels
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.

4.4.3.5 Radioactivity

Gamma radiation from radium-226 and 2 of its associate radionuclides were found at concentrations ranging from 56 pCi/L to 109 pCi/L in groundwater sample MW12B-1. The principal radionuclide uranium-235 was also detected at a concentration of 44 pCi/L (Table 4.4-4) in this sample. The specific activity of uranium-235 is 2.14 pCi/ug, therefore, the equivalent concentration of 44 pCi/L of uranium-235 is 20.5 μg/L. This concentration exceeded only the proposed MCL limit of 20 μg/L for uranium (total). Radium-226 was also detected in sample MW12B-1 at a concentration of 97 pCi/ug, which exceeds the proposed MCL limit of 20 μg/L. Gamma radiation from potassium-40 was also detected in all 4 groundwater samples at concentrations ranging from 151 to 242 pCi/L. Gross alpha radiation was detected at concentrations which exceeded the gross alpha criteria of 15 pCi/L in all 4 of the groundwater samples. Gross beta radiation was detected in all 4 groundwater samples collected at SEAD-12B. The calculated annual dose from the concentrations of gross beta radiations were all below the proposed MCL and the federal health advisory values of 4 mrem/year. Tritium (oxide) was also detected at concentrations ranging from 0.06 to 0.27 pCi/L. Currently, no criteria exist for reported concentrations of tritium oxide in New York State Class GA groundwater.

4.4.4 Tentatively Identified Compounds

The total concentrations of tentatively identified compounds (TIC) were below 50 mg/kg in all of the samples collected at SEAD-12B.

4.5 SEAD-43: OLD MISSILE PROPELLANT TEST LAB (BLDG. 606) SEAD-56: HERBICIDE/PESTICIDE STORAGE SEAD-69: BUILDING 606 DISPOSAL AREA

4.5.1 Introduction

A total of 30 surface and subsurface soil samples, 5 surface water and 5 sediment samples were collected at SEADs 43, 56 & 69. Four monitoring wells were also installed and sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEADs-43, 56 & 69.

4.5.2 Soils

The analytical results for the 30 surface and subsurface soil samples collected as part of the SEAD-43, 56 and 69 investigations are presented in Table 4.5-1. The following sections describe the nature and extent of contamination in SEAD 43, 56 and 69 soils. The sample locations are shown in Figure 2.5-2.

TABLE 4.4-4

SENECA ARMY DEPOT ACTIVITY
SEAD-12B ENVIRONMENTAL SITE INSPECTION
GROUNDWATER RADIOACTIVITY ANALYSIS RESULTS

					MEDIA	WATER		WATER		WATER		WATER		WATER
					SWMU	SEAD-12		SEAD-12		SEAD-12		SEAD-12		SEAD-12
					DATE SAMPLED	7/19/94		7/19/94		7/19/94		7/19/94		7/19/94
					ES ID	MW12B-1		MW12B-5		MW12B-2		MW12B-3		MW12B-1DUP
					LAB ID	227878		227882		227880		227881		
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	NY AWQS CLASS GA	PROPOSED MCLs	FEDERAL HEALTH ADVISORY	NUMBER ABOVE CRITERIA	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year	
K-40	50%	NA	NA	NA	NA	242		149		151		209		
Radium-226 @ 186 KeV		NA	20 pCi/L	150 pCi/L	1	97		149.1U		149.5U		167.4U		
Lead-214 @ 295.2 KeV		NA	NA	NA	NA	59		36.21U		36.65U		27.93U		
Lead-214 @ 352 KeV		NA	NA	NA	NA	56		14.06U		13.76U		16.87U		
Bismuth-214 @ 609.4 KeV		NA	NA	NA	NA	80		16.09U		15.68U		17.69U		
Bismuth-214 @ 1120.4 KeV		NA	NA	NA	NA	109		54.55U		87.5U		91.26U		
Bismuth-214 @ 1764.7 KeV		NA	NA	NA	NA	99		86.13U		89.26U		90.85U		
Uranium-235 @ 143.8 KeV		5000 ug/L	20 ug/L	70 ug/L	1	44	(20.5) see note 6	55U		54.28U		68.78U		
GROSS ALPHA	100%	15 pCi/L	15 pCi/L	15 pCi/L	4	76		45		31		34		
GROSS BETA	100%	1000 pCi/L	4 mrem/year	4 mrem/year	0	130	0.2	76	0.1	120	0.2	116	0.2	
TRITIUM	100%	NA	NA	NA		0.9		0.21		0.27		0.06		

NOTES:
1. Background gross beta radiation was 39 pCi/L as measured from the background monitoring well MW12A-1. This radiation was assumed to have originated from the decay of naturally occurring K-40.
2. It was assumed that all beta radiation above 39 pCi/L was due to the decay of Ra-226 decay products Pb-214, Bi-214, Pb-210, and Bi-210, which were considered to be in secular equilibrium with Ra-226.
3. Dose calculations from Ra-226 decay products considered only those concentrations of beta radiation which were above 39pCi/L
4. For the purpose of dose calculations from Ra-226 decay products, the initial concentration of Ra-226 ingested was equal to one quarter (25%) of the reported gross beta radiation (above 39 pCi/L). This factor takes into account the equilibrium beta radiation from the four Ra-226 decay product which produce 99.96% of the total beta radiation in the Ra-226 decay chain.
5. Dose calculations for concentrations of gross beta radiation under 39 pCi/L were based upon a whole body exposure of K-40. The annual dose calculations assumed a daily water consumption of 2L per day.
6. The specific activity of U-235 is 2.14 pCi/ug
7. U=not detected above this concentration.

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-43 0-0.2 06/10/94 SB43-1-00 223889 44725	SOIL SEAD-43 4-5 06/10/94 SB43-1-03 223891 44725	SOIL SEAD-43 14-16 06/10/94 SB43-1-08 223892 44725	SOIL SEAD-43 0-0.2 06/10/94 SB43-2-00 223682 44694	SOIL SEAD-43 4-6 06/10/94 SB43-2-03 223684 44694	SOIL SEAD-43 10-12 06/10/94 SB43-2-06 223685 44694	SOIL SEAD-43 0-0.2 06/09/94 SB43-3-00 223686 44694
VOLATILE ORGANICS												
Methylene Chloride	ug/Kg	4	13%	100	0	13 U	11 U	11 U R	12 U	11 U	11 U R	11 U
Acetone	ug/Kg	5	7%	200	0	13 U	11 U	11 U R	12 U	11 U	16 U R	11 U
Chloroform	ug/Kg	4	7%	300	0	13 U	11 U	11 U R	12 U	11 U	11 U R	11 U
Toluene	ug/Kg	27	23%	1500	0	13 U	11 U	11 U R	12 U	11 U	11 U R	11 U
Xylene (total)	ug/Kg	12	10%	1200	0	13 U	11 U	11 U R	12 U	11 U	11 U R	11 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	12 J	5.6 U	5.3 U	6.4 U	5.5 U	5.4 U	5.5 U
Dicamba	ug/Kg	11	3%	NA	NA	11 J	5.6 U	5.3 U	6.4 U	5.5 U	5.4 U	5.5 U
Dichloroprop	ug/Kg	72	3%	NA	NA	72 J	56 U	53 U	64 U	55 U	54 U	55 U
MCPP	ug/Kg	7700	10%	NA	NA	7300 J	5600 U	5300 U	6400 U	5500 U	5400 U	7100
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Naphthalene	ug/Kg	200	7%	13000	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Acenaphthene	ug/Kg	570	7%	50000*	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Dibenzofuran	ug/Kg	310	7%	6200	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Fluorene	ug/Kg	610	7%	50000*	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Phenanthrene	ug/Kg	5200	13%	50000*	0	410 U	370 U	350 U	27 J	360 U	350 U	140 J
Anthracene	ug/Kg	1300	10%	50000*	0	410 U	370 U	350 U	420 U	360 U	350 U	35 J
Carbazole	ug/Kg	620	10%	50000*	0	410 U	370 U	350 U	420 U	360 U	350 U	20 J
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	410 U	370 U	350 U	420 U	360 U	350 U	360 U
Fluoranthene	ug/Kg	6300	13%	50000*	0	410 U	370 U	350 U	42 J	360 U	350 U	240 J
Pyrene	ug/Kg	4700	13%	50000*	0	410 U	370 U	350 U	45 J	360 U	350 U	230 J
Benzo(a)anthracene	ug/Kg	2400	13%	220	2	410 U	370 U	350 U	22 J	360 U	350 U	110 J
Chrysene	ug/Kg	2400	13%	400	2	410 U	370 U	350 U	25 J	360 U	350 U	120 J
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000*	0	510 J	370 U	70 J	53 J	50 J	29 J	530
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	410 U	370 U	350 U	420 U	360 U	350 U	100 J
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	410 U	370 U	350 U	420 U	360 U	350 U	86 J
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	410 U	370 U	350 U	420 U	360 U	350 U	96 J
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	410 U	370 U	350 U	420 U	360 U	350 U	75 J
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	410 U	370 U	350 U	420 U	360 U	350 U	33 J
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000*	0	410 U	370 U	350 U	420 U	360 U	350 U	88 J
PESTICIDES/PCB												
Endosulfan I	ug/Kg	1.2	3%	900	0	2.1 U	1.9 U	1.8 U	2.2 U	1.8 U	1.8 U	1.2 J
alpha-Chlordane	ug/Kg	2.4	3%	540	0	2.1 U	1.9 U	1.8 U	2.2 U	1.8 U	1.8 U	1.8 U

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-43 0-0.2 06/10/94 SB43-1-00 223889 44725	SOIL SEAD-43 4-5 06/10/94 SB43-1-03 223891 44725	SOIL SEAD-43 14-16 06/10/94 SB43-1-08 223892 44725	SOIL SEAD-43 0-0.2 06/10/94 SB43-2-00 223682 44694	SOIL SEAD-43 4-6 06/10/94 SB43-2-03 223684 44694	SOIL SEAD-43 10-12 06/10/94 SB43-2-06 223685 44694	SOIL SEAD-43 0-0.2 06/09/94 SB43-3-00 223686 44694
METALS												
Aluminum	mg/Kg	27000	100%	14593	9	20800	8620	16200	14700 J	11600 J	12800 J	10900 J
Antimony	mg/Kg	7.2	30%	3.59	2	0.23 UJ	0.19 UJ	0.21 UJ	0.32 UJ	0.24 J	0.23 UJ	0.24 J
Arsenic	mg/Kg	7.1	100%	7.5	0	6.1	3.9	6.2	6.1	5.4	5.5	5.3
Barium	mg/Kg	175	100%	300	0	145	46	54.8	104 J	72.1 J	70.9 J	60.3 J
Beryllium	mg/Kg	1.2	100%	.73	6	0.86 J	0.41 J	0.73 J	0.69 J	0.52 J	0.58 J	0.44 J
Cadmium	mg/Kg	1.5	87%	1	2	0.96	0.91	0.98	0.68 J	0.71 J	0.64 J	0.58 J
Calcium	mg/Kg	141000	100%	101904	3	8980	67800	48900	11800 J	69200 J	77400 J	41900 J
Chromium	mg/Kg	30.7	100%	22	11	26.2	13.3	25.7	21.2 J	18.5 J	20.5 J	15.7 J
Cobalt	mg/Kg	20.9	100%	30	0	10.9	7.2 J	13.1	9.3 J	10.2 J	10.8 J	8.2 J
Copper	mg/Kg	28.1	100%	25	4	21.8	24.5	24.7	21 J	22.6 J	20.3 J	23.6 J
Iron	mg/Kg	40300	100%	26627	12	26800	17200	30900	26800 J	23000 J	24900 J	19200 J
Lead	mg/Kg	30.2	100%	21.9	2	19.2	7.6	6.8	19.8	8.2	8.8	19.1
Magnesium	mg/Kg	47500	100%	12222	13	5440	17600	11500	6080 J	18500 J	12700 J	20000 J
Manganese	mg/Kg	782	87%	669	1	782	387	510	546 J	416 J	493 J	593 J
Mercury	mg/Kg	0.08	80%	0.1	0	0.07 J	0.01 J	0.02 J	0.06 J R	0.03 J	0.03 J	0.08 J R
Nickel	mg/Kg	57.2	100%	34	7	28.1	22.6	41.5	26.7 J	31.6 J	33.3 J	20.6 J
Potassium	mg/Kg	3560	100%	1762	15	3560 J	2000 J	2670 J	2060	2160	2630	2550
Selenium	mg/Kg	1.8	63%	2	0	1.1	0.39 U	0.54 J	1.3	0.43 U	0.47 U	0.48 J
Sodium	mg/Kg	151	87%	104	8	17.8 U	88.3 J	136 J	24.8 U	101 J	151 J	27.5 J
Vanadium	mg/Kg	41.8	100%	150	0	36.7	17.6	23.8	27 J	18.8 J	20.1 J	21.1 J
Zinc	mg/Kg	338	100%	83	23	98.6	116	122	91.1 J	94.7 J	59.9 J	121 J
Cyanide	mg/Kg	1.7	3%	.30	1	0.58 U	0.56 U	0.48 U	0.58 U	0.48 U	0.34 U	0.45 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	9.7	83%	NA	NA	0.94 J	0.26	0.04 U	0.01 U	0.03	0.01 U	0.08
Total Solids	%W/W					80.7	89.6	94	78.6	91.6	94.4	92

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-43 2-4 06/09/94 SB43-3-02 223687 44694	SOIL SEAD-43 4-5.5 06/09/94 SB43-3-03 223688 44694	SOIL SEAD-43 1.0-1.5 02/17/94 SB43-4.01 211724 42460	SOIL SEAD-43 2-4 02/17/94 SB43-4.02 211725 42460	SOIL SEAD-43 10-10.5 02/18/94 SB43-4.07 211726 42460	SOIL SEAD-56 0-0.2 05/23/94 SB56-1-00 222124 44090	SOIL SEAD-56 4-6 05/23/94 SB56-1-03 222125 44090
VOLATILE ORGANICS												
Methylene Chloride	ug/Kg	4	13%	100	0	13 U	11 U	11 U	12 U	11 UJ	11 U	11 U
Acetone	ug/Kg	5	7%	200	0	13 U	11 U	15 U	12 U	20 UJ	11 U	19 U
Chloroform	ug/Kg	4	7%	300	0	13 U	11 U	3 J	4 J	11 UJ	11 U	11 U
Toluene	ug/Kg	27	23%	1500	0	13 U	11 U	3 J	12 U	11 J	11 U	11 U
Xylene (total)	ug/Kg	12	10%	1200	0	13 U	11 U	4 J	12 U	12 J	11 U	11 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	6 U	5.5 U	5.9 U	6.1 U	5.4 U	6.5 U	5.6 U
Dicamba	ug/Kg	11	3%	NA	NA	6 U	5.5 U	5.9 U	6.1 U	5.4 U	6.5 U	5.6 U
Dichloroprop	ug/Kg	72	3%	NA	NA	60 U	55 U	59 U	61 U	54 U	65 U	56 U
MCPP	ug/Kg	7700	10%	NA	NA	7700	5500 U	5900 U	6100 U	5400 U	6500 U	5600 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	390 U	360 U	520 U	1100 U	350 U	430 U	370 U
Naphthalene	ug/Kg	200	7%	13000	0	390 U	360 U	140 J	200 J	350 U	430 U	370 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	390 U	360 U	46 J	88 J	350 U	430 U	370 U
Acenaphthene	ug/Kg	570	7%	50000*	0	390 U	360 U	300 J	570 J	350 U	430 U	370 U
Dibenzofuran	ug/Kg	310	7%	6200	0	390 U	360 U	170 J	310 J	350 U	430 U	370 U
Fluorene	ug/Kg	610	7%	50000*	0	390 U	360 U	320 J	610 J	350 U	430 U	370 U
Phenanthrene	ug/Kg	5200	13%	50000*	0	390 U	360 U	2600	5200 J	350 U	430 U	370 U
Anthracene	ug/Kg	1300	10%	50000*	0	390 U	360 U	700	1300 J	350 U	430 U	370 U
Carbazole	ug/Kg	620	10%	50000*	0	390 U	360 U	350 J	620 J	350 U	430 U	370 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	390 U	360 U	48 J	1100 U	350 U	430 U	370 U
Fluoranthene	ug/Kg	6300	13%	50000*	0	390 U	360 U	3200	6300 J	350 U	430 U	370 U
Pyrene	ug/Kg	4700	13%	50000*	0	390 U	360 U	2700	4700 J	350 U	430 U	370 U
Benzo(a)anthracene	ug/Kg	2400	13%	220	2	390 U	360 U	1200	2400 J	350 U	430 U	370 U
Chrysene	ug/Kg	2400	13%	400	2	390 U	360 U	1200	2400 J	350 U	430 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000*	0	36 J	2100	2700	700 J	1300	280 J	89 J
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	390 U	360 U	1000	1600 J	350 U	430 U	370 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	390 U	360 U	960	2000 J	350 U	430 U	370 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	390 U	360 U	1200	2000 J	350 U	430 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	390 U	360 U	660	1200 J	350 U	430 U	370 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	390 U	360 U	300 J	520 J	350 U	430 U	370 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000*	0	390 U	360 U	730	1300 J	350 U	430 U	370 U
PESTICIDES/PCB												
Endosulfan I	ug/Kg	1.2	3%	900	0	2 U	1.9 U	2 U	2.1 U	1.8 U	2.2 U	1.9 U
alpha-Chlordane	ug/Kg	2.4	3%	540	0	2 U	1.9 U	2.4 J	2.1 U	1.8 U	2.2 U	1.9 U

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-43 2-4 06/09/94 SB43-3-02 223687 44694	SOIL SEAD-43 4-5.5 06/09/94 SB43-3-03 223688 44694	SOIL SEAD-43 1.0-1.5 02/17/94 SB43-4.01 211724 42460	SOIL SEAD-43 2-4 02/17/94 SB43-4.02 211725 42460	SOIL SEAD-43 10-10.5 02/18/94 SB43-4.07 211726 42460	SOIL SEAD-56 0-0.2 05/23/94 SB56-1-00 222124 44090	SOIL SEAD-56 4-6 05/23/94 SB56-1-03 222125 44090
METALS												
Aluminum	mg/Kg	27000	100%	14593	9	27000 J	10600 J	13300 J	15500 J	15200 J	4620	11700
Antimony	mg/Kg	7.2	30%	3.59	2	0.26 J	0.25 UJ	4.6 J	7.2 J	3.3 J	0.21 UJ	0.19 UJ
Arsenic	mg/Kg	7.1	100%	7.5	0	4.3	4	6 J	6.5 J	4 J	3.5	6
Barium	mg/Kg	175	100%	300	0	175 J	62.2 J	92.1 J	123 J	49.9 J	26 J	70.7
Beryllium	mg/Kg	1.2	100%	.73	6	1.2	0.48 J	0.58 J	0.74 J	0.72	0.22 J	0.59 J
Cadmium	mg/Kg	1.5	87%	1	2	0.7 J	0.58 J	0.41 U	0.51 U	0.26 U	1.5	0.76 J
Calcium	mg/Kg	141000	100%	101904	3	7280 J	62400 J	60500 J	15900 J	21500 J	62200	51500
Chromium	mg/Kg	30.7	100%	22	11	30.7 J	16.8 J	23.1	23.9	25.7	7.1	18.6
Cobalt	mg/Kg	20.9	100%	30	0	6.7 J	8.5 J	8.7 J	13.4	15.7	3.8 J	10.7
Copper	mg/Kg	28.1	100%	25	4	23.8 J	22.5 J	23.8	26	28.1	18.8	24.5
Iron	mg/Kg	40300	100%	26627	12	28100 J	20700 J	23900 J	30700 J	31000 J	10900	26300
Lead	mg/Kg	30.2	100%	21.9	2	12.7	9	15.9	13.6	15.6	30.2	11.1
Magnesium	mg/Kg	47500	100%	12222	13	5210 J	13400 J	18800 J	7270 J	8540 J	29500	11700
Manganese	mg/Kg	782	87%	669	1	182 J	453 J	530 R	1100 R	479 R	529	575
Mercury	mg/Kg	0.08	80%	0.1	0	0.05 J R	0.04 J R	0.04 J	0.06 J	0.02 J	0.02 J	0.02 J
Nickel	mg/Kg	57.2	100%	34	7	27 J	29.1 J	27	43.8	53.4	10.9	32.5
Potassium	mg/Kg	3560	100%	1762	15	3130	2070	1940	1740	1580	1020 J	1180
Selenium	mg/Kg	1.8	63%	2	0	1.1	0.52 U	0.17 UJ	0.17 J	1.8 J	0.35 U	0.51 J
Sodium	mg/Kg	151	87%	104	8	72.5 J	96.5 J	128 J	82.5 J	98.5 J	94.6 J	100 J
Vanadium	mg/Kg	41.8	100%	150	0	41.8 J	18.3 J	24.6	28.2	21.3	10.2 J	18
Zinc	mg/Kg	338	100%	83	23	94 J	89.8 J	71.7 J	84.4 J	126 J	295	84.6
Cyanide	mg/Kg	1.7	3%	.30	1	0.49 U	0.37 U	0.56 U	0.54 U	0.51 U	0.61 U	0.42 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	9.7	83%	NA	NA	0.64	0.12	1.63	1.25	0.13	0.58	0.18
Total Solids	%W/W					83.8	90.6	84.8	82.1	92.8	77.4	90.4

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-56 12-13 05/23/94 SB56-1-07 222126 44090	SOIL SEAD-56 0-0.2 05/23/94 SB56-2-00 222127 44090	SOIL SEAD-56 4-6 05/23/94 SB56-2-03 222128 44345	SOIL SEAD-56 8-10 05/23/94 SB56-2-05 222129 44345	SOIL SEAD-56 0-0.2 05/18/94 SB56-3-00 221480 44090	SOIL SEAD-56 6-8 05/18/94 SB56-3-04 221481 44090	SOIL SEAD-56 14-16 05/18/94 SB56-3-08 221482 44090
VOLATILE ORGANICS												
Methylene Chloride	ug/Kg	4	13%	100	0	4 J	11 U	12 U	11 U	12 U	11 U	3 J
Acetone	ug/Kg	5	7%	200	0	16 UJ	11 U	5 J	5 J	12 U	11 U	11 U
Chloroform	ug/Kg	4	7%	300	0	11 UJ	11 U	12 U	11 U	12 U	11 U	11 U
Toluene	ug/Kg	27	23%	1500	0	2 J	11 U	12 U	11 U	12 U	11 U	2 J
Xylene (total)	ug/Kg	12	10%	1200	0	11 UJ	11 U	12 U	11 U	12 U	11 U	11 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	5.3 U	5.9 U	5.8 U	5.6 U	6.1 U	6.1 U	5.4 U
Dicamba	ug/Kg	11	3%	NA	NA	5.3 U	5.9 U	5.8 U	5.6 U	6.1 U	6.1 U	5.4 U
Dichloroprop	ug/Kg	72	3%	NA	NA	53 U	59 U	58 U	56 U	61 U	61 U	54 U
MCPP	ug/Kg	7700	10%	NA	NA	5300 U	5900 U	5800 U	5600 U	6100 U	6100 U	5400 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Naphthalene	ug/Kg	200	7%	13000	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Acenaphthene	ug/Kg	570	7%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Dibenzofuran	ug/Kg	310	7%	6200	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Fluorene	ug/Kg	610	7%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Phenanthrene	ug/Kg	5200	13%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Anthracene	ug/Kg	1300	10%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Carbazole	ug/Kg	620	10%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Fluoranthene	ug/Kg	6300	13%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Pyrene	ug/Kg	4700	13%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Benzo(a)anthracene	ug/Kg	2400	13%	220	2	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Chrysene	ug/Kg	2400	13%	400	2	350 U	380 U	380 U	370 U	400 U	400 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000*	0	350 U	81 J	40 J	32 J	1300	400 U	350 U
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	350 U	380 U	380 U	370 U	400 U	400 U	350 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000*	0	350 U	380 U	380 U	370 U	400 U	400 U	350 U
PESTICIDES/PCB												
Endosulfan I	ug/Kg	1.2	3%	900	0	1.8 U	2 U	2 U	1.9 U	2.1 U	2 U	1.8 U
alpha-Chlordane	ug/Kg	2.4	3%	540	0	1.8 U	2 U	2 U	1.9 U	2.1 U	2 U	1.8 U

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-56 12-13 05/23/94 SB56-1-07 222126 44090	SOIL SEAD-56 0-0.2 05/23/94 SB56-2-00 222127 44090	SOIL SEAD-56 4-6 05/23/94 SB56-2-03 222128 44345	SOIL SEAD-56 8-10 05/23/94 SB56-2-05 222129 44345	SOIL SEAD-56 0-0.2 05/18/94 SB56-3-00 221480 44090	SOIL SEAD-56 6-8 05/18/94 SB56-3-04 221481 44090	SOIL SEAD-56 14-16 05/18/94 SB56-3-08 221482 44090
METALS												
Aluminum	mg/Kg	27000	100%	14593	9	13200	4850	12700	11700	2900	10200	9590
Antimony	mg/Kg	7.2	30%	3.59	2	0.19 UJ	0.19 UJ	0.15 UJ	0.21 UJ	0.17 UJ	0.21 UJ	0.17 UJ
Arsenic	mg/Kg	7.1	100%	7.5	0	3.5	3.3	5.7	4	4.5	3.9	3.6
Barium	mg/Kg	175	100%	300	0	49.7	33 J	70.1	49	14.4 J	53.4	43.1
Beryllium	mg/Kg	1.2	100%	.73	6	0.6 J	0.22 J	0.62 J	0.58 J	0.17 J	0.5 J	0.46 J
Cadmium	mg/Kg	1.5	87%	1	2	0.7 J	0.51 J	0.63 J	0.58 J	0.55 J	0.67 J	0.63 J
Calcium	mg/Kg	141000	100%	101904	3	31200	66400	8840	39800	111000	77700	50500
Chromium	mg/Kg	30.7	100%	22	11	22.8	7	20.8	19.9	5.4	17.3	16.7
Cobalt	mg/Kg	20.9	100%	30	0	13.6	4.5 J	12.1	12.5	2.8 J	8.3 J	9.6
Copper	mg/Kg	28.1	100%	25	4	25.6	17.3	23.1	23.2	11.4	19.7	17.1
Iron	mg/Kg	40300	100%	26627	12	29000	11500	29200	25500	8520	21200	21600
Lead	mg/Kg	30.2	100%	21.9	2	17.1	12.8	14.8 J	12.1 J	19.3	10.2	9.8
Magnesium	mg/Kg	47500	100%	12222	13	8440	26400	7550	13200	17800	18900	14700
Manganese	mg/Kg	782	87%	669	1	404	533	421	373	502	394	386
Mercury	mg/Kg	0.08	80%	0.1	0	0.01 U	0.03 J	0.06	0.06 J	0.01 J	0.02 J	0.01 U
Nickel	mg/Kg	57.2	100%	34	7	41.5	10.3	28.6	33.4	6.8	28.6	29.7
Potassium	mg/Kg	3560	100%	1762	15	1430	1030	1250 J	1440 J	730 J	1630	1230
Selenium	mg/Kg	1.8	53%	2	0	1	0.55 J	0.6 J	0.52 J	0.29 U	0.36 U	0.28 U
Sodium	mg/Kg	151	87%	104	8	94.6 J	52 J	50.3 J	88.4 J	86.1 J	88 J	117 J
Vanadium	mg/Kg	41.8	100%	150	0	17.9	10.6	21.4	17.6	6.4 J	16.7	14
Zinc	mg/Kg	338	100%	83	23	83.6	75.4	89	98	139	89.1	81.9
Cyanide	mg/Kg	1.7	3%	.30	1	0.53 U	0.55 U	0.55 U	0.48 U	0.54 U	1.7	0.45 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	9.7	83%	NA	NA	0.04	1.02	0.08	0.2	0.02	0.67	0.15
Total Solids	%W/W					94.1	86.4	86.5	90.3	82	83.4	93

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-69 0-0.2 05/17/94 SB69-1-00 221354 44090	SOIL SEAD-69 8-10 05/17/94 SB69-1-05 221483 44090	SOIL SEAD-69 10-12 05/17/94 SB69-1-06 221484 44090	SOIL SEAD-69 0-0.2 02/19/94 SB69-2.01 211964 42460	SOIL SEAD-69 6-8 05/16/94 SB69-2-04 221356 44090	SOIL SEAD-69 12-14 05/16/94 SB69-2-07 221357 44090	SOIL SEAD-69 0-0.2 02/18/94 SB69-3.01 211967 42493
VOLATILE ORGANICS												
Methylene Chloride	ug/Kg	4	13%	100	0	15 U	11 U	3 J	24 U	11 U	4 J	19 U
Acetone	ug/Kg	5	7%	200	0	15 U	11 U	11 UJ	24 U	11 U	11 U R	19 U
Chloroform	ug/Kg	4	7%	300	0	15 U	11 U	11 UJ	24 U	11 U	11 U R	19 U
Toluene	ug/Kg	27	23%	1500	0	15 U	11 U	3 J	24 U	11 U	27 J	19 U
Xylene (total)	ug/Kg	12	10%	1200	0	15 U	11 U	2 J	24 U	11 U	11 U R	19 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	7.4 U	5.7 U	5.4 U	9.4 U	5.4 U	5.3 U	9.8 U
Dicamba	ug/Kg	11	3%	NA	NA	7.4 U	5.7 U	5.4 U	9.4 U	5.4 U	5.3 U	9.8 U
Dichloroprop	ug/Kg	72	3%	NA	NA	74 U	57 U	54 U	94 U	54 U	53 U	98 U
MCPP	ug/Kg	7700	10%	NA	NA	7400 U	5700 U	5400 U	9400 U	5400 U	5300 U	9800 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	490 U	370 U	360 U	580 J	350 U	350 U	650 U
Naphthalene	ug/Kg	200	7%	13000	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Acenaphthene	ug/Kg	570	7%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Dibenzofuran	ug/Kg	310	7%	6200	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Fluorene	ug/Kg	610	7%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Phenanthrene	ug/Kg	5200	13%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Anthracene	ug/Kg	1300	10%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Carbazole	ug/Kg	620	10%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	490 U	370 U	360 U	620 U	350 U	350 U	62 J
Fluoranthene	ug/Kg	6300	13%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Pyrene	ug/Kg	4700	13%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Benzo(a)anthracene	ug/Kg	2400	13%	220	2	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Chrysene	ug/Kg	2400	13%	400	2	490 U	370 U	360 U	620 U	350 U	350 U	650 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000*	0	490 U	370 U	360 U	690	350 U	350 U	580 J
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	490 U	370 U	360 U	620 U	350 U	350 U	650 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000*	0	490 U	370 U	360 U	620 U	350 U	350 U	650 U
PESTICIDES/PCB												
Endosulfan I	ug/Kg	1.2	3%	900	0	2.5 U ~	1.9 U	1.8 U	3.3 U	1.8 U	1.8 U	3.3 U
alpha-Chlordane	ug/Kg	2.4	3%	540	0	2.5 U	1.9 U	1.8 U	3.3 U	1.8 U	1.8 U	3.3 U

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-69 0-0.2 05/17/94 SB69-1-00 221354 44090	SOIL SEAD-69 8-10 05/17/94 SB69-1-05 221483 44090	SOIL SEAD-69 10-12 05/17/94 SB69-1-06 221484 44090	SOIL SEAD-69 0-0.2 02/19/94 SB69-2.01 211964 42460	SOIL SEAD-69 6-8 05/16/94 SB69-2-04 221356 44090	SOIL SEAD-69 12-14 05/16/94 SB69-2-07 221357 44090	SOIL SEAD-69 0-0.2 02/18/94 SB69-3.01 211967 42493
METALS												
Aluminum	mg/Kg	27000	100%	14593	9	13900	13700	8550	16000 J	14100	17500	14900
Antimony	mg/Kg	7.2	30%	3.59	2	0.26 UJ	0.15 UJ	0.13 UJ	6 UJ	0.16 UJ	0.12 J	0.37 UJ
Arsenic	mg/Kg	7.1	100%	7.5	0	5.8	4.8	3.1	5.4 J	5.1	7.1	4.7
Barium	mg/Kg	175	100%	300	0	132	52.7	50.9	133 J	42.7	82.1	118
Beryllium	mg/Kg	1.2	100%	.73	6	0.75 J	0.63 J	0.46 J	0.9 J	0.66 J	0.78	0.67 J
Cadmium	mg/Kg	1.5	87%	1	2	0.83 J	0.87	0.64 J	0.58 U	0.83	1.1	0.31 J
Calcium	mg/Kg	141000	100%	101904	3	8360	26800	112000	7760 J	28900	22000	7510 J
Chromium	mg/Kg	30.7	100%	22	11	19.9	22.6	14.1	22.6	24.1	30.2	21.5
Cobalt	mg/Kg	20.9	100%	30	0	9.2 J	14.8	8.1	8.9 J	17.8	20.9	8.2 J
Copper	mg/Kg	28.1	100%	25	4	20.5	23.6	16.3	22.9	27.8	25	20.6
Iron	mg/Kg	40300	100%	26627	12	24600	29300	17800	27100 J	31400	40300	24900
Lead	mg/Kg	30.2	100%	21.9	2	23.9	15.6	9.1	21.1	9.7	13.6	25.1
Magnesium	mg/Kg	47500	100%	12222	13	4290	10500	47500	4940 J	10200	9880	4730
Manganese	mg/Kg	782	87%	669	1	540	373	423	576 R	488	539	368
Mercury	mg/Kg	0.08	80%	0.1	0	0.06 J	0.02 J	0.01 J	0.08 J	0.02 J	0.02 J	0.06 J
Nickel	mg/Kg	57.2	100%	34	7	22.5	44.8	24.1	28.1	47.2	57.2	26.6 J
Potassium	mg/Kg	3560	100%	1762	15	2140	1770	1300	1930	1350	1600	1940 J
Selenium	mg/Kg	1.8	63%	2	0	1.4	0.28 J	0.22 U	0.54 J	0.28 U	0.36 J	1.2 J
Sodium	mg/Kg	151	87%	104	8	41 U	90.2 J	111 J	54.9 U	85.8 J	113 J	85.5 J
Vanadium	mg/Kg	41.8	100%	150	0	25	19.4	13	28.3	20	24.5	27.6
Zinc	mg/Kg	338	100%	83	23	94.2	162	67.5	338 J	182	97.2	273
Cyanide	mg/Kg	1.7	3%	.30	1	0.5 U	0.52 U	0.43 U	0.94 U	0.48 U	0.5 U	0.92 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	9.7	83%	NA	NA	9.7	0.29	0.18	0.02 U	0.58	0.19	0.02 U
Total Solids	%W/W					67.9	89.4	92.1	52.5	93.6	95.4	51.2

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-69 6-8 02/18/94 SB69-3.04 212007 42493	SOIL SEAD-69 10-12 02/18/94 SB69-3.06 211970 42493
VOLATILE ORGANICS							
Methylene Chloride	ug/Kg	4	13%	100	0	11 U	11 U R
Acetone	ug/Kg	5	7%	200	0	11 U	11 U R
Chloroform	ug/Kg	4	7%	300	0	11 U	11 U R
Toluene	ug/Kg	27	23%	1500	0	11 U	4 J
Xylene (total)	ug/Kg	12	10%	1200	0	11 U	11 U R
HERBICIDES							
2,4,5-T	ug/Kg	12	3%	1900	0	5.5 U	5.4 U
Dicamba	ug/Kg	11	3%	NA	NA	5.5 U	5.4 U
Dichloroprop	ug/Kg	72	3%	NA	NA	55 U	54 U
MCPP	ug/Kg	7700	10%	NA	NA	5500 U	5400 U
SEMIVOLATILE ORGANICS							
4-Methylphenol	ug/Kg	580	3%	900	0	360 U	350 U
Naphthalene	ug/Kg	200	7%	13000	0	360 U	350 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	360 U	350 U
Acenaphthene	ug/Kg	570	7%	50000*	0	360 U	350 U
Dibenzofuran	ug/Kg	310	7%	6200	0	360 U	350 U
Fluorene	ug/Kg	610	7%	50000*	0	360 U	350 U
Phenanthrene	ug/Kg	5200	13%	50000*	0	360 U	350 U
Anthracene	ug/Kg	1300	10%	50000*	0	360 U	350 U
Carbazole	ug/Kg	620	10%	50000*	0	360 U	350 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	25 J	350 U
Fluoranthene	ug/Kg	6300	13%	50000*	0	360 U	350 U
Pyrene	ug/Kg	4700	13%	50000*	0	360 U	350 U
Benzo(a)anthracene	ug/Kg	2400	13%	220	2	360 U	350 U
Chrysene	ug/Kg	2400	13%	400	2	360 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000*	0	140 J	340 J
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	360 U	350 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	360 U	350 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	360 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	360 U	350 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	360 U	350 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000*	0	360 U	350 U
PESTICIDES/PCB							
Endosulfan I	ug/Kg	1.2	3%	900	0	1.9 U	1.8 U
alpha-Chlordane	ug/Kg	2.4	3%	540	0	1.9 U	1.8 U

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-69 6-8 02/18/94 SB69-3.04 212007 42493	SOIL SEAD-69 10-12 02/18/94 SB69-3.06 211970 42493
METALS							
Aluminum	mg/Kg	27000	100%	14593	9	11500	10900
Antimony	mg/Kg	7.2	30%	3.59	2	0.23 J	0.32 J
Arsenic	mg/Kg	7.1	100%	7.5	0	5.1	6.5
Barium	mg/Kg	175	100%	300	0	80.4	80.2
Beryllium	mg/Kg	1.2	100%	.73	6	0.55 J	0.49 J
Cadmium	mg/Kg	1.5	87%	1	2	0.28 J	0.23 J
Calcium	mg/Kg	141000	100%	101904	3	141000 J	58900 J
Chromium	mg/Kg	30.7	100%	22	11	17.9	18.4
Cobalt	mg/Kg	20.9	100%	30	0	10.5	10.8
Copper	mg/Kg	28.1	100%	25	4	21.1	23
Iron	mg/Kg	40300	100%	26627	12	22300	24200
Lead	mg/Kg	30.2	100%	21.9	2	6.1	5.9
Magnesium	mg/Kg	47500	100%	12222	13	10900	10900
Manganese	mg/Kg	782	87%	669	1	403	484
Mercury	mg/Kg	0.08	80%	0.1	0	0.03 J	0.02 J
Nickel	mg/Kg	57.2	100%	34	7	30.2 J	30 J
Potassium	mg/Kg	3560	100%	1762	15	2350 J	1490 J
Selenium	mg/Kg	1.8	63%	2	0	0.51 J	0.66 J
Sodium	mg/Kg	151	87%	104	8	139 J	122 J
Vanadium	mg/Kg	41.8	100%	150	0	18.4	15.7
Zinc	mg/Kg	338	100%	83	23	82.6	64.3
Cyanide	mg/Kg	1.7	3%	.30	1	0.54 U	0.47 U
OTHER ANALYSES							
Nitrate/Nitrite-Nitrogen	mg/Kg	9.7	83%	NA	NA	0.04	0.03
Total Solids	%W/W					91	92.8

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

4.5.2.1 Volatile Organic Compounds

Five volatile organic compounds were detected in 10 of the 30 soil samples collected at SEADs 43, 56 and 69. All were found at concentrations which were at least an order of magnitude below their respective TAGM values. Four of the five volatile organic compounds detected (methylene chloride, acetone, Chloroform, and toluene) are considered to be common laboratory contaminants. The fifth VOC detected, xylene, occurred in only three samples, and was found at a maximum concentration of 12J μg/kg in soil sample SB43-4.07.

4.5.2.2 Semivolatile Organic Compounds

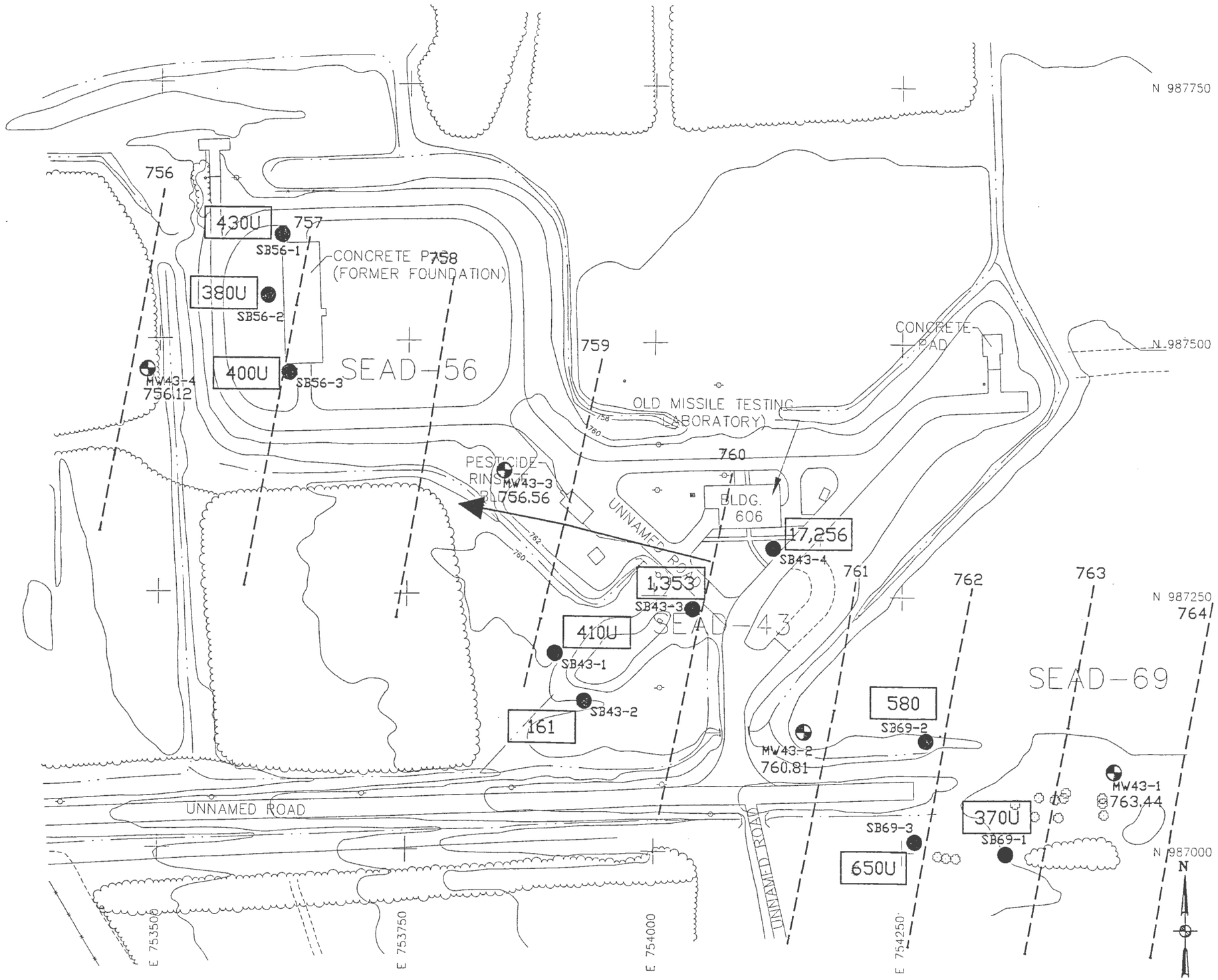
A total of 21 semivolatile organic compounds were found at varying concentrations in the soil samples collected at SEAD-43, 56 and 69. Only 6 PAH compounds, benzo(a)anthracene, chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, Benzo(b)fluoranthene, and Benzo(k)fluoranthene, were found at concentrations which exceed their respective TAGM values. All of the TAGM exceedances for these compounds were in soil samples SB43-3-00, SB43-4.01 and SB43-4.02. The highest concentrations of the PAHs found above TAGM values, as well as the highest concentrations for 12 of the 15 remaining SVOs detected at SEADs 43, 56, and 64, were found in soil sample SB43-4.02. Figure 4.5-1 shows the distribution of PAHs in surface soils based upon the analytical results from this ESI.

4.5.2.3 Pesticides and PCBs

Two pesticides (endosulfan I and alpha-chlordane) were detected in 2 of the soil samples collected at SEAD-43, 56 and 69. Endosulfan I was found in sample SB-43-3.00 and was reported at a concentration of 1.2J μg/kg (the TAGM value for endosulfan I in soil is 900 μg/kg). Alpha-Chlordane was found in sample SB43-4.01 at a concentration of 2.4J μg/kg, (the TAGM value for alpha-chlordane is 540 μg/kg).

4.5.2.4 Herbicides

Four herbicides were detected in 3 of the 30 soil samples collected at SEADs 43, 56 and 69. The herbicides 2,4,5-T (12J μg/Kg), dicamba (11J μg/Kg), dichloroprop (72J μg/Kg), and MCPP (7,300J μg/Kg) were detected in surface soil sample SB43-1-00. MCPP was also found in soil sample SB43-3-02 (7,700 μg/Kg) and surface soil sample SB43-3-00 (7,100 μg/Kg). Herbicides were not detected in the remaining 27 soil samples collected at SEAD 43, 56 and 69.



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL
- SOIL BORING
- 580 TOTAL PAHs (ug/kg) IN SURFACE SOILS
- MW43-1 763.44 MONITORING WELL WITH WATER TABLE ELEVATION
- 763 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

SEAD 43: BLDG.606 OLD MISSLE PROPELLANT TEST LABORATORY
SEAD 56: FORMER HERBICIDE AND PESTICIDE STORAGE AREA
SEAD 69: DISPOSAL AREA

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA army DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 4.5-1
SEAD-43,56 AND 69
TOTAL PAHs IN SURFACE SOILS

SCALE 1" = 100' | DATE 4/14/95 | REV A

4.5.2.5 Metals

Twenty-two metals were found at varying concentrations in the 30 soil samples collected at SEADs 43, 56 and 69. Sixteen of the 22 metals detected were found in one or more samples at concentrations which exceeded their respective TAGM values. The occurrences of TAGM exceedances were distributed throughout the 30 soil samples analyzed from SEADs 43, 56 and 69. Aluminum, chromium, iron, magnesium, potassium and zinc were the most frequently detected metals and each had reported concentrations above their associated TAGM values. Zinc was found at concentrations which exceeded the TAGM value of 83 mg/Kg in 23 of the 30 soil samples. A trace amount of cyanide (1.7 mg/kg) was found in soil sample SB56-3-04. This was the only detected concentration of cyanide in the 30 samples collected.

4.5.2.6 Nitroaromatics

Nitroaromatics were not detected in the soil samples collected at SEAD-43, 56 and 69.

4.5.2.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in 83% of the soil samples collected at SEADs 43, 56 and 69. Concentrations ranged from a low of 0.02 mg/kg in sample SB56-3-00 to a maximum of 9.7 mg/kg in sample SB69-1-00.

4.5.3 Groundwater

Four groundwater monitoring wells were installed as part of the SEAD-43, 56, and 69 investigation. The summary analytical results are presented in Table 4.5-2. The following sections described the nature and extent of the groundwater contamination identified at SEADs-43, 56 and 69.

4.5.3.1 Volatile Organic Compounds

VOC's were not detected in the groundwater samples collected at SEAD-43, 56 and 69.

4.5.3.2 Semivolatile Organic Compounds

SVOs were not detected in the groundwater samples collected at SEAD-43, 56 and 69.

TABLE 4.5-2

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-43 07/19/94 MW43-1 227445 45332	WATER SEAD-43 07/19/94 MW43-2 227448 45332	WATER SEAD-43 03/28/94 MW43-3 215554 43179	WATER SEAD-43 03/28/94 MW43-4 215557 43179
HERBICIDES										
2,4,5-TP (Silvex)	ug/L	0.44	25%	5	50	0	0.11 U	0.11 U	0.44 J	0.11 U
METALS										
Aluminum	ug/L	2870	100%	NA	NA	NA	2610 J	169 J	2870	1010
Antimony	ug/L	1.5	25%	3	6	0	1.3 U	1.5 J	1 U	1 U
Arsenic	ug/L	1.5	25%	25	50	0	2 U	2 U	1.5 J	1.5 U
Barium	ug/L	113	100%	1000	2000	0	77.1 J	43.4 J	113 J	97.2 J
Calcium	ug/L	138000	100%	NA	NA	NA	102000	112000	138000	123000
Chromium	ug/L	5.3	75%	50	100	0	3.5 J	0.4 U	5.3 J	2 J
Cobalt	ug/L	4.2	75%	NA	NA	NA	2.2 J	0.5 U	3.3 J	4.2 J
Copper	ug/L	4	75%	200	1300 (h)	0	3.3 J	0.5 U	4 J	1.9 J
Iron	ug/L	7170	100%	300	NA	4	4010 J	1000	7170	1930
Lead	ug/L	2.4	25%	25	15 (i)	0	0.9 U	0.9 U	2.4 J	0.8 U
Magnesium	ug/L	46800	100%	NA	NA	NA	27500	46800	42700	36800
Manganese	ug/L	297	100%	300	NA	0	120	139	183	297
Mercury	ug/L	0.04	25%	2	2	0	0.04 J	0.04 U	0.03 U	0.03 U
Nickel	ug/L	9.4	75%	NA	100	0	7.7 J	0.7 U	9.2 J	9.4 J
Potassium	ug/L	3280	100%	NA	NA	NA	2420 J	3010 J	3280 J	3250 J
Silver	ug/L	0.7	25%	50	NA	0	0.7 J	0.5 U	0.7 U	0.7 U
Sodium	ug/L	13400	100%	20000	NA	0	4600 J	8100	7410	13400
Thallium	ug/L	2.2	25%	NA	2	1	2.2 J	1.9 U	1.6 U	1.6 U
Vanadium	ug/L	5.2	75%	NA	NA	NA	4.4 J	0.5 U	5.2 J	2.3 J
Zinc	ug/L	22.5	100%	300	NA	0	11 J	2.3 J	22.5 J	11.8 J
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	0.06	75%	10	10	0	0.06	0.01 U	0.03 J	0.02
pH	Standard Units						7.1	7.1	7.7	7.1
Conductivity	umhos/cm						460	610	600	535
Temperature	°C						13.7	13.1	8	6.1
Turbidity	NTU						148	16.6	431	0.2

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) Federal Primary Drinking Water Maximum Contaminant Levels.
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.

4.5.3.3 Pesticides and PCBs

Pesticides and PCBs were not detected in the groundwater samples collected at SEAD-43, 56 and 69.

4.5.3.4 Herbicides

The analysis for herbicides by method 8150 revealed 2,4,5-TP (silvex) at a concentration of 0.44J μg/L in the groundwater sample from monitoring well MW43-3. This concentration is below the New York Class GA groundwater criteria of 5 μg/L.

4.5.3.5 Metals

A total of 20 inorganic elements were detected in the groundwater at SEADs-43, 56 and 69. The reported concentrations of iron in all 4 groundwater samples and thallium in the groundwater sample from MW43-1 were the only values which exceeded the associated federal or state criteria. The concentrations of iron ranged from a low of 1,000 μg/L in groundwater sample MW43-2 to a high of 7,170 μg/L in groundwater sample MW43-3. Thallium was detected at a concentration of 2.2J μg/L in the groundwater sample from MW43-1.

4.5.3.6 Nitroaromatics

Nitroaromatics were not detected in the groundwater samples collected at SEADs-43, 56, and 69.

4.5.3.7 Indicator Compounds

The groundwater samples were analyzed for nitrate/nitrite nitrogen. Concentrations of 0.06, 0.03 and 0.02 were reported in samples MW43-1, MW43-1 and MW43-4, respectively. No indicator compounds were detected in groundwater sample MW43-2.

4.5.4 Surface Water

Five surface water samples were collected as part of the SEAD-43, 56 and 69 investigations. The summary results of the chemical analyses are presented in Table 4.5-3. The following

TABLE 4.5-3

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-43 04/16/94 SW43-1 217864 43549	WATER SEAD-43 04/16/94 SW43-2 217865 43549	WATER SEAD-43 04/15/94 SW43-3 217769 43549	WATER SEAD-43 04/16/94 SW43-4 217866 43549	WATER SEAD-43 04/15/94 SW43-5 217770 43549
VOLATILE ORGANICS										
Acetone	ug/L	5	20%	NA	NA	10 U	5 J	10 U	10 U	10 U
SEMIVOLATILE ORGANICS										
4-Methylphenol	ug/L	1	20%	NA	NA	36 U	1 J	12 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	150	20%	.6	1	150	12 U	12 U	10 U	11 U
METALS										
Aluminum	ug/L	1190	100%	100	4	400	1190	72.2 J	335	111 J
Barium	ug/L	55.2	100%	NA	NA	23.6 J	27.9 J	55.2 J	32.7 J	40.4 J
Beryllium	ug/L	0.1	20%	1100	0	0.1 J	0.06 U	0.06 U	0.06 U	0.06 U
Cadmium	ug/L	0.34	40%	2.1	0	0.14 J	0.1 U	0.1 U	0.34 J	0.1 U
Calcium	ug/L	92900	100%	NA	NA	49900	43200	92900	52300	79400
Chromium	ug/L	3.3	100%	390	0	0.82 J	1.6 J	3.3 J	0.51 J	0.47 J
Copper	ug/L	2.5	100%	22.9	0	1.9 J	2.5 J	1.6 J	2.3 J	1.3 J
Iron	ug/L	1750	100%	300	3	397	1750	177	503	150
Lead	ug/L	1.4	20%	8.6	0	0.8 U	0.8 U	0.8 U	1.4 J	0.8 U
Magnesium	ug/L	15900	100%	NA	NA	9210	7820	15900	9420	14600
Manganese	ug/L	94.6	100%	NA	NA	13.9 J	94.6	91.5 J	39.1	12.2 J
Mercury	ug/L	0.06	100%	.2 (g)	0	0.04 J	0.06 J	0.06 J	0.04 J	0.05 J
Nickel	ug/L	277	100%	172	1	1.6 J	2.8 J	1.6 J	277	1.4 J
Potassium	ug/L	2660	100%	NA	NA	1000 J	2290 J	1520 J	2660 J	1810 J
Sodium	ug/L	5180	100%	NA	NA	2450 J	892 J	4550 J	3240 J	5180
Vanadium	ug/L	2.1	40%	14	0	0.89 J	2.1 J	0.7 U	0.69 U	0.7 U
Zinc	ug/L	1040	100%	159.6	1	5.3 J	12.1 J	3.9 J	1040	14.2 J
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	1.42	100%	NA	NA	0.01	0.02	1.42	0.02	0.04
pH	Standard Units					9.2	8.8	7.3	7.6	7.9
Conductivity	umhos/cm					215	165	333	255	432
Temperature	°C					11	10	21	16	21
Turbidity	NTU					9.8	31.2	1.9	9.7	2.3

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1993).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) NYSDEC guidance value

sections describe the nature and extent of surface water contamination identified at SEAD-43, 56, and 69.

4.5.4.1 Volatile Organic Compounds

One volatile organic compound was detected in one surface water sample collected at SEADs-43, 56 and 69. Acetone, a common laboratory contaminant, was present at a concentration of 5 μg/L in surface water sample SW43-2. All four of the remaining surface water samples revealed no trace of VOCs.

4.5.4.2 Semivolatile Organic Compounds

Two semivolatile organic compounds were found in the surface water collected at SEADs-43, 56 and 69. Surface water sample SW43-2 had 1J μg/L of 4-Methylphenol and surface water sample SW43-1 had 150 μg/L of bis (2-ethylhexyl)phthalate. The New York Class C criteria for bis(2-ethylhexyl)phthalate is 0.6 μg/L. Currently, no criteria exist for detected concentrations of 4-methylphenol in New York Class C surface water.

4.5.4.3 Pesticides and PCBs

No pesticides or PCBs were found in any of the five surface water samples collected at SEADs-43, 56 and 69.

4.5.4.4 Herbicides

Herbicides were not detected in the surface water samples collected at SEADs-43, 56, and 69.

4.5.4.5 Metals

A total of 17 metals were found in the surface water samples collected at SEADs-43, 56 and 69 concentrations. Aluminum, iron, and zinc were elevated in one or more of the five surface water samples collected. The highest concentration of iron (1,750 μg/L) was detected in sample SW43-1. The highest concentration of zinc (1,040 μg/L) was found in surface water sample SW43-4. Aluminum was detected at concentrations above the NYSDEC criteria of 100 μg/L. A maximum concentration of 1190 μg/L was detected in surface water sample SW43-2. Nickel was detected in surface water sample SW43-4 at a concentration of 277 μg/L,

which is greater than the NYSDEC criteria of 172 μg/L. All other detected metals were below criteria values.

4.5.4.6 Nitroaromatics

Nitroaromatic compounds were not detected in the surface water samples collected at SEAD-43, 56, and 69.

4.5.4.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in all five of the surface water samples analyzed from SEADs 43, 56 and 69. The reported concentrations of nitrate/nitrite nitrogen ranged from a low of 0.01 mg/L in sample SW43-1 to a high of 1.42 mg/L in SW43-3.

4.5.5 Sediment

Five sediment samples were collected as part of the SEAD-43, 56 and 69 investigations. The summary chemical analyses are presented in Table 4.5-4. The following sections describe the nature and extent of sediment contamination identified at SEAD-43, 56, and 69.

4.5.5.1 Volatile Organic Compounds

Acetone and 2-butanone were the only VOCs found in the five sediment samples collected at SEADs-43, 56 and 69. Sediment sample SD43-3 was the only sample which contained a detectable concentration of acetone (220 μg/kg). 2-butanone was detected in sediment samples SD43-1 and SD43-3 at concentrations of 19 and 49 μg/kg, respectively. These VOCs are common laboratory contaminants.

4.5.5.2 Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the five sediment samples collected at SEAD-43, 56, and 69.

TABLE 4.5-4

SENECA ARMY DEPOT
SEAD-43, 56, AND 69 ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER 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)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-43 0-0.2 04/16/94 SD43-1 217861 43543	SOIL SEAD-43 0-0.2 04/16/94 SD43-2 217862 43543	SOIL SEAD-43 0.4 04/15/94 SD43-3 217764 43543	SOIL SEAD-43 0-0.2 04/16/94 SD43-4 217863 43543	SOIL SEAD-43 0.6 04/15/94 SD43-5 217766 43543
VOLATILE ORGANICS														
Acetone	ug/Kg	220	20%	NA	NA	NA			NA	82 U	20 U	220	32 U	65 U
2-Butanone	ug/Kg	49	40%	NA	NA	NA			NA	19	17 U	49	14 U	16 U
HERBICIDES														
2,4-DB	ug/Kg	110	20%	NA	NA	NA			NA	84 U	110	110 U	72 U	81 U
2,4,5-T	ug/Kg	23	80%	NA	NA	NA			NA	18	18	23 J	7.2 U	11
MCPP	ug/Kg	17000	40%	NA	NA	NA			NA	16000	17000	11000 U	7200 U	8100 U
NITROAROMATICS														
HMX	ug/Kg	110	40%	NA	NA	NA			NA	130 U	110 J	130 U	72 J	130 U
METALS														
Aluminum	mg/Kg	19600	100%				NA	NA	NA	19600	16800	17600	13000	15400
Antimony	mg/Kg	0.37	20%				2	25	0	0.26 UJ	0.29 UJ	0.37 J	0.19 UJ	0.27 UJ
Arsenic	mg/Kg	9	100%				6	33	2	9	6.5	4.6	5.3	4.1
Barium	mg/Kg	158	100%				NA	NA	NA	158	127	133	85.1	97.8
Beryllium	mg/Kg	0.99	100%				NA	NA	NA	0.99 J	0.85 J	0.78 J	0.61 J	0.69 J
Cadmium	mg/Kg	0.63	100%				.6	9	1	0.63 J	0.46 J	0.58 J	0.33 J	0.37 J
Calcium	mg/Kg	68900	100%				NA	NA	NA	7220	7170	8230	68900	9030
Chromium	mg/Kg	27.4	100%				26	110	1	27.4	23.1	23	19.5	21
Cobalt	mg/Kg	19.7	100%				NA	NA	NA	19.7	10.9 J	10.6 J	9.6	7.6 J
Copper	mg/Kg	30.1	100%				16	110	5	30.1	20.3	24.1	20.4	18.5
Iron	mg/Kg	37100	100%				2% (c)	4% (c)	3	37100	28900	23800	25300	22100
Lead	mg/Kg	28.7	100%				31	110	0	28.7	23.2	22.2	9.8	16.7
Magnesium	mg/Kg	10500	100%				NA	NA	NA	6870	5390	4880	10500	5180
Manganese	mg/Kg	1480	100%				460	1100	3	1480	501	433	615	198
Mercury	mg/Kg	0.07	100%				.15	1.3	0	0.06 J	0.04 J	0.06 J	0.03 J	0.07 J
Nickel	mg/Kg	44.3	100%				16	50	5	44.3	27.4	26.8	29.7	24.8
Potassium	mg/Kg	2440	100%				NA	NA	NA	2140	2080	2320	2160	2440
Selenium	mg/Kg	1	20%				NA	NA	NA	0.44 U	0.49 U	1 J	0.32 U	0.45 U
Sodium	mg/Kg	50	20%				NA	NA	NA	41.3 U	45.5 U	45.3 U	50 J	42.2 U
Thallium	mg/Kg	0.75	60%				NA	NA	NA	0.42 U	0.73 J	0.68 J	0.3 U	0.75 J
Vanadium	mg/Kg	37.4	100%				NA	NA	NA	37.4	32.4	32.1	20.6	27.1
Zinc	mg/Kg	178	100%				120	270	3	122	124	105	64.3	178
OTHER ANALYSES														
Nitrate/Nitrite-Nitrogen	mg/Kg	0.15	80%	NA	NA	NA	NA	NA	NA	0.1	0.03	0.15 J	0.06	0.02 U
Total Solids	%W/W									59.5	62.2	48.6	69.5	62.1

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

4.5.5.3 Pesticides and PCBs

No pesticides or PCBs were detected in the five sediment samples collected at SEAD-43, 56, and 69.

4.5.5.4 Herbicides

Three herbicides were detected in the sediment samples collected at SEADs-43, 56, and 69. The herbicides 2,4,5-T, 2,4-DB, and MCPP were all found in sample SD43-2 at concentrations of 18, 110, and 17,000 μg/kg, respectively. These were the highest concentrations of 2,4-DB and MCPP detected in the sediments at SEADs-43, 56, and 69. The maximum concentration of 2,4,5-T was 23J μg/kg in sample SD43-3.

4.5.5.5 Metals

A total of 22 metals were detected in the sediment samples collected as part of the SEAD-43, 56, and 69 investigations. Arsenic, cadmium, chromium, copper, iron, manganese, nickel, and zinc were found at concentrations which exceeded their respective criteria values. Except for zinc, the highest concentrations for the eight metals found above criteria values occurred in sample SD43-1. The highest reported concentration of zinc (178 μg/Kg) was in sediment sample SD43-5.

4.5.5.6 Nitroaromatics

The analysis for explosives by method 8330 detected HMX in 2 of the 5 sediment samples collected at SEADs-43, 56, and 69. The concentrations in sediment samples SD43-2 and SD43-4 were 110 and 72 μg/kg, respectively.

4.5.5.7 Indicator Compounds

Nitrate/nitrite-nitrogen was detected in 4 of the 5 sediment samples. Concentrations ranged from 0.03 to 0.15J μg/kg. The maximum concentration was found in sample SD43-3.

4.6 SEAD-44A QUALITY ASSURANCE TEST LAB

4.6.1 Introduction

A total of six surface soil samples, 9 berm excavation samples, three surface water and three sediment samples were collected at SEAD-44A. 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-44A.

4.6.2 Soil

The analytical results for the 15 soil samples collected as part of the SEAD-44A investigation are presented in Table 4.6-1. The following sections describe the nature and extent of contamination in SEAD-44A soils. The sample locations are shown in Figure 2.8-1.

4.6.2.1 Volatile Organic Compounds

Six volatile organic compounds were detected in 8 of the 15 soil samples collected at SEAD-44A. 2-Butanone and Toluene were found at maximum concentrations of 28 and 1 μg/Kg, respectively, both of which are well below their respective TAGMs of 300 and 1,500 μg/Kg. These two VOCs, as well as 4-methyl-2 pentanone, 2-hexanone, and 1,1,2,2-tetrachloroethane (these 4 compounds do not have associated TAGM values) were detected in only 7% of the samples analyzed from SEAD-44A. Acetone was detected in all 6 surface soil samples. The highest reported concentration of acetone was 200 μg/Kg which occurred in surface soil sample SS44A-5. This concentration is equal to the TAGM for acetone.

4.6.2.2 Semivolatile Organic Compounds

A total of 23 semivolatile organic compounds were found at varying concentrations in the soil samples collected at SEAD-44A. Surface soil samples showed no TAGM exceedances and, for the most part, were very low. Subsurface berm excavations revealed TAGM exceedances for Benz(a)anthracene, chrysene, benzo(a)pyrene (BAP), and dibenz(a,h)anthracene. Berm excavation sample TP44A-7 had a BAP concentration of 1,100 μg/Kg which was roughly 18 times the TAGM value of 61 μg/kg. Benzo(a)pyrene was found to be present in all 9 berm excavations performed at SEAD-44A. Benz(a)anthracene, chrysene, and dibenz(a,h) anthracene were found at concentrations which were 2 to 11 times greater than their

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44A-1 217678 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-2 217680 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-3 217681 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-4 217682 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-5 217683 43535
VOLATILE ORGANICS										
Acetone	ug/Kg	200	40%	200	0	73	11 J	26	18	200
2-Butanone	ug/Kg	28	7%	300	0	16 U	15 U	18 U	16 U	28
4-Methyl-2-Pentanone	ug/Kg	4	7%	NA	NA	16 U	15 U	18 U	16 U	21 U
2-Hexanone	ug/Kg	4	7%	NA	NA	16 U	15 U	18 U	16 U	21 U
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	NA	NA	16 U	15 U	18 U	16 U	21 U
Toluene	ug/Kg	1	7%	1500	0	16 U	15 U	18 U	16 U	21 U
NITROAROMATICS										
2,4,6-Trinitrotoluene	ug/Kg	110	7%	NA	NA	130 U	130 U	130 U	130 U	110 J
SEMIVOLATILE ORGANICS										
4-Methylphenol	ug/Kg	250	13%	900	0	520 U	520 U	250 J	580 U	660 U
Naphthalene	ug/Kg	330	13%	13000	0	520 U	520 U	580 U	580 U	660 U
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	520 U	520 U	580 U	580 U	660 U
Acenaphthylene	ug/Kg	72	20%	41000	0	520 U	520 U	580 U	580 U	660 U
Acenaphthene	ug/Kg	380	40%	50000*	0	520 U	520 U	580 U	580 U	660 U
Dibenzofuran	ug/Kg	280	7%	6200	0	520 U	520 U	580 U	580 U	660 U
Fluorene	ug/Kg	410	40%	50000*	0	520 U	520 U	580 U	580 U	660 U
Hexachlorobenzene	ug/Kg	36	13%	410	0	520 U	520 U	580 U	580 U	660 U
Phenanthrene	ug/Kg	2100	67%	50000*	0	520 U	120 J	580 U	580 U	660 U
Anthracene	ug/Kg	640	47%	50000*	0	520 U	520 U	580 U	580 U	660 U
Carbazole	ug/Kg	370	40%	50000*	0	520 U	520 U	580 U	580 U	660 U
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	26 J	520 U	580 U	580 U	53 J
Fluoranthene	ug/Kg	2400	73%	50000*	0	23 J	150 J	580 U	580 U	660 U
Pyrene	ug/Kg	2000	73%	50000*	0	26 J	120 J	580 U	580 U	660 U
Benzo(a)anthracene	ug/Kg	990	67%	220	4	520 U	56 J	580 U	580 U	660 U
Chrysene	ug/Kg	1200	67%	400	4	520 U	53 J	580 U	580 U	660 U
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000*	0	54 J	520 U	580 U	580 U	32 J
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	520 U	43 J	580 U	580 U	660 U
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	520 U	52 J	580 U	580 U	660 U
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	520 U	49 J	580 U	580 U	660 U
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	520 U	26 J	580 U	580 U	660 U
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	520 U	520 U	580 U	580 U	660 U
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000*	0	520 U	520 U	580 U	580 U	660 U
PESTICIDES/PCB										
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	2.7 U	2.7 U	2.9 U	3 U	3.4 U
Endosulfan I	ug/Kg	5.4	27%	900	0	2.7 U	2.7 U	2.9 U	3 U	3.4 U
Dieldrin	ug/Kg	70	47%	440	0	20 J	5.2 U	9.9 J	59	29
4,4'-DDE	ug/Kg	3.1	20%	2100	0	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin	ug/Kg	3.5	7%	100	0	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endosulfan II	ug/Kg	2.8	13%	900	0	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin ketone	ug/Kg	5.2	7%	NA	NA	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin aldehyde	ug/Kg	4.5	13%	NA	NA	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44A-1 217678 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-2 217680 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-3 217681 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-4 217682 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44A-5 217683 43535
METALS										
Aluminum	mg/Kg	17500	100%	14593	9	16000	15300	15300	12900	17400
Antimony	mg/Kg	10.8	60%	3.59	2	0.21 UJ	0.27 UJ	0.23 UJ	0.2 UJ	0.25 UJ
Arsenic	mg/Kg	7.7	100%	7.5	1	6.5	4.9	4.8	4.5	5.7
Barium	mg/Kg	164	100%	300	0	94.1	92.5	148	108	164
Beryllium	mg/Kg	0.91	100%	.73	3	0.56 J	0.63 J	0.72 J	0.63 J	0.91 J
Cadmium	mg/Kg	0.48	87%	1	0	0.26 J	0.26 J	0.36 J	0.39 J	0.48 J
Calcium	mg/Kg	77400	100%	101904	0	3460	6230	5690	4900	7160
Chromium	mg/Kg	27.1	100%	22	5	18.5	20.1	20.5	17.9	23.7
Cobalt	mg/Kg	14.5	100%	30	0	7.9 J	7.7 J	8.6 J	8.3 J	8.8 J
Copper	mg/Kg	29	100%	25	3	20.6	14.5	18.9	17.2	20
Iron	mg/Kg	34900	100%	26627	5	23300	24200	23800	21900	27400
Lead	mg/Kg	24.9	100%	21.9	2	21.6	18.6	18	16.5	22.5
Magnesium	mg/Kg	40200	100%	12222	1	3270	3970	4090	3630	4370
Manganese	mg/Kg	956	100%	669	2	370 J	298 J	489 J	326 J	678 J
Mercury	mg/Kg	0.17	93%	0.1	2	0.05 J	0.03 J	0.05 J	0.04 J	0.07 J
Nickel	mg/Kg	41.8	100%	34	4	20.7	20.4	24	21.2	26
Potassium	mg/Kg	2530	100%	1762	7	1450	1410	1980	1410	1980
Selenium	mg/Kg	1.7	100%	2	0	1 J	0.99 J	0.93 J	1.5	1.7
Sodium	mg/Kg	142	60%	104	1	34 U	42.1 U	36 U	31 U	40 U
Vanadium	mg/Kg	30.2	100%	150	0	27.6	26.8	25.3	21.4	30.2
Zinc	mg/Kg	115	100%	83	7	85	72.4	88.6	80.5	94
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	NA	0.19	0.11	0.3	0.11	0.1
Total Solids	%W/W					63.9	64.4	57.5	56.8	50.1

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44A-6 217684 43535	SOIL SEAD-44 3 02/19/94 TP44A-1 211984 42493	SOIL SEAD-44 3 02/17/94 TP44A-2 211734 42460	SOIL SEAD-44 3 02/17/94 TP44A-3 211735 42460
VOLATILE ORGANICS									
Acetone	ug/Kg	200	40%	200	0	16 J	12 U	13 U	13 U
2-Butanone	ug/Kg	28	7%	300	0	16 U	12 U	13 U	13 U
4-Methyl-2-Pentanone	ug/Kg	4	7%	NA	NA	16 U	12 U	13 U	13 U
2-Hexanone	ug/Kg	4	7%	NA	NA	16 U	12 U	13 U	13 U
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	NA	NA	16 U	12 U	13 U	13 U
Toluene	ug/Kg	1	7%	1500	0	16 U	12 U	13 U	13 U
NITROAROMATICS									
2,4,6-Trinitrotoluene	ug/Kg	110	7%	NA	NA	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANICS									
4-Methylphenol	ug/Kg	250	13%	900	0	64 J	390 U	420 U	420 U
Naphthalene	ug/Kg	330	13%	13000	0	570 U	330 J	420 U	420 U
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	570 U	150 J	420 U	420 U
Acenaphthylene	ug/Kg	72	20%	41000	0	570 U	390 U	420 U	420 U
Acenaphthene	ug/Kg	380	40%	50000*	0	570 U	380 J	36 J	420 U
Dibenzofuran	ug/Kg	280	7%	6200	0	570 U	280 J	420 U	420 U
Fluorene	ug/Kg	410	40%	50000*	0	570 U	410	34 J	420 U
Hexachlorobenzene	ug/Kg	36	13%	410	0	570 U	390 U	420 U	420 U
Phenanthrene	ug/Kg	2100	67%	50000*	0	570 U	2100	240 J	170 J
Anthracene	ug/Kg	640	47%	50000*	0	570 U	640	69 J	20 J
Carbazole	ug/Kg	370	40%	50000*	0	570 U	370 J	36 J	420 U
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	570 U	390 U	420 U	420 U
Fluoranthene	ug/Kg	2400	73%	50000*	0	570 U	1900	300 J	330 J
Pyrene	ug/Kg	2000	73%	50000*	0	570 U	1300	220 J	250 J
Benzo(a)anthracene	ug/Kg	990	67%	220	4	570 U	970	130 J	110 J
Chrysene	ug/Kg	1200	67%	400	4	570 U	840	140 J	170 J
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000*	0	30 J	480	420 U	420 U
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	570 U	790	120 J	170 J
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	570 U	610	100 J	130 J
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	570 U	780	100 J	130 J
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	570 U	350 J	51 J	83 J
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	570 U	160 J	21 J	32 J
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000*	0	570 U	300 J	48 J	87 J
PESTICIDES/PCB									
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	2.9 U	1.2 J	2.2 U	2.2 U
Endosulfan I	ug/Kg	5.4	27%	900	0	2.9 U	5.4	2.2 U	2.1 J
Dieldrin	ug/Kg	70	47%	440	0	70	3.9 U	4.2 U	4.2 U
4,4'-DDE	ug/Kg	3.1	20%	2100	0	5.7 U	3.9 U	4.2 U	4.2 U
Endrin	ug/Kg	3.5	7%	100	0	5.7 U	3.9 U	4.2 U	4.2 U
Endosulfan II	ug/Kg	2.8	13%	900	0	5.7 U	3.9 U	4.2 U	4.2 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	5.7 U	3.9 U	4.2 U	4.2 U
Endrin ketone	ug/Kg	5.2	7%	NA	NA	5.7 U	3.9 U	4.2 U	4.2 U
Endrin aldehyde	ug/Kg	4.5	13%	NA	NA	5.7 U	3.9 U	4.2 U	4.2 U

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44A-6 217684 43535	SOIL SEAD-44 3 02/19/94 TP44A-1 211984 42493	SOIL SEAD-44 3 02/17/94 TP44A-2 211734 42460	SOIL SEAD-44 3 02/17/94 TP44A-3 211735 42460
METALS									
Aluminum	mg/Kg	17500	100%	14593	9	11500	11600	14800 J	12700 J
Antimony	mg/Kg	10.8	60%	3.59	2	0.19 UJ	0.35 J	8.2 J	10.8 J
Arsenic	mg/Kg	7.7	100%	7.5	1	3.5	3.8	4.1 J	3.9 J
Barium	mg/Kg	164	100%	300	0	116	77.9	86.2 J	93.2 J
Beryllium	mg/Kg	0.91	100%	.73	3	0.57 J	0.44 J	0.64 J	0.52 J
Cadmium	mg/Kg	0.48	87%	1	0	0.36 J	0.22 J	0.33 U	0.41 U
Calcium	mg/Kg	77400	100%	101904	0	5950	31400 J	22100 J	34100 J
Chromium	mg/Kg	27.1	100%	22	5	15	15.5	19.3	16.5
Cobalt	mg/Kg	14.5	100%	30	0	5.1 J	7.6 J	9.2	7.6 J
Copper	mg/Kg	29	100%	25	3	14	16.1	24.8	16.5
Iron	mg/Kg	34900	100%	26627	5	16500	18400	22600 J	20100 J
Lead	mg/Kg	24.9	100%	21.9	2	13.9	17.3	17	18.4
Magnesium	mg/Kg	40200	100%	12222	1	2690	5920	6630 J	6430 J
Manganese	mg/Kg	956	100%	669	2	301 J	323	403 R	440 R
Mercury	mg/Kg	0.17	93%	0.1	2	0.05 J	0.12	0.04 J	0.04 J
Nickel	mg/Kg	41.8	100%	34	4	14.4	20 J	25.6	21.3
Potassium	mg/Kg	2530	100%	1762	7	1200	1150 J	1430	1310
Selenium	mg/Kg	1.7	100%	2	0	1.3	0.69 J	0.26 J	0.29 J
Sodium	mg/Kg	142	60%	104	1	30.2 U	70.7 J	69.7 J	73.5 J
Vanadium	mg/Kg	30.2	100%	150	0	21	19.5	24.6	22.4
Zinc	mg/Kg	115	100%	83	7	59.2	71.4	76.1 J	70.7 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	NA	1.14	10.8	6.8	7.9
Total Solids	%W/W					58	84.5	77.7	78.8

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 3 02/18/94 TP44A-4 211985 42493	SOIL SEAD-44 3 02/18/94 TP44A-5 211986 42493	SOIL SEAD-44 3 02/18/94 TP44A-6 211987 42493	SOIL SEAD-44 3 02/18/94 TP44A-7 212004 42494	SOIL SEAD-44 7 02/20/94 TP44A-8 212042 42494	SOIL SEAD-44 3 02/19/94 TP44A-9 212005 42494
VOLATILE ORGANICS											
Acetone	ug/Kg	200	40%	200	0	12 U	12 U	12 U	12 U	12 U	12 U
2-Butanone	ug/Kg	28	7%	300	0	12 U	12 U	12 U	12 U	12 U	12 U
4-Methyl-2-Pentanone	ug/Kg	4	7%	NA	NA	12 U	12 U	12 U	12 U	12 U	4 J
2-Hexanone	ug/Kg	4	7%	NA	NA	12 U	12 U	12 U	12 U	12 U	4 J
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	NA	NA	12 U	12 U	12 U	12 U	12 U	2 J
Toluene	ug/Kg	1	7%	1500	0	12 U	12 U	12 U	1 J	12 U	12 U
NITROAROMATICS											
2,4,6-Trinitrotoluene	ug/Kg	110	7%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANICS											
4-Methylphenol	ug/Kg	250	13%	900	0	390 U	400 U	410 U	430 U	430 U	400 U
Naphthalene	ug/Kg	330	13%	13000	0	390 U	400 U	410 U	430 U	430 U	22 J
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	390 U	400 U	410 U	430 U	430 U	400 U
Acenaphthylene	ug/Kg	72	20%	41000	0	390 U	400 U	410 U	72 J	46 J	58 J
Acenaphthene	ug/Kg	380	40%	50000*	0	390 U	21 J	410 U	40 J	22 J	23 J
Dibenzofuran	ug/Kg	280	7%	6200	0	390 U	400 U	410 U	430 U	430 U	400 U
Fluorene	ug/Kg	410	40%	50000*	0	390 U	21 J	410 U	53 J	30 J	38 J
Hexachlorobenzene	ug/Kg	36	13%	410	0	390 U	36 J	24 J	430 U	430 U	400 U
Phenanthrene	ug/Kg	2100	67%	50000*	0	68 J	240 J	100 J	980	510	580
Anthracene	ug/Kg	640	47%	50000*	0	390 U	43 J	410 U	140 J	77 J	100 J
Carbazole	ug/Kg	370	40%	50000*	0	390 U	26 J	410 U	190 J	150 J	150 J
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	390 U	400 U	410 U	430 U	430 U	400 U
Fluoranthene	ug/Kg	2400	73%	50000*	0	120 J	400	190 J	2400	1200	1400
Pyrene	ug/Kg	2000	73%	50000*	0	100 J	310 J	160 J	2000	910	1000
Benzo(a)anthracene	ug/Kg	990	67%	220	4	52 J	160 J	77 J	990	520	560
Chrysene	ug/Kg	1200	67%	400	4	77 J	200 J	94 J	1200	650	740
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000*	0	280 J	500	200 J	150 J	940	720
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	62 J	190 J	88 J	1100	560	600
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	66 J	180 J	81 J	1100	640	620
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	68 J	180 J	84 J	1100	600	680
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	49 J	120 J	61 J	490	250 J	400 J
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	390 U	58 J	410 U	430 U	430 U	400 U
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000*	0	49 J	110 J	58 J	510	220 J	400 J
PESTICIDES/PCB											
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	2 U	2 U	2.1 U	2.2 U	2.2 U	2.1 U
Endosulfan I	ug/Kg	5.4	27%	900	0	2.5	2 U	1.6 J	2.2 U	2.2 U	2.1 U
Dieldrin	ug/Kg	70	47%	440	0	3.9 U	5.8 J	4.1 U	4.3 U	4.3 U	12 J
4,4'-DDE	ug/Kg	3.1	20%	2100	0	3.9 U	4 U	2.8 J	2.8 J	4.3 U	3.1 J
Endrin	ug/Kg	3.5	7%	100	0	3.9 U	4 U	4.1 U	3.5 J	4.3 U	4 U
Endosulfan II	ug/Kg	2.8	13%	900	0	3.9 U	4 U	4.1 U	2.8 J	2.7 J	4 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	3.9 U	4 U	4.1 U	5.6	2.6 J	3.6 J
Endrin ketone	ug/Kg	5.2	7%	NA	NA	3.9 U	4 U	4.1 U	4.3 U	5.2 J	4 U
Endrin aldehyde	ug/Kg	4.5	13%	NA	NA	3.9 U	4 U	4.1 U	4.5 J	4.3 U	3.5 J

TABLE 4.6-1

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SEAD-44A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 3 02/18/94 TP44A-4 211985 42493	SOIL SEAD-44 3 02/18/94 TP44A-5 211986 42493	SOIL SEAD-44 3 02/18/94 TP44A-6 211987 42493	SOIL SEAD-44 3 02/18/94 TP44A-7 212004 42494	SOIL SEAD-44 7 02/20/94 TP44A-8 212042 42494	SOIL SEAD-44 3 02/19/94 TP44A-9 212005 42494
METALS											
Aluminum	mg/Kg	17500	100%	14593	9	13800	11000	17500	16000 J	17200 J	15700 J
Antimony	mg/Kg	10.8	60%	3.59	2	0.57 J	0.33 J	0.65 J	0.31 J	0.62 J	0.4 J
Arsenic	mg/Kg	7.7	100%	7.5	1	4	3.7	7.7	4.7 J	6 J	6.1 J
Barium	mg/Kg	164	100%	300	0	69.3	62	124	121 J	106 J	130 J
Beryllium	mg/Kg	0.91	100%	.73	3	0.6 J	0.42 J	0.77 J	0.64 J	0.74 J	0.69 J
Cadmium	mg/Kg	0.48	87%	1	0	0.14 J	0.28 J	0.18 J	0.25 J	0.29 J	0.23 J
Calcium	mg/Kg	77400	100%	101904	0	25200 J	77400 J	13200 J	35400 J	30100 J	11500 J
Chromium	mg/Kg	27.1	100%	22	5	23.9	16.7	27.1	21.4 J	24.7 J	24.2 J
Cobalt	mg/Kg	14.5	100%	30	0	11.6	8.4 J	14.5	8.7 J	12.9 J	14.4 J
Copper	mg/Kg	29	100%	25	3	26.9	17.8	29	21.5 J	24.4 J	25.5 J
Iron	mg/Kg	34900	100%	26627	5	28400	19900	34900	24000 J	30000 J	31300 J
Lead	mg/Kg	24.9	100%	21.9	2	19.3	13.6	23.8	24.9 J	18.7 J	21.4 J
Magnesium	mg/Kg	40200	100%	12222	1	7510	40200	7130	6610 J	7330 J	6260 J
Manganese	mg/Kg	956	100%	669	2	479	669	528	451 J	741 J	956 J
Mercury	mg/Kg	0.17	93%	0.1	2	0.02 U	0.17	0.04 J	0.06 J	0.04 J	0.04 J
Nickel	mg/Kg	41.8	100%	34	4	41.8 J	26.1 J	41.7 J	26.9 J	34.7 J	38.5 J
Potassium	mg/Kg	2530	100%	1762	7	1480 J	2090 J	2310 J	2230 J	2530 J	1830 J
Selenium	mg/Kg	1.7	100%	2	0	0.56 J	0.97	0.66 J	1.1 J	0.69 J	0.67 J
Sodium	mg/Kg	142	60%	104	1	81.8 J	142 J	56.6 J	57.4 J	73.3 J	49.7 J
Vanadium	mg/Kg	30.2	100%	150	0	20.1	18.2	29.9	28.9 J	29.4 J	27.3 J
Zinc	mg/Kg	115	100%	83	7	73.4	62.3	115	100 J	98.6 J	94.8 J
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	NA	0.52	4	3.7	13	12.9	8.1
Total Solids	%W/W					85.1	83	80.9	77.2	77.4	81.7

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

associated TAGM values. Figure 4.6-1 shows the sum of semivolatile organic compounds found in the soil samples collected at SEAD-44A.

4.6.2.3 Pesticides and PCBs

A total of 9 pesticide compounds were detected in the soil samples collected at SEAD-44A. All of the pesticides detected, except endrin ketone and endrin aldehyde, were found at concentration which were at least an order of magnitude below their respective TAGM value. Endrin ketone and endrin aldehyde were found at maximum concentrations of 5.2J and 4.5J μg/Kg, respectively. No TAGM values exist for these two compounds.

4.6.2.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44A.

4.6.2.5 Metals

A total of 21 metals were detected in the soil samples collected at SEAD-44A. Of the 21 metals reported, 15 were found in one or more of the samples at concentrations which were above TAGM limits. The reported concentrations of those metals which were found above TAGM limits were typically less than two times their associated TAGM values. The only exceptions were magnesium and antimony. These two metals were detected at maximum concentration which were 3 times greater than their associated TAGM values.

4.6.2.6 Nitroaromatics

2,4,6-Trinitrotoluene was detected in only one sample, SS44A-5, at a concentration of 110J μg/kg. Currently, there is no TAGM value for 2,4,6-TNT.

4.6.2.7 Indicator Compounds

Nitrate/nitrite-nitrogen was detected in all 15 samples collected at SEAD-44A. The reported concentrations ranged from a low of 0.1 mg/kg to a high of 13 mg/kg, found in sample TP44A-7.

94
SS44A-6
85
SS44A-5
8,091
BE44A-7
12,515
BE44A-9
BE44A-8
7,325
MW44A-1
750.22
2,795
1,217
BE44A-4
BE44A-5
BE44A-6
991
250
SS44A-3
SS44A-4
580U
MW44A-2
N 985500
N 985250
13,140
BE44A-1
1,682
BE44A-3
1,645
BE44A-2
SS44A-1
669
SS44A-2
MW44A-3
750.4
129
E 752250
E 752500
E 752750
E 753000
E 753250
E 753500
745
746
747
748
749
750

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

MW44A-3
750.4 MONITORING WELL WITH WATER TABLE ELEVATION

746 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

- SURFACE SOIL SAMPLE
- SURFACE WATER/ SEDIMENT SAMPLE
- BERM EXCAVATION
- 13,140 TOTAL SVOs (ug/kg) IN SOILS

N

50 0 50 100
(feet)

ACAD\SENECA\LSW\MUNACADFIGS\SD44ASVO.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 4.6-1
SEAD-44A QUALITY ASSURANCE TEST LABORATORY
TOTAL SVOs IN SOIL

SCALE 1" = 100'
DATE 4/13/95
REV A

4.6.3 Groundwater

Three monitoring wells were installed and sampled as part of the SEAD-44A investigation. The summary results of the chemical analyses are presented in Table 4.6-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-44A.

4.6.3.1 Volatile Organic Compounds

Two volatile organic compounds, acetone (8J μg/L) and 1,1,2,2-tetrachloroethane (3J μg/L) were detected in groundwater sample MW44A-2. The occurrence of 1,1,2,2-tetrachloroethane was below its TAGM of 5 μg/L. The NY AWQS Class GA groundwater, criteria for acetone is 50 μg/L.

4.6.3.2 Semivolatile Organic Compounds

No Semivolatiles organic compounds were found in the three groundwater samples at SEAD-44A.

4.6.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples at SEAD-44A.

4.6.3.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44A.

4.6.3.5 Metals

Of the 19 metals found in the three groundwater wells, elevated concentrations of aluminum, iron, nickel, and sodium were noted in sample MW44A-2. Iron was the only metal found at concentrations exceeding the associated federal or state criteria. A maximum concentration of 4,810 μg/L was found in the groundwater collected from monitoring well MW44A-2. Elevated concentrations of specific metals in groundwater sample MW44A-2 were likely associated with the high turbidity (693 NTUs) of the sample.

TABLE 4.6-2

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-44 07/12/94 MW44A-1 226786 45282	WATER SEAD-44 07/13/94 MW44A-2 226789 45282	WATER SEAD-44 07/12/94 MW44A-3 226790 45282
VOLATILE ORGANICS									
Acetone	ug/L	8	33%	50	NA	0	10 U	8 J	10 U
1,1,2,2-Tetrachloroethane	ug/L	3	33%	5	NA	0	10 U	3 J	10 U
METALS									
Aluminum	ug/L	2240	100%	NA	NA	NA	125 J	2240	243
Arsenic	ug/L	4.1	33%	25	50	0	2 U	4.1 J	2 U
Barium	ug/L	104	100%	1000	2000	0	104 J	41.6 J	52.4 J
Beryllium	ug/L	0.23	33%	NA	4	0	0.1 U	0.23 J	0.1 U
Calcium	ug/L	132000	100%	NA	NA	NA	92200	132000	102000
Chromium	ug/L	4.8	67%	50	100	0	0.4 U	4.8 J	0.74 J
Cobalt	ug/L	4	67%	NA	NA	NA	0.5 U	4 J	0.95 J
Copper	ug/L	4.5	67%	200	1300 (h)	0	0.5 U	4.5 J	1.9 J
Iron	ug/L	4810	100%	300	NA	2	269 J	4810	419
Lead	ug/L	4.1	33%	25	15 (i)	0	0.9 U	4.1	0.89 U
Magnesium	ug/L	75600	100%	NA	NA	NA	19000	75600	34000
Manganese	ug/L	217	100%	300	NA	0	18.2	217	131
Mercury	ug/L	0.06	67%	2	2	0	0.04 U	0.06 J	0.05 J
Nickel	ug/L	12.3	67%	NA	100	0	0.7 U	12.3 J	2.6 J
Potassium	ug/L	6160	100%	NA	NA	NA	1050 J	6160	4050 J
Silver	ug/L	0.63	33%	50	NA	0	0.63 J	0.5 U	0.5 U
Sodium	ug/L	18900	100%	20000	NA	0	2390 J	18900	4300 J
Vanadium	ug/L	4.7	100%	NA	NA	NA	0.63 J	4.7 J	1.4 J
Zinc	ug/L	12.8	100%	300	NA	0	3.8 J	12.8 J	4.3 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.10	67%	10	10	0	0.05	0.01 U	0.1
pH	Standard Units						7.8	7.5	7.5
Conductivity	umhos/cm						410	900	550
Temperature	°C						13.4	14.7	15.4
Turbidity	NTU						10.7	693	16.8

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) Federal Drinking Water Maximim Contamination Levels
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.

4.6.3.6 Nitroaromatics

No nitroaromatics were found in the soil samples collected at SEAD-44A.

4.6.3.7 Indicator Parameters

Nitrate/nitrite nitrogen was detected in groundwater samples MW44A-1 (.05 μg/L) and MW44A-3 (.1 μg/L). The detected nitrate/nitrite nitrogen concentrations were 2 to 3 orders of magnitude below the federal and state criteria of 10 mg/L.

4.6.4 Surface Water

Four surface water samples were collected as part of the SEAD-44A investigation. The summary results of the chemical analyses are presented in Table 4.6-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-44A.

4.6.4.1 Volatile Organic Compounds

No volatile compounds were found in the four surface water samples collected at SEAD-44A.

4.6.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the four surface water samples collected at SEAD-44A.

4.6.4.3 Pesticides and PCBs

No pesticides or PCBs compounds were found in the four surface water samples collected at SEAD-44A.

4.6.4.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44A.

TABLE 4.6-3

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-44 04/17/94 SW44A-1 218085 43549	WATER SEAD-44 04/17/94 SW44A-2 218086 43549	WATER SEAD-44 04/17/94 SW44A-3 218087 43549	WATER SEAD-44 04/27/94 SW44A-4 219414 43626
METALS									
Aluminum	ug/L	476	100%	100	4	476	243	324	382
Barium	ug/L	50.4	100%	NA	NA	29.6 J	27.8 J	28.6 J	50.4 J
Cadmium	ug/L	0.23	25%	2.1	0	0.23 J	0.1 U	0.1 U	0.1 U
Calcium	ug/L	156000	100%	NA	NA	41800	40600	42700	156000
Chromium	ug/L	1	100%	390	0	0.92 J	0.52 J	1 J	0.91 J
Cobalt	ug/L	1.1	25%	5	0	0.6 U	0.6 U	0.59 U	1.1 J
Copper	ug/L	4.7	100%	22.9	0	4.7 J	2 J	2.3 J	3.2 J
Iron	ug/L	632	100%	300	4	632	344	479	525
Lead	ug/L	2.2	50%	8.6	0	2.2 J	0.8 U	0.9 J	0.79 U
Magnesium	ug/L	22500	100%	NA	NA	7800	7670	8190	22500
Manganese	ug/L	165	100%	NA	NA	9.8 J	8.3 J	6.3 J	165
Mercury	ug/L	0.05	75%	.2 (f)	0	0.05 J	0.05 J	0.05 J	0.03 U
Nickel	ug/L	174	100%	172	1	174	1 J	1.9 J	2.7 J
Potassium	ug/L	3600	100%	NA	NA	1210 J	1150 J	1100 J	3600 J
Sodium	ug/L	3420	100%	NA	NA	3420 J	2760 J	2880 J	2730 J
Vanadium	ug/L	1	50%	14	0	1 J	0.7 U	1 J	0.69 U
Zinc	ug/L	1050	100%	159.6	1	1050	5.6 J	10.4 J	5.5 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.06	100%	NA	NA	0.04	0.02	0.01	0.06
pH	Standard Units	8.7				8	8.6	8.7	7.6
Conductivity	umhos/cm	800				180	168	175	800
Temperature	°C	22.7				8.8	8.1	7.5	22.7
Turbidity	NTU	14.2				12.2	9.1	9.4	14.2

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water(1993).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.

4.6.4.5 Metals

A total of 17 metals were detected in the surface water samples collected at SEAD-44A. Of the 17 metals detected, aluminum, iron, nickel and zinc were found at concentrations which exceeded New York Class C surface water criteria. Iron concentrations exceeded the NYSDEC criteria of 300 μg/L in all of the 4 samples. The highest concentration was 632 μg/L in sample SW44A-1. The zinc concentration in sample SW44A-1 also exceeded the guideline of 159.6 μg/L, where it was found at a concentration of 1,050 μg/L. The concentrations of zinc in the 3 remaining surface water samples were below the guideline value. Aluminum concentrations exceeded the NYSDEC criteria of 100 μg/L in all of the 4 samples. Nickel was detected in surface water sample SW44A-1 (174 μg/L) at a concentration above the NYSDEC criteria of 172 μg/L.

4.6.4.6 Nitroaromatics

No nitroaromatics were found in the surface water samples collected at SEAD-44A.

4.6.4.7 Indicator Compounds

Nitrate/nitrite nitrogen was found in all four of the surface water samples collected at SEAD-44A. The reported concentrations ranged from 0.01 mg/L to 0.06 mg/L. The maximum concentration, 0.06 mg/L, was found in sample SW44A-4.

4.6.5 Sediment

A total of four sediment samples were collected as part of the SEAD-44A investigation. The summary chemical analyses are presented in Table 4.6-4. The following sections describe the nature and extent of sediment contaminants identified at SEAD-44A.

4.6.5.1 Volatile Organic Compounds

No volatile organic compounds were detected in the four sediment samples collected at SEAD-44A.

4.6.5.2 Semivolatile Organic Compounds

Two SVOs were identified in two of the four sediment samples collected at SEAD-44A. The SVOs detected were both phthalates, and were found at low concentrations. The maximum concentration detected was 72J μg/kg of di-n-butylphthalate which was found in sediment sample SD44A-1. Phthalates are common laboratory contaminants.

4.6.5.3 Pesticides and PCBs

No pesticides or PCBs were detected in the four sediment samples collected at SEAD-44A.

4.6.5.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44A.

4.6.5.5 Metals

A number of metals were detected in the sediment at SEAD 44-A. Of these, copper, iron, manganese, and nickel were detected at concentrations which exceeded the NYSDEC Sediment Criteria. The lowest effect level for copper of 16 mg/kg was exceeded in sample SD44A-2 which had a copper concentration of 25.6 mg/kg. Maximum concentrations of iron were detected in samples SD44A-2 (26,300 μg/kg) and SD44A-4 (24,200 μg/kg). Both occurrences were greater than the sediment criteria value of 20,000 mg/kg for iron. The manganese criteria of 460 mg/kg was exceeded in samples SD44A-1 (concentration of 462 mg/kg) and SD44A-2 (concentration of 510 mg/kg). Nickel was detected at concentrations of 25.9, 31.9, and 26.2 mg/kg in samples SD44A-1, SD44A-2, and SD44A-4 respectively. All of these exceeded the lowest effect level for nickel of 16 mg/kg.

4.6.5.6 Nitroaromatics

No nitroaromatics were detected in the four sediment samples collected at SEAD-44A.

TABLE 4.6-4

SENECA ARMY DEPOT
SEAD-44A ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER 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)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-44 0-0.2 04/17/94 SD44A-1 218073 43543	SOIL SEAD-44 0-0.2 04/17/94 SD44A-2 218075 43543	SOIL SEAD-44 0-0.2 04/17/94 SD44A-3 218076 43543	SOIL SEAD-44 0-0.2 04/27/94 SD44A-4 219399 43663
SEMIVOLATILE ORGANICS													
Di-n-butylphthalate	ug/Kg	72	25%	NA	NA	NA			NA	72 J	460 U	490 U	520 U
bis(2-Ethylhexyl)phthalate	ug/Kg	34	25%	1995 (c)	NA	NA			0	480 U	34 J	490 U	520 U
METALS													
Aluminum	mg/Kg	14000	100%				NA	NA	NA	13400	14000	9880	13300
Antimony	mg/Kg	0.4	50%				2	25	0	0.4 J	0.19 J	0.27 UJ	0.16 UJ
Arsenic	mg/Kg	5.4	100%				6	33	0	4.9	5.4	4.4	5.2
Barium	mg/Kg	121	100%				NA	NA	NA	121	86.8	86.1	91.2
Beryllium	mg/Kg	0.71	100%				NA	NA	NA	0.71 J	0.67 J	0.49 J	0.66 J
Cadmium	mg/Kg	0.41	100%				.6	9	0	0.37 J	0.41 J	0.26 J	0.29 J
Calcium	mg/Kg	79400	100%				NA	NA	NA	3280	79400	12400	22400
Chromium	mg/Kg	20.7	100%				26	110	0	19.8	20.7	14.8	18.7
Cobalt	mg/Kg	11	100%				NA	NA	NA	8.5 J	11	7.2 J	10.3
Copper	mg/Kg	25.6	100%				16	110	4	17.5	25.6	17.8	18.6
Iron	mg/Kg	26300	100%				2% (i)	4% (i)	3	23000	26300	19200	24200
Lead	mg/Kg	13.6	100%				31	110	0	13.1	12.6	10.7	13.6
Magnesium	mg/Kg	12900	100%				NA	NA	NA	4100	12900	5520	7850
Manganese	mg/Kg	510	100%				460	1100	2	462	510	365	393 J
Mercury	mg/Kg	0.07	100%				.15	1.3	0	0.07 J	0.05 J	0.05 J	0.03 J
Nickel	mg/Kg	31.9	100%				16	50	4	25.9	31.9	21	26.2
Potassium	mg/Kg	2760	100%				NA	NA	NA	1640	2760	1190 J	1200
Sodium	mg/Kg	69.7	50%				NA	NA	NA	41.4 U	69.7 J	42.3 U	52.7 J
Thallium	mg/Kg	0.53	25%				NA	NA	NA	0.53 J	0.29 U	0.43 U	0.25 U
Vanadium	mg/Kg	24	100%				NA	NA	NA	23.9	24	19.1	22.5
Zinc	mg/Kg	83.9	100%				120	270	0	83.9	70.2	62.6	66.2
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/Kg	1.39	100%	NA	NA	NA	NA	NA	NA	1.39	0.07	0.01	0.03
Total Solids	%W/W									68.9	71.1	67.5	63.2

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) Chronic toxicity sediment criteria for benthic aquatic life.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg

4.6.5.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in all 4 of the sediment samples collected at SEAD-44A. Reported concentrations ranged from 0.01 mg/kg to 1.39 mg/kg. The maximum concentration, 1.39 mg/kg, was found in sample SD44A-1.

4.6.6 Tentatively Identified Compounds

The total concentrations of tentatively identified compounds (TIC) were below 50 mg/kg in all of the samples collected at SEAD-44A.

4.7 SEAD-44B QUALITY ASSURANCE TEST LABORATORY

4.7.1 Introduction

A total of three (3) surface soil samples, three (3) groundwater samples, and two (2) surface water and sediment samples were collected as part of the SEAD-44B investigation. The following sections describe the nature and extent of contamination identified at SEAD-44B.

4.7.2 Soil

The analytical results for the 3 surface soil samples collected as part of the SEAD-44B investigation are presented in Table 4.7-1. The following sections describe the nature and extent of contamination in SEAD-44B soils. The sample locations are shown in Figure 2.9-2.

4.7.2.1 Volatile Organic Compounds

Two volatile organic compounds, acetone and 2-butanone, were detected in the soil samples collected at SEAD-44B. Acetone and 2-butanone are common laboratory contaminants.

Both contaminants were present at concentrations which were well below their respective TAGM values. Acetone was present in all three surface soil samples at concentrations ranging from 38 to 47 μg/kg. 2-butanone was present in only one sample, SS44B-1, at a concentration of 10J μg/kg which is 3% of the TAGM value of 300 μg/kg.

TABLE 4.7-1

SENECA ARMY DEPOT
SEAD-44B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44B-1 217686 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-2 217687 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-3 217688 43535
VOLATILE ORGANICS								
Acetone	ug/Kg	47	100%	200	0	45	38	47
2-Butanone	ug/Kg	10	33%	300	0	10 J	18 U	14 U
SEMIVOLATILE ORGANICS								
Phenanthrene	ug/Kg	330	67%	50000*	0	34 J	630 U	330 J
Anthracene	ug/Kg	35	33%	50000*	0	420 U	630 U	35 J
Fluoranthene	ug/Kg	350	67%	50000*	0	82 J	630 U	350 J
Pyrene	ug/Kg	380	67%	50000*	0	89 J	630 U	380 J
Benzo(a)anthracene	ug/Kg	130	67%	220	0	33 J	630 U	130 J
Chrysene	ug/Kg	150	67%	400	0	52 J	630 U	150 J
bis(2-Ethylhexyl)phthalate	ug/Kg	42	67%	50000*	0	34 J	630 U	42 J
Benzo(b)fluoranthene	ug/Kg	99	67%	1100	0	51 J	630 U	99 J
Benzo(k)fluoranthene	ug/Kg	110	67%	1100	0	40 J	630 U	110 J
Benzo(a)pyrene	ug/Kg	98	67%	61	1	32 J	630 U	98 J
Indeno(1,2,3-cd)pyrene	ug/Kg	64	67%	3200	0	24 J	630 U	64 J
Dibenz(a,h)anthracene	ug/Kg	28	33%	14	1	420 U	630 U	28 J
Benzo(g,h,i)perylene	ug/Kg	56	33%	50000*	0	420 U	630 U	56 J

TABLE 4.7-1

SENECA ARMY DEPOT
SEAD-44B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-44 0-0.2 04/13/94 SS44B-1 217686 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-2 217687 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-3 217688 43535
PESTICIDES/PCB								
Endosulfan I	ug/Kg	2	33%	900	0	2 J	3.3 U	2.4 U
Dieldrin	ug/Kg	57	33%	440	0	4.2 U	6.3 U	57
4,4'-DDE	ug/Kg	48	33%	2100	0	48	6.3 U	4.6 U
4,4'-DDD	ug/Kg	28	33%	2900	0	28	6.3 U	4.6 U
4,4'-DDT	ug/Kg	27	33%	2100	0	27	6.3 U	4.6 U
METALS								
Aluminum	mg/Kg	16400	100%	14593	1	11000	16400	9820
Arsenic	mg/Kg	13.1	100%	7.5	2	6.8	8.2	13.1
Barium	mg/Kg	136	100%	300	0	60.6	136	70.8
Beryllium	mg/Kg	0.77	100%	.73	1	0.54 J	0.77 J	0.48 J
Cadmium	mg/Kg	0.34	100%	1	0	0.33 J	0.34 J	0.24 J
Calcium	mg/Kg	33300	100%	101904	0	10900	5100	33300
Chromium	mg/Kg	20.7	100%	22	0	20	20.7	15.2
Cobalt	mg/Kg	10.8	100%	30	0	10.8 J	7.8 J	8.2 J
Copper	mg/Kg	26.2	100%	25	1	26.2	21.7	19.9
Iron	mg/Kg	24100	100%	26627	0	24100	23100	19600
Lead	mg/Kg	39.5	100%	21.9	1	39.5	21.4	12.4
Magnesium	mg/Kg	9660	100%	12222	0	5200	3910	9660
Manganese	mg/Kg	372	100%	669	0	372 J	318 J	364 J
Mercury	mg/Kg	0.04	100%	0.1	0	0.02 J	0.04 J	0.02 J
Nickel	mg/Kg	34.8	100%	34	1	34.8	20.8	24.3
Potassium	mg/Kg	1880	100%	1762	1	1380	1880	1550
Selenium	mg/Kg	1.2	100%	2	0	1.1 J	1.2	0.44 J
Sodium	mg/Kg	43.2	33%	104	0	35.3 U	31.5 U	43.2 J
Vanadium	mg/Kg	28	100%	150	0	20.3	28	16.3
Zinc	mg/Kg	145	100%	83	1	145	73.4	68.9
OTHER ANALYSES								
Nitrate/Nitrite-Nitrogen	mg/Kg	0.47	100%	NA	NA	0.47	0.06	0.04
Total Solids	%W/W					78.1	52.4	72.5

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

4.7.2.2 Semivolatile Organic Compounds

A total of 13 semivolatile organic compounds were found at varying concentrations in two of the three surface soil samples collected at SEAD-44B. In general, the concentrations of semivolatile organic compounds were low, with only two compounds exceeding their respective TAGM values in surface soil sample SS44B-3. Benzo(a)pyrene and dibenz(a,h)anthracene were detected at concentrations of 98J μg/kg and 28J μg/kg, respectively. The TAGM value for benzo(a)pyrene is 61 μg/kg and the TAGM value for dibenz(a,h)anthracene is 14 μg/kg.

4.7.2.3 Pesticides and PCBs

Five pesticides were found in two of the three surface soil samples collected at SEAD-44B. All detected compounds were found at concentrations which were well below their respective TAGM values. No PCB compounds were detected in the soil samples collected at SEAD-44B.

4.7.2.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44B.

4.7.2.5 Metals

Twenty metals were detected in the surface soils collected at SEAD-44B. Of the 20 metals detected, 8 were found at concentrations which were above their associated TAGM values. All of the TAGM exceedances were limited to a single occurrence except for arsenic, which was found above its TAGM value in two samples.

4.7.2.6 Nitroaromatics

No nitroaromatics were found in the surface soil samples collected at SEAD-44B.

4.7.2.7 Indicator Compounds

Nitrate/nitrite nitrogen was detected in all 3 surface soil samples collected. Reported

concentrations ranged from a low of 0.04 mg/kg in sample SS44B-3, to a maximum of 0.47 mg/kg in sample SS44B-1.

4.7.3 Groundwater

Three groundwater monitoring wells were installed as part of the SEAD-44B investigation. The summary analytical results are presented in Table 4.7-2. The following sections describe the nature and extent of the groundwater contamination identified at SEAD-44B.

4.7.3.1 Volatile Organic Compounds

No VOCs were found in the groundwater samples collected at SEAD-44B.

4.7.3.2 Semivolatile Organic Compounds

No SVOs were found in the groundwater samples collected at SEAD-44B.

4.7.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples collected at SEAD-44B.

4.7.3.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44B.

4.7.3.5 Metals

A total of 16 metals were detected in the groundwater samples collected at SEAD-44B. Iron and thallium were the only metals found at concentrations above the associated federal or state criteria. Iron concentrations of 2,340 and 666 μg/L, found in samples MW44B-2 and MW44B-2 respectively, were the only values for iron that exceeded groundwater criteria. Thallium was found in the groundwater sample from MW44B-1 at a concentration of 4.7J μg/L.

TABLE 4.7-2

SENECA ARMY DEPOT
SEAD-44B ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (f)	NUMBER ABOVE CRITERIA	WATER SEAD-44 07/12/94 MW44B-1 226792 45332	WATER SEAD-44 03/29/94 MW44B-2 215835 43179	WATER SEAD-44 07/13/94 MW44B-3 226793 45332
METALS									
Aluminum	ug/L	1230	100%	NA	NA	NA	288 J	1230	80.2 J
Barium	ug/L	77.7	100%	1000	2000	0	72.6 J	77.7 J	39.3 J
Calcium	ug/L	120000	100%	NA	NA	NA	120000	92000	114000
Chromium	ug/L	2.5	33%	50	100	0	0.4 U	2.5 J	0.4 U
Cobalt	ug/L	1.8	67%	NA	NA	NA	0.91 J	1.8 J	0.5 U
Copper	ug/L	2.4	33%	200	1300 (g)	0	0.5 U	2.4 J	0.5 U
Iron	ug/L	2340	100%	300	NA	2	666	2340	231
Magnesium	ug/L	32900	100%	NA	NA	NA	31800	22500	32900
Manganese	ug/L	219	100%	300	NA	0	219	29.4	151
Nickel	ug/L	4.4	67%	NA	100	0	0.73 J	4.4 J	0.69 U
Potassium	ug/L	2910	100%	NA	NA	NA	2150 J	1360 J	2910 J
Silver	ug/L	0.7	67%	50	NA	0	0.68 J	0.7 J	0.5 U
Sodium	ug/L	8350	100%	20000	NA	0	7190	8350	6110
Thallium	ug/L	4.7	33%	NA	2	1	4.7 J	1.6 U	1.9 U
Vanadium	ug/L	2.7	67%	NA	NA	NA	0.5 U	2.7 J	0.63 J
Zinc	ug/L	10.4	67%	300	NA	0	2.2 U	10.4 J	4.9 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.13	100%	10	10	0	0.11	0.06	0.13
pH	Standard Units						7.1	8	7.2
Conductivity	umhos/cm						620	383	600
Temperature	°C						15.3	5.9	15
Turbidity	NTU						16.5	67	2.5

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) Federal Primary Drinking Water Maximum Contaminant Levels
g) The value listed is an action level for copper at the tap, and not an MCL.

4.7.3.6 Nitroaromatics

No nitroaromatics were found in the three groundwater samples collected at SEAD-44B.

4.7.3.7 Indicator Compounds

Nitrate/nitrite-nitrogen was detected in all 3 of the groundwater samples at concentrations which were below the criteria value of 10 mg/L. The maximum nitrate/nitrite-nitrogen concentration detected was 0.13 mg/L in the groundwater sample collected from monitoring well MW44B-3.

4.7.4 Surface Water

Two surface water samples were collected as part of the SEAD-44B investigation. The summary results of the chemical analyses are presented in Table 4.7-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-44B.

4.7.4.1 Volatile Organic Compounds

No VOCs were found in the two surface water samples collected at SEAD-44B.

4.7.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the two surface water samples collected at SEAD-44B.

4.7.4.3 Pesticides and PCBs

No pesticides or PCBs were found in the two surface water samples collected at SEAD-44B.

4.7.4.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44B.

TABLE 4.7-3

SENECA ARMY DEPOT
SEAD-44B ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-44 04/17/94 SW44B-1 218088 43549	WATER SEAD-44 04/17/94 SW44B-2 218089 43549
METALS							
Aluminum	ug/L	76.5	100%	100	0	76.5 J	64.4 J
Arsenic	ug/L	11.6	100%	190	0	5.8 J	11.6
Barium	ug/L	34	100%	NA	NA	34 J	33.3 J
Calcium	ug/L	93000	100%	NA	NA	87000	93000
Copper	ug/L	2.2	100%	22.9	0	1.2 J	2.2 J
Iron	ug/L	79.8	100%	300	0	79.8 J	75.5 J
Magnesium	ug/L	9070	100%	NA	NA	8990	9070
Manganese	ug/L	5.3	100%	NA	NA	2.7 J	5.3 J
Mercury	ug/L	0.05	100%	.2 (f)	0	0.05 J	0.05 J
Nickel	ug/L	0.68	100%	172	0	0.68 J	0.66 J
Potassium	ug/L	3290	100%	NA	NA	2680 J	3290 J
Sodium	ug/L	73200	100%	NA	NA	73200	61000
Zinc	ug/L	2.2	100%	159.6	0	2 J	2.2 J
OTHER ANALYSES							
Nitrate/Nitrite-Nitrogen	mg/L	0.01	50%	NA	NA	0.01	0.01 U
pH	Standard Units					8.7	8.5
Conductivity	umhos/cm					700	690
Temperature	°C					16.2	16.5
Turbidity	NTU					2.9	2.8

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (199
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) NYSDEC guidance value

4.7.4.5 Metals

A total of 13 metals were found in the surface water samples analyzed at SEAD-44B. All reported concentrations of aluminum, arsenic, copper, iron, mercury, nickel, and zinc were below NY Class C criteria values. No criteria exist for the remaining 6 metals detected in the surface water at SEAD-44B.

4.7.4.6 Nitroaromatics

No nitroaromatic compounds were found in the two surface water samples collected at SEAD-44B.

4.7.4.7 Indicator Compounds

Nitrate/nitrite-nitrogen was found in one of the two samples at a concentration of 0.01 mg/L. Currently, no criteria exists for nitrate/nitrite nitrogen in NY Class D surface waters.

4.7.5 Sediment

A total of two sediment samples were collected as part of the SEAD-44B investigation. The summary chemical analyses are presented in Table 4.7-4. The following sections describe the nature and extent of sediment contamination identified at SEAD-44B.

4.7.5.1 Volatile Organic Compounds

2-butanone was the only volatile organic compound found in the surface sediments at SEAD-44B. A concentration 12J μg/kg was and found in sediment sample SD44B-2.

4.7.5.2 Semivolatile Organic Compounds

Di-n-butylphthalate was identified in both sediment samples collected at SEAD-44B. The reported concentrations of di-n-Butylphthalate were 65J and 110J μg/kg in samples SD44B-1 & SD44B-2, respectively.

TABLE 4.7-4

SENECA ARMY DEPOT
SEAD-44B ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER 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)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-44 0-0.2 04/17/94 SD44B-1 218077 43543	SOIL SEAD-44 0-0.2 04/17/94 SD44B-2 218078 43543
VOLATILE ORGANICS											
2-Butanone	ug/Kg	12	50%	NA	NA	NA			NA	16 U	12 J
SEMIVOLATILE ORGANICS											
Di-n-butylphthalate	ug/Kg	110	100%	NA	NA	NA			NA	65 J	110 J
METALS											
Aluminum	mg/Kg	13000	100%				NA	NA	NA	13000	10300
Antimony	mg/Kg	0.37	50%				2	25	0	0.37 J	0.3 UJ
Arsenic	mg/Kg	58.3	100%				6	33	2	58.3	9.4
Barium	mg/Kg	93.8	100%				NA	NA	NA	93.8	68.6
Beryllium	mg/Kg	0.66	100%				NA	NA	NA	0.66 J	0.53 J
Cadmium	mg/Kg	0.38	100%				.6	9	0	0.38 J	0.23 J
Calcium	mg/Kg	8780	100%				NA	NA	NA	4240	8780
Chromium	mg/Kg	19.8	100%				26	110	0	19.8	14.6
Cobalt	mg/Kg	11.9	100%				NA	NA	NA	11.9	7.1 J
Copper	mg/Kg	19.1	100%				16	110	1	19.1	14.6
Iron	mg/Kg	28400	100%				2% (c)	4% (c)	1	28400	17600
Lead	mg/Kg	17.7	100%				31	110	0	17.7	13.6
Magnesium	mg/Kg	4880	100%				NA	NA	NA	4530	4880
Manganese	mg/Kg	679	100%				460	1100	1	679	230
Mercury	mg/Kg	0.06	100%				.15	1.3	0	0.05 J	0.06 J
Nickel	mg/Kg	28.4	100%				16	50	2	28.4	18.2
Potassium	mg/Kg	1500	100%				NA	NA	NA	1500	1160 J
Sodium	mg/Kg	378	100%				NA	NA	NA	378 J	97.6 J
Vanadium	mg/Kg	23.8	100%				NA	NA	NA	23.8	18.5
Zinc	mg/Kg	76.3	100%				120	270	0	76.3	56.5
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen	mg/Kg	0.06	100%	NA	NA	NA	NA	NA	NA	0.06	0.03
Total Solids	%W/W									65	61.2

NOTES:

a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

4.7.5.3 Pesticides and PCBs

No pesticides or PCBs were detected in the two sediment samples collected at SEAD-44B.

4.7.5.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-44B.

4.7.5.5 Metals

A total of twenty metals were detected in the sediment samples collected at SEAD-44B. Arsenic, copper, iron, manganese, and nickel were detected at concentrations which exceeded NYSDEC sediment criteria. The highest concentration of arsenic was 58.3 μg/kg in sample SD44B-1. This value was almost 10 times the lowest effect level value of 6 mg/kg. The remaining metals, copper, iron, manganese, and nickel, were detected only slightly above the associated lowest effect level.

4.7.5.6 Nitroaromatics

No nitroaromatics were detected in the four sediment samples collected at SEAD-44B.

4.7.5.7 Indicator Compounds

Nitrate/nitrite-nitrogen was detected in both sediment samples at concentrations of 0.03 and 0.06 mg/kg. The maximum concentration, 0.06 mg/kg, was found in sample SD44A-1.

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-44B.

4.8 SEAD 50 TANK FARM

4.8.1 Introduction

A total of 15 surface soil samples, 3 groundwater samples, and three surface water and sediment samples were collected as part of the SEAD-50 investigation. The following sections describe the nature and extent of contamination identified at SEAD-50.

4.8.2 Soil

The analytical results for the 15 surface soil samples collected as part of the SEAD-50 investigation are presented in Table 4.8-1. The following sections describe the nature and extent of contamination at SEAD-50. The sample locations are shown in Figure 2.10-2.

4.8.2.1 Volatile Organic Compounds

Acetone was detected in one of the 15 surface soil samples collected at SEAD-50. Acetone was found at a concentration of 83 μg/kg in surface soil sample SS50-2. The TAGM for acetone in soil is 200 μg/kg.

4.8.2.2 Semivolatile Organic Compounds

A total of 20 semivolatile organic compounds were detected at varying concentrations in all fifteen of the surface soil samples collected at SEAD-9. Six PAH compounds exceeded their associated TAGM values. Maximum concentrations of benzo(a)anthracene (5,200 μg/kg), chrysene (5,500 μg/kg), benzo(b)fluoranthene (4,400 μg/kg), benzo(k)fluoranthene (4,000 μg/kg), benzo(a)pyrene (3,700 μg/kg), and dibenz(a,h)anthracene (840J μg/kg) were found in surface soil sample SS50-11, which was collected 0 to 0.2 feet below ground surface. The remaining TAGM exceedances for PAHs were found in surface soil samples SS50-2, SS50-6, SS50-14, and SS50-15. Figure 4.8-1 shows the total PAH concentrations found in the surface soil samples and sediment samples collected at SEAD-50.

4.8.2.3 Pesticides and PCBs

A total of 10 pesticides and 3 PCB compounds were detected in 9 of the 15 surface soil samples collected at SEAD-50. All of the reported concentrations of pesticides and PCBs were at least an order of magnitude below their respective TAGM values.

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-1 02/18/94 SS50-1 211971 42493	SOIL SEAD-50 0-0.2 02/18/94 SS50-2 211972 42493	SOIL SEAD-50 0-1 02/18/94 SS50-3 211973 42493	SOIL SEAD-50 0-1 02/17/94 SS50-4 211728 42460	SOIL SEAD-50 0-0.2 02/18/94 SS50-5 211974 42493
VOLATILE ORGANICS										
Acetone	ug/Kg	83	7%	200	0	14 U	83	13 U	72 U	16 U
SEMIVOLATILE ORGANICS										
Phenol	ug/Kg	31	7%	330	0	31 J	610 U	480 U	410 U	450 U
4-Methylphenol	ug/Kg	310	20%	900	0	490 U	100 J	480 U	410 U	95 J
Acenaphthene	ug/Kg	930	13%	50000*	0	490 U	610 U	480 U	410 U	450 U
Dibenzofuran	ug/Kg	260	7%	6200	0	490 U	610 U	480 U	410 U	450 U
Fluorene	ug/Kg	590	13%	50000*	0	490 U	610 U	480 U	410 U	450 U
Phenanthrene	ug/Kg	7800	67%	50000*	0	490 U	150 J	480 U	20 J	27 J
Anthracene	ug/Kg	1500	20%	50000*	0	490 U	610 U	480 U	410 U	450 U
Carbazole	ug/Kg	1100	20%	50000*	0	490 U	610 U	480 U	410 U	450 U
Di-n-butylphthalate	ug/Kg	56	80%	8100	0	35 J	56 J	33 J	410 U	34 J
Fluoranthene	ug/Kg	14000	80%	50000*	0	33 J	230 J	480 U	32 J	37 J
Pyrene	ug/Kg	12000	73%	50000*	0	25 J	160 J	480 U	27 J	30 J
Benzo(a)anthracene	ug/Kg	5200	40%	220	3	490 U	81 J	480 U	410 U	450 U
Chrysene	ug/Kg	5500	40%	400	3	490 U	100 J	480 U	410 U	450 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	93%	50000*	0	950	720	760	690	820
Benzo(b)fluoranthene	ug/Kg	4400	40%	1100	1	490 U	180 J	480 U	410 U	450 U
Benzo(k)fluoranthene	ug/Kg	4000	40%	1100	1	490 U	610 UJ	480 U	410 U	450 U
Benzo(a)pyrene	ug/Kg	3700	40%	61	5	490 U	78 J	480 U	410 U	450 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1800	33%	3200	0	490 U	69 J	480 U	410 U	450 U
Dibenz(a,h)anthracene	ug/Kg	840	20%	14	3	490 U	610 U	480 U	410 U	450 U
Benzo(g,h,i)perylene	ug/Kg	1800	27%	50000*	0	490 U	56 J	480 U	410 U	450 U

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-1 02/18/94 SS50-1 211971 42493	SOIL SEAD-50 0-0.2 02/18/94 SS50-2 211972 42493	SOIL SEAD-50 0-1 02/18/94 SS50-3 211973 42493	SOIL SEAD-50 0-1 02/17/94 SS50-4 211728 42460	SOIL SEAD-50 0-0.2 02/18/94 SS50-5 211974 42493
PESTICIDES/PCB										
Heptachlor	ug/Kg	1.3	7%	100	0	2.5 U	3.1 U	2.5 U	2.1 U	2.3 U
Aldrin	ug/Kg	1.3	7%	41	0	2.5 U	3.1 U	2.5 U	2.1 U	1.3 J
Heptachlor epoxide	ug/Kg	2.4	13%	20	0	2.5 U	3.1 U	2.5 U	2.1 U	2.4
Endosulfan I	ug/Kg	13	7%	900	0	2.5 U	3.1 U	2.5 U	2.1 U	2.3 U
Dieldrin	ug/Kg	59	13%	440	0	4.8 U	6.1 U	4.8 U	4.1 U	4.4 U
4,4'-DDE	ug/Kg	4.8	27%	2100	0	4.8 U	6.1 U	4.8 U	4.1 U	3.1 J
Endrin	ug/Kg	2.8	7%	100	0	4.8 U	6.1 U	4.8 U	4.1 U	4.4 U
4,4'-DDD	ug/Kg	2.2	7%	2900	0	4.8 U	6.1 U	4.8 U	4.1 U	4.4 U
4,4'-DDT	ug/Kg	4.1	27%	2100	0	4.8 U	6.1 U	4.8 U	4.1 U	2.2 J
alpha-Chlordane	ug/Kg	3.8	7%	540	0	2.5 U	3.1 U	2.5 U	2.1 U	2.3 U
Aroclor-1242	ug/Kg	75	20%	1000/10000(a)	0	48 U	61 U	48 U	41 U	75
Aroclor-1254	ug/Kg	75	13%	1000/10000(a)	0	48 U	61 U	48 U	41 U	44 U
Aroclor-1260	ug/Kg	25	7%	1000/10000(a)	0	48 U	61 U	48 U	41 U	25 J
METALS										
Aluminum	mg/Kg	15300	100%	14593	3	14500	13500	12500	15100 J	9050
Antimony	mg/Kg	7.1	93%	3.59	1	1.4 J	1.6 J	2.9 J	7.1 J	2.7 J
Arsenic	mg/Kg	151	100%	7.5	4	4.9	57.4	5	5.1 J	3.7
Barium	mg/Kg	115	100%	300	0	95.6	115	87.5	96.8 J	66.2
Beryllium	mg/Kg	0.71	100%	.73	0	0.61 J	0.59 J	0.59 J	0.68 J	0.38 J
Cadmium	mg/Kg	0.8	87%	1	0	0.17 J	0.22 J	0.12 J	0.46 U	0.25 J
Calcium	mg/Kg	120000	100%	101904	1	12500 J	4740 J	6220 J	3650 J	46800 J
Chromium	mg/Kg	60.7	100%	22	10	28.3	21.7	20.4	34.6	60.7
Cobalt	mg/Kg	12.6	100%	30	0	11 J	9 J	8.8 J	9.9 J	7.4 J
Copper	mg/Kg	35.2	100%	25	2	24.8	24.4	18.7	16.9	22.2
Iron	mg/Kg	30000	100%	26627	5	25600	22800	22800	24400 J	18000
Lead	mg/Kg	398	100%	21.9	14	94.8	40.1	27	74	398
Magnesium	mg/Kg	48300	100%	12222	3	5300	3900	3930	3840 J	21100
Manganese	mg/Kg	722	87%	669	1	569	630	490	539 R	350
Mercury	mg/Kg	0.37	100%	0.1	2	0.06 J	0.05 J	0.04 J	0.04 J	0.37
Nickel	mg/Kg	42.6	100%	34	4	35 J	25.2 J	22.8 J	24.3	22.9 J
Potassium	mg/Kg	2170	100%	1762	5	1780 J	2160 J	1040 J	1190	1430 J
Selenium	mg/Kg	1.1	93%	2	0	0.95 J	1.1 J	0.52 J	0.23 UJ	0.25 J
Silver	mg/Kg	0.34	13%	0.4	0	0.16 U	0.25 U	0.16 U	0.91 U	0.11 U
Sodium	mg/Kg	136	80%	104	1	64.7 J	55.6 U	42.5 J	43 U	86.1 J
Vanadium	mg/Kg	26.2	100%	150	0	23.8	24.9	22.6	26.1	15.6
Zinc	mg/Kg	152	100%	83	13	109	100	71.9	88.9 J	152
OTHER ANALYSES										
Total Solids	%W/W					67.8	53.8	68.9	80.6	73.9

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-0.2 02/18/94 SS50-6 211975 42493	SOIL SEAD-50 0-1 02/18/94 SS50-7 211976 42493	SOIL SEAD-50 0-1 02/18/94 SS50-8 211977 42493	SOIL SEAD-50 0-0.2 02/18/94 SS50-9 211978 42493	SOIL SEAD-50 0-1 02/19/94 SS50-10 211979 42493
VOLATILE ORGANICS										
Acetone	ug/Kg	83	7%	200	0	41 U	12 U	12 U	22 U	14 U
SEMIVOLATILE ORGANICS										
Phenol	ug/Kg	31	7%	330	0	610 UJ	390 U	370 U	430 U	430 U
4-Methylphenol	ug/Kg	310	20%	900	0	310 J	390 U	370 U	430 U	430 U
Acenaphthene	ug/Kg	930	13%	50000*	0	610 UJ	390 U	370 U	430 U	430 U
Dibenzofuran	ug/Kg	260	7%	6200	0	610 UJ	390 U	370 U	430 U	430 U
Fluorene	ug/Kg	590	13%	50000*	0	610 UJ	390 U	370 U	430 U	430 U
Phenanthrene	ug/Kg	7800	67%	50000*	0	140 J	390 U	370 U	40 J	430 U
Anthracene	ug/Kg	1500	20%	50000*	0	610 UJ	390 U	370 U	430 U	430 U
Carbazole	ug/Kg	1100	20%	50000*	0	610 UJ	390 U	370 U	430 U	430 U
Di-n-butylphthalate	ug/Kg	56	80%	8100	0	610 UJ	34 J	22 J	46 J	28 J
Fluoranthene	ug/Kg	14000	80%	50000*	0	210 J	390 U	370 U	58 J	23 J
Pyrene	ug/Kg	12000	73%	50000*	0	140 J	390 U	370 U	47 J	430 U
Benzo(a)anthracene	ug/Kg	5200	40%	220	3	81 J	390 U	370 U	430 U	430 U
Chrysene	ug/Kg	5500	40%	400	3	97 J	390 U	370 U	430 U	430 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	93%	50000*	0	980 J	500	1300	330 J	150 J
Benzo(b)fluoranthene	ug/Kg	4400	40%	1100	1	99 J	390 U	370 U	430 U	430 U
Benzo(k)fluoranthene	ug/Kg	4000	40%	1100	1	80 J	390 U	370 U	30 J	430 U
Benzo(a)pyrene	ug/Kg	3700	40%	61	5	84 J	390 U	370 U	430 U	430 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1800	33%	3200	0	64 J	390 U	370 U	430 U	430 U
Dibenz(a,h)anthracene	ug/Kg	840	20%	14	3	610 UJ	390 U	370 U	430 U	430 U
Benzo(g,h,i)perylene	ug/Kg	1800	27%	50000*	0	610 UJ	390 U	370 U	430 U	430 U

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-0.2 02/18/94 SS50-6 211975 42493	SOIL SEAD-50 0-1 02/18/94 SS50-7 211976 42493	SOIL SEAD-50 0-1 02/18/94 SS50-8 211977 42493	SOIL SEAD-50 0-0.2 02/18/94 SS50-9 211978 42493	SOIL SEAD-50 0-1 02/19/94 SS50-10 211979 42493
PESTICIDES/PCB										
Heptachlor	ug/Kg	1.3	7%	100	0	3.2 U	2 U	1.9 U	1.3 J	2.2 U
Aldrin	ug/Kg	1.3	7%	41	0	3.2 U	2 U	1.9 U	2.2 U	2.2 U
Heptachlor epoxide	ug/Kg	2.4	13%	20	0	2.1 J	2 U	1.9 U	2.2 U	2.2 U
Endosulfan I	ug/Kg	13	7%	900	0	3.2 U	2 U	1.9 U	2.2 U	2.2 U
Dieldrin	ug/Kg	59	13%	440	0	6.2 U	3.9 U	3.7 U	4.3 U	4.3 U
4,4'-DDE	ug/Kg	4.8	27%	2100	0	6.2 U	3.9 U	3.7 U	2.9 J	4.3 U
Endrin	ug/Kg	2.8	7%	100	0	6.2 U	3.9 U	3.7 U	4.3 U	4.3 U
4,4'-DDD	ug/Kg	2.2	7%	2900	0	6.2 U	3.9 U	3.7 U	4.3 U	4.3 U
4,4'-DDT	ug/Kg	4.1	27%	2100	0	6.2 U	3.9 U	3.7 U	1.9 J	4.3 U
alpha-Chlordane	ug/Kg	3.8	7%	540	0	3.2 U	2 U	1.9 U	2.2 U	2.2 U
Aroclor-1242	ug/Kg	75	20%	1000/10000(a)	0	62 U	39 U	49	43 U	43 U
Aroclor-1254	ug/Kg	75	13%	1000/10000(a)	0	62 U	39 U	37 U	43 U	75
Aroclor-1260	ug/Kg	25	7%	1000/10000(a)	0	62 U	39 U	37 U	43 U	43 U
METALS										
Aluminum	mg/Kg	15300	100%	14593	3	12500	13800	9150	12300	11300
Antimony	mg/Kg	7.1	93%	3.59	1	1.5 J	1.7 J	0.71 J	2.3 J	0.95 J
Arsenic	mg/Kg	151	100%	7.5	4	151	7.6	4.7	7.5	4.9
Barium	mg/Kg	115	100%	300	0	103	55.5	58.1	39 J	63.2
Beryllium	mg/Kg	0.71	100%	.73	0	0.56 J	0.57 J	0.36 J	0.45 J	0.45 J
Cadmium	mg/Kg	0.8	87%	1	0	0.19 J	0.09 J	0.28 J	0.09 J	0.17 J
Calcium	mg/Kg	120000	100%	101904	1	4650 J	27300 J	120000 J	3480 J	24000 J
Chromium	mg/Kg	60.7	100%	22	10	19.9	28.1	32.6	40.9	23.5
Cobalt	mg/Kg	12.6	100%	30	0	7.3 J	12.6	6.4 J	11.2	8 J
Copper	mg/Kg	35.2	100%	25	2	18.5	35.2	13.9	18.4	18.9
Iron	mg/Kg	30000	100%	26627	5	21700	29400	18200	28600	26100
Lead	mg/Kg	398	100%	21.9	14	25.2	52.7	242	181	48.4
Magnesium	mg/Kg	48300	100%	12222	3	3550	6600	15700	5690	11200
Manganese	mg/Kg	722	87%	669	1	487	374	604	413	430
Mercury	mg/Kg	0.37	100%	0.1	2	0.22	0.02 J	0.04 J	0.03 J	0.03 J
Nickel	mg/Kg	42.6	100%	34	4	20.8 J	42.6 J	15.4 J	30.2 J	22 J
Potassium	mg/Kg	2170	100%	1762	5	1550 J	1680 J	1540 J	1030 J	1490 J
Selenium	mg/Kg	1.1	93%	2	0	0.71 J	0.59 J	0.67 J	0.53 J	0.21 J
Silver	mg/Kg	0.34	13%	0.4	0	0.21 U	0.15 U	0.34 J	0.14 U	0.12 U
Sodium	mg/Kg	136	80%	104	1	66 J	81.6 J	89.3 J	53 J	60.7 J
Vanadium	mg/Kg	26.2	100%	150	0	23.2	21	17	16.4	19.2
Zinc	mg/Kg	152	100%	83	13	101	81.2	104	114	87.4
OTHER ANALYSES										
Total Solids	%W/W					53.3	84.9	88	76.8	77

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

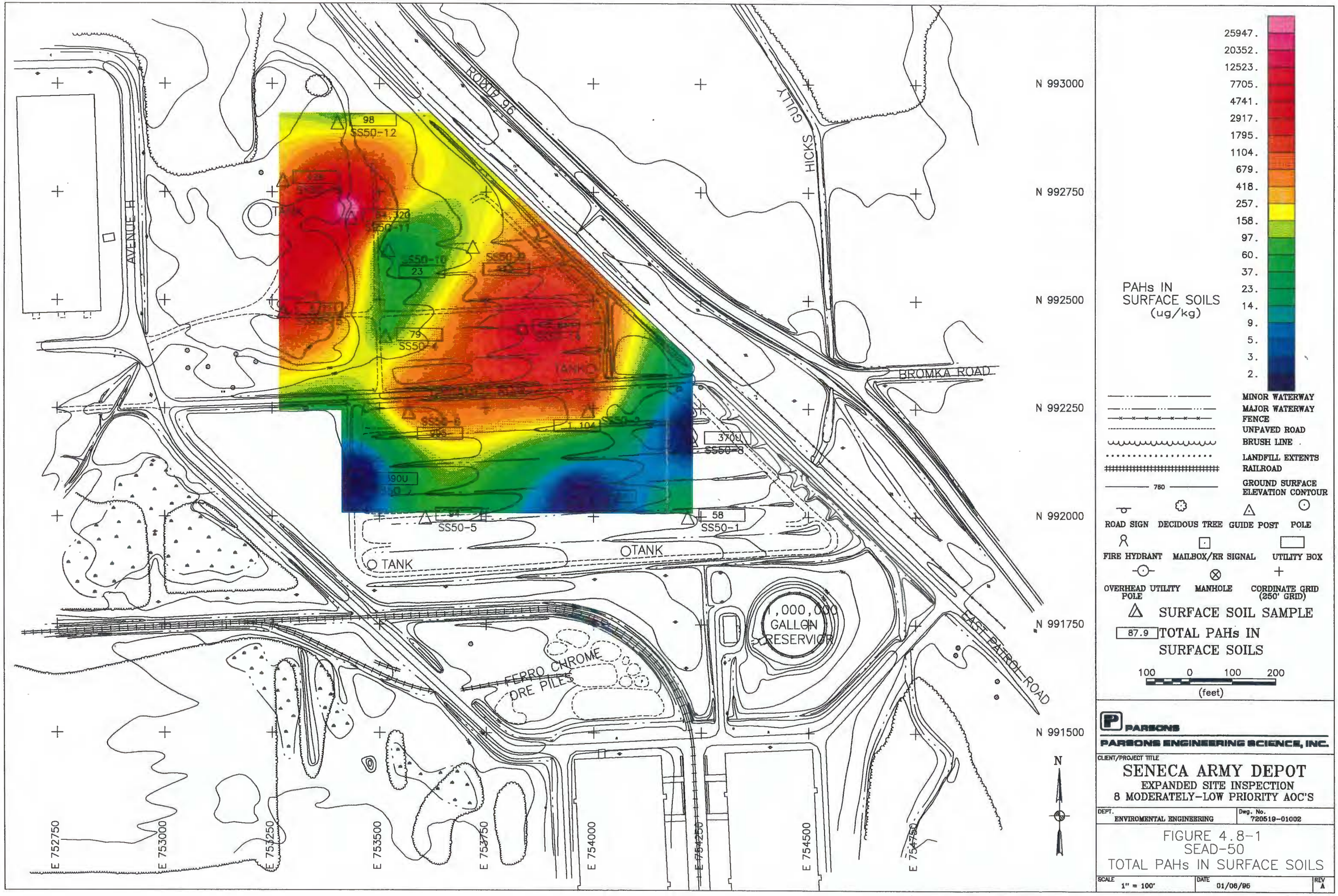
COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-0.2 02/19/94 SS50-11 211965 42460	SOIL SEAD-50 0-1 02/19/94 SS50-12 211980 42493	SOIL SEAD-50 0-0.2 02/19/94 SS50-13 211981 42493	SOIL SEAD-50 0-1 02/19/94 SS50-14 211982 42493	SOIL SEAD-50 0-0.2 02/19/94 SS50-15 211983 42493
VOLATILE ORGANICS										
Acetone	ug/Kg	83	7%	200	0	14 U	13 U	15 U	12 U	15 U
SEMIVOLATILE ORGANICS										
Phenol	ug/Kg	31	7%	330	0	2300 U	420 U	480 U	420 U	520 U
4-Methylphenol	ug/Kg	310	20%	900	0	2300 U	420 U	480 U	420 U	520 U
Acenaphthene	ug/Kg	930	13%	50000*	0	930 J	420 U	480 U	420 U	51 J
Dibenzofuran	ug/Kg	260	7%	6200	0	260 J	420 U	480 U	420 U	520 U
Fluorene	ug/Kg	590	13%	50000*	0	590 J	420 U	480 U	420 U	36 J
Phenanthrene	ug/Kg	7800	67%	50000*	0	7800	26 J	53 J	370 J	530
Anthracene	ug/Kg	1500	20%	50000*	0	1500 J	420 U	480 U	81 J	100 J
Carbazole	ug/Kg	1100	20%	50000*	0	1100 J	420 U	480 U	71 J	67 J
Di-n-butylphthalate	ug/Kg	56	80%	8100	0	2300 U	51 J	51 J	36 J	30 J
Fluoranthene	ug/Kg	14000	80%	50000*	0	14000	41 J	86 J	1300	1300
Pyrene	ug/Kg	12000	73%	50000*	0	12000	31 J	73 J	1200	1000
Benzo(a)anthracene	ug/Kg	5200	40%	220	3	5200	420 U	35 J	830	650
Chrysene	ug/Kg	5500	40%	400	3	5500	420 U	53 J	840	670
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	93%	50000*	0	640 J	1800	960	610	1300
Benzo(b)fluoranthene	ug/Kg	4400	40%	1100	1	4400	420 U	45 J	860	690
Benzo(k)fluoranthene	ug/Kg	4000	40%	1100	1	4000	420 U	43 J	600	410 J
Benzo(a)pyrene	ug/Kg	3700	40%	61	5	3700	420 U	40 J	660	520
Indeno(1,2,3-cd)pyrene	ug/Kg	1800	33%	3200	0	1800 J	420 U	480 U	400 J	360 J
Dibenz(a,h)anthracene	ug/Kg	840	20%	14	3	840 J	420 U	480 U	200 J	190 J
Benzo(g,h,i)perylene	ug/Kg	1800	27%	50000*	0	1800 J	420 U	480 U	270 J	240 J

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-50 0-0.2 02/19/94 SS50-11 211965 42460	SOIL SEAD-50 0-1 02/19/94 SS50-12 211980 42493	SOIL SEAD-50 0-0.2 02/19/94 SS50-13 211981 42493	SOIL SEAD-50 0-1 02/19/94 SS50-14 211982 42493	SOIL SEAD-50 0-0.2 02/19/94 SS50-15 211983 42493
PESTICIDES/PCB										
Heptachlor	ug/Kg	1.3	7%	100	0	2.3 U	4.3 U	2.5 U	2.2 U	2.7 U
Aldrin	ug/Kg	1.3	7%	41	0	2.3 U	4.3 U	2.5 U	2.2 U	2.7 U
Heptachlor epoxide	ug/Kg	2.4	13%	20	0	2.3 U	4.3 U	2.5 U	2.2 U	2.7 U
Endosulfan I	ug/Kg	13	7%	900	0	2.3 U	4.3 U	2.5 U	13	2.7 U
Dieldrin	ug/Kg	59	13%	440	0	4.5 U	59 J	4.8 U	28 J	5.2 U
4,4'-DDE	ug/Kg	4.8	27%	2100	0	4.5 U	8.4 U	4.8 U	4.8 J	4 J
Endrin	ug/Kg	2.8	7%	100	0	2.8 J	8.4 U	4.8 U	4.2 U	5.2 U
4,4'-DDD	ug/Kg	2.2	7%	2900	0	4.5 U	8.4 U	4.8 U	2.2 J	5.2 U
4,4'-DDT	ug/Kg	4.1	27%	2100	0	4.5 U	8.4 U	4.8 U	4.1 J	4.1 J
alpha-Chlordane	ug/Kg	3.8	7%	540	0	3.8 J	4.3 U	2.5 U	2.2 U	2.7 U
Aroclor-1242	ug/Kg	75	20%	1000/10000(a)	0	45 U	84 U	48 U	37 J	52 U
Aroclor-1254	ug/Kg	75	13%	1000/10000(a)	0	45 U	84 U	48 U	24 J	52 U
Aroclor-1260	ug/Kg	25	7%	1000/10000(a)	0	45 U	84 U	48 U	42 U	52 U
METALS										
Aluminum	mg/Kg	15300	100%	14593	3	15300 J	15200	13800	10600	13300
Antimony	mg/Kg	7.1	93%	3.59	1	5.2 UJ	0.55 J	0.63 J	0.6 J	0.85 J
Arsenic	mg/Kg	151	100%	7.5	4	6 J	37.6	6.4	6.2	6.3
Barium	mg/Kg	115	100%	300	0	101 J	91.2	78	73.1	92.1
Beryllium	mg/Kg	0.71	100%	.73	0	0.71 J	0.65 J	0.55 J	0.4 J	0.59 J
Cadmium	mg/Kg	0.8	87%	1	0	0.51 U	0.15 J	0.09 J	0.8 J	0.22 J
Calcium	mg/Kg	120000	100%	101904	1	15200 J	3870 J	10600 J	80100 J	18000 J
Chromium	mg/Kg	60.7	100%	22	10	29.9	22.7	21.1	21.8	25.7
Cobalt	mg/Kg	12.6	100%	30	0	10.3 J	11.6	10.4 J	9.2 J	12.6
Copper	mg/Kg	35.2	100%	25	2	23.6	19.6	22.2	20.9	28.1
Iron	mg/Kg	30000	100%	26627	5	27000 J	29400	26200	19700	30000
Lead	mg/Kg	398	100%	21.9	14	25.7	18.5	22.6	61.4	45.3
Magnesium	mg/Kg	48300	100%	12222	3	7510 J	4570	6330	48300	6780
Manganese	mg/Kg	722	87%	669	1	496 R	722	461	548	589
Mercury	mg/Kg	0.37	100%	0.1	2	0.05 J	0.05 J	0.05 J	0.03 J	0.03 J
Nickel	mg/Kg	42.6	100%	34	4	37.2	30.1 J	28.9 J	24.4 J	37 J
Potassium	mg/Kg	2170	100%	1762	5	2170	1600 J	1760 J	2140 J	1890 J
Selenium	mg/Kg	1.1	93%	2	0	0.41 J	0.41 J	0.33 J	0.55 J	0.44 J
Silver	mg/Kg	0.34	13%	0.4	0	1 U	0.16 J	0.18 U	0.16 U	0.14 U
Sodium	mg/Kg	136	80%	104	1	63.7 J	26.7 U	64.9 J	136 J	64.6 J
Vanadium	mg/Kg	26.2	100%	150	0	26.2	24.6	23.4	19.8	21.3
Zinc	mg/Kg	152	100%	83	13	110 J	93.7	87.9	102	141
OTHER ANALYSES										
Total Solids	%W/W					72.9	78.2	69.3	78.8	63.9

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA army DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 4.8-1
SEAD-50
TOTAL PAHs IN SURFACE SOILS

SCALE	DATE	REV
1" = 100'	01/06/96	A

4.8.2.4 Metals

A total of 22 metals were detected in the soil samples collected at SEAD-50. Fifteen metals were detected in one or more samples at concentrations which exceeded their respective TAGM values. The reported concentrations of chromium, lead, and zinc exceeded their respective TAGM values in at least 66% of the surface soil samples. The maximum concentration of lead (398 mg/kg) was an order of magnitude greater than its associated TAGM of 21.9 mg/kg. The maximum detected concentrations of chromium and zinc were 60.7 and 152 mg/kg, respectively. Figure 4.8-2 shows the distribution of these metals in the surface soils at SEAD-50. Arsenic was the only additional metal which was found at concentrations which were significantly higher than its associated TAGM value of 7.5 mg/kg. Arsenic was found at concentrations of 151 mg/kg in sample SS50-6, 57.4 mg/kg in sample SS50-2, and 37.6 mg/kg in sample SS50-12.

4.8.2.5 Asbestos

Asbestos was found in one soil sample (SS50-1) at SEAD-50. Chrysotile asbestos comprised between 10 and 15 percent of the SS50-1 surface soil sample. Asbestos was not detected in any of the remaining surface soil samples collected at SEAD-50. The results of the asbestos analysis results are shown in Table 4.8-2.

4.8.3 Groundwater

The analytical results for the three groundwater samples collected at SEAD-50 are presented in Table 4.8-3. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-50. The locations of the monitoring wells are shown in Figure 2.10-2.

4.8.3.1 Volatile Organic Compounds

No volatile organic compounds were found in the groundwater samples collected at SEAD-50.

4.8.3.2 Semivolatile Organic Compounds

Di-n-octylphthalate was found in the groundwater sample collected at monitoring well MW50-3. The reported concentration was 5J μg/L which is below the NY AWQS Class GA groundwater criteria of 50 μg/L.

TABLE 4.8-2
SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
BULK SAMPLE ASBESTOS ANALYSIS RESULTS

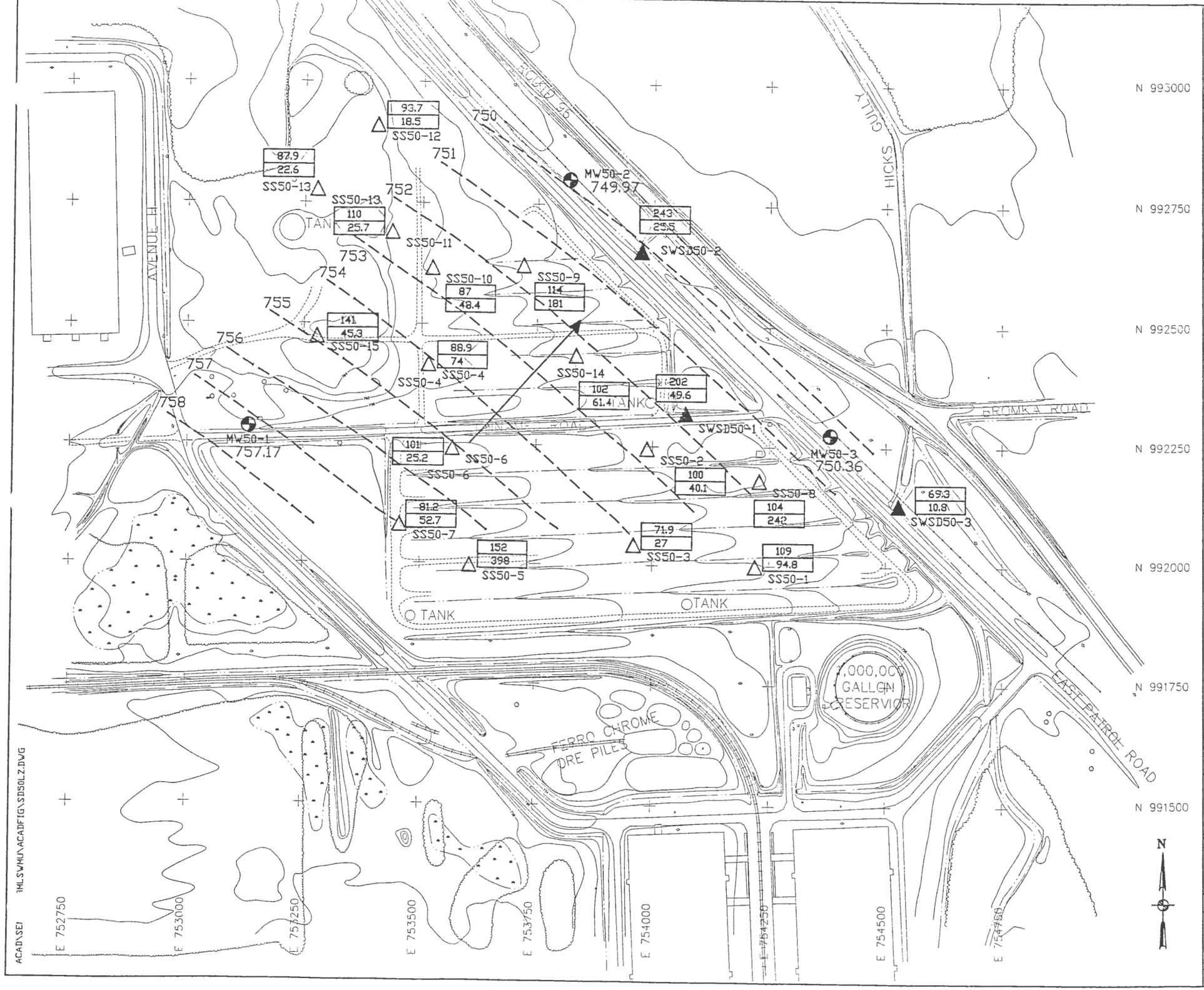
ES Sample ID	Asbestos (% Type)	Other Material
SS50-1	10-15 % Chrysotile	Binder, Quartz, 3-5 % Organic Fiber
SS50-2	Not Detected	Binder, Quartz, 15-25 % Organic Fiber
SS50-3	Not Detected	Binder, Quartz, 10-15 % Organic Fiber
SS50-4	Not Detected	Binder, Quartz, 1-3 % Organic Fiber
SS50-5	Not Detected	Binder,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

TABLE 4.8-3

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA	FEDERAL DRINKING WATER MCL (f)	NUMBER ABOVE CRITERIA	WATER SEAD-50 07/12/94 MW50-1 226794 45332	WATER SEAD-50 07/18/94 MW50-2 227267 45332	WATER SEAD-50 07/18/94 MW50-3 227268 45332
SEMIVOLATILE ORGANICS									
Di-n-octylphthalate	ug/L	5	33%	50	NA	0	10 U	10 U	5 J
METALS									
Aluminum	ug/L	1790	100%	NA	NA	NA	1790 J	137 J	19.6 J
Arsenic	ug/L	2.2	33%	25	50	0	2.2 J	2 U	2 U
Barium	ug/L	96.5	100%	1000	2000	0	50.8 J	68.9 J	96.5 J
Calcium	ug/L	153000	100%	NA	NA	NA	153000	113000	113000
Chromium	ug/L	3	33%	50	100	0	3 J	0.4 U	0.4 U
Cobalt	ug/L	4.9	100%	NA	NA	NA	4.9 J	1.6 J	0.62 J
Copper	ug/L	1.4	33%	200	1300 (g)	0	1.4 J	0.5 U	0.5 U
Iron	ug/L	5070	100%	300	NA	2	5070	1400	206
Magnesium	ug/L	40200	100%	NA	NA	NA	40200	20800	16900
Manganese	ug/L	1040	100%	300	NA	3	1040	791	317
Mercury	ug/L	0.05	33%	2	2	0	0.05 J	0.04 U	0.04 U
Nickel	ug/L	8	67%	NA	100	0	8 J	2 J	0.69 U
Potassium	ug/L	10400	100%	NA	NA	NA	4460 J	5770 J	10400 J
Silver	ug/L	0.76	67%	50	NA	0	0.5 U	0.75 J	0.76 J
Sodium	ug/L	91200	100%	20000	NA	2	22700	91200	10000
Thallium	ug/L	3	67%	NA	2	1	1.9 J	3 J	1.9 U
Vanadium	ug/L	3	67%	NA	NA	NA	3 J	0.5 U	0.54 J
Zinc	ug/L	20.2	67%	300	NA	0	20.2	2.4 J	2.2 U
OTHER ANALYSES									
pH	Standard Units						6.9	7	7.2
Conductivity	umhos/cm						820	900	580
Temperature	°C						17	17.9	18.7
Turbidity	NTU						160	27.7	1.5

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) Federal Primary Drinking Water Maximum Contaminant Levels
g) The value listed is an action level for copper at the tap, and not an MCL.



ACAD\SEI 3HLSWMU\ACADFIG\SDSOLZ.DWG

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- △ SURFACE SOIL SAMPLE
- 97.9 ZINC IN SURFACE SOIL (mg/kg)
- 22.6 LEAD IN SURFACE SOIL(mg/kg)
- MW50-3 / 750.36 MONITORING WELL WITH WATER TABLE ELEVATION
- 753 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

100 0 100 200
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.8-2
SEAD-50 TANK FARM AREA
ZINC & LEAD IN SURFACE SOILS

SCALE	DATE	REV
1" = 200'	4/14/95	A

4.8.3.3 Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-50.

4.8.3.4 Metals

A total of 18 metals were detected in the groundwater samples collected at SEAD-50. Four metals, iron, manganese, sodium, and thallium were detected at concentrations which were above the associated federal or state criteria. The reported concentrations of iron and sodium in the groundwater samples collected at MW50-1 (5,070 and 22,700 μg/L, respectively) and MW50-2 (1,400 and 91,200 μg/L, respectively) were above their respective TAGMs of 300 μg/L and 20,000 μg/L. The reported concentrations of manganese were above the TAGM value of 300 μg/L in all three groundwater samples collected at SEAD-50 (1,040 μg/L in sample MW50-1, 791 μg/L in sample MW50-2 and 317 μg/L in sample MW50-3). Thallium was detected in groundwater samples from two monitoring wells (1.9J μg/L in sample MW50-1 and 3J μg/L in sample MW50-2) at concentrations above the federal MCL of 2 μg/L.

4.8.4 Surface water

The analytical results for the three surface water samples collected at SEAD-50 are presented in Table 4.8-4. The following sections describe the nature and extent of contamination identified in the surface water at SEAD-50. The locations of the surface water sampling locations are shown in Figure 2.10-2.

4.8.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the surface water samples collected at SEAD-50.

4.8.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the surface water samples collected at SEAD-50.

TABLE 4.8-4

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-50 04/19/94 SW50-1 218499 43626	WATER SEAD-50 04/19/94 SW50-2 218500 43626	WATER SEAD-50 04/19/94 SW50-3 218501 43626
METALS								
Aluminum	ug/L	376	100%	100	1	376	63.1 J	68.2 J
Arsenic	ug/L	22.1	67%	190	0	22.1	4.5 J	1.5 U
Barium	ug/L	34.3	100%	NA	NA	33.4 J	34.3 J	21.9 J
Calcium	ug/L	85200	100%	NA	NA	82700	85200	43400
Chromium	ug/L	1.3	67%	390	0	0.88 J	0.4 U	1.3 J
Copper	ug/L	2.1	100%	22.9	0	2.1 J	1.1 J	1.8 J
Iron	ug/L	575	100%	300	1	575	91.8 J	121
Lead	ug/L	0.89	33%	8.6	0	0.89 J	0.8 U	0.8 U
Magnesium	ug/L	13200	100%	NA	NA	12300	13200	8660
Manganese	ug/L	67.9	100%	NA	NA	67.9	6.6 J	7.1 J
Nickel	ug/L	1.7	67%	172	0	1.7 J	0.6 U	0.83 J
Potassium	ug/L	3140	100%	NA	NA	3140 J	1210 J	822 J
Sodium	ug/L	11200	100%	NA	NA	1890 J	11000	11200
Vanadium	ug/L	1.1	33%	14	0	1.1 J	0.7 U	0.7 U
Zinc	ug/L	10.5	100%	159.6	0	10.5 J	8.1 J	1.5 J
OTHER ANALYSES								
pH	Standard Units						7.7	8.4
Conductivity	umhos/cm						450	260
Temperature	°C						15.7	16
Turbidity	NTU						5.1	1.6

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1993).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.

4.8.4.3 Pesticides and PCBs

No Pesticides or PCBs were found in the surface water samples collected at SEAD-50.

4.8.4.4 Metals

A total of 15 metals were detected in the surface water samples collected at SEAD-50. Iron was detected at an elevated concentration of 575 μg/L only in surface water sample SW50-1. The NYS criteria for iron in class C surface water is 300 μg/kg. Aluminum was detected in surface water sample SW50-1 (376 μg/L) at a concentration above the NYSDEC criteria of 100 μg/L. The reported concentrations of arsenic, chromium, copper, lead, nickel, vanadium, and zinc were below their respective criteria values. No criteria exist for the 6 remaining metals detected in the surface water samples collected at SEAD-50.

4.8.5 Sediment

The analytical results for the three sediment samples collected at SEAD-50 are presented in Table 4.8-5. The following sections describe the nature and extent of contamination identified in the sediment samples collected at SEAD-50. The locations of the sediment sampling locations are shown in Figure 2.10-2.

4.8.5.1 Volatile Organic Compounds

2-Butanone was detected at a concentration of 11 μg/kg in sediment sample SD50-1. No criteria exists for the occurrence of 2-butanone in sediment. No other volatile organic compounds were found in the sediment samples collected at SEAD-50.

4.8.5.2 Semivolatile Organic Compounds

A total of 17 SVOs were detected in the sediment samples collected at SEAD-50. Of the 17 SVOs detected, six PAH compounds, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were detected in all three sediment samples at concentrations which exceeded their respective NYSDEC sediment criteria for human health. The PAH compound phenanthrene was found only in sediment sample SD50-1 at a concentration which was above the respective NYSDEC sediment criteria for human health . The highest concentrations of all but one SVO (4-methylphenol) occurred in sediment sample SD50-1. The total PAH concentrations found in the 3 sediment samples, as well as the total PAH concentrations in the surface soils at SEAD-50, are shown in Figure 4.8-1.

TABLE 4.8-5

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT ACUTE CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-50 0-0.2 04/19/94 SD50-1 218502 43663	SOIL SEAD-50 0-0.2 04/19/94 SD50-2 218503 43663	SOIL SEAD-50 0-0.2 04/19/94 SD50-3 218504 43663
VOLATILE ORGANICS													
2-Butanone	ug/Kg	11	33%	NA	NA	NA	NA			NA	11 J	21 UJ	13 U
SEMIVOLATILE ORGANICS													
4-Methylphenol	ug/Kg	110	67%	NA	NA	NA	NA			NA	44 J	110 J	420 U
Acenaphthene	ug/Kg	160	33%	NA	1400	NA	NA			0	160 J	690 UJ	420 U
Dibenzofuran	ug/Kg	97	33%	NA	NA	NA	NA			NA	97 J	690 UJ	420 U
Fluorene	ug/Kg	310	33%	NA	NA	NA	NA			NA	310 J	690 UJ	420 U
Phenanthrene	ug/Kg	2700	100%	NA	1200	NA	NA			1	2700	140 J	35 J
Anthracene	ug/Kg	480	33%	NA	NA	NA	NA			NA	480 J	690 UJ	420 U
Carbazole	ug/Kg	250	33%	NA	NA	NA	NA			NA	250 J	690 UJ	420 U
Fluoranthene	ug/Kg	3500	100%	NA	10200	NA	NA			0	3500	310 J	94 J
Pyrene	ug/Kg	4000	100%	NA	NA	NA	NA			NA	4000	300 J	83 J
Benzo(a)anthracene	ug/Kg	1400	100%	NA	NA	13	NA			3	1400	120 J	44 J
Chrysene	ug/Kg	1500	100%	NA	NA	13	NA			3	1500	170 J	60 J
Benzo(b)fluoranthene	ug/Kg	1300	100%	NA	NA	13	NA			3	1300	160 J	51 J
Benzo(k)fluoranthene	ug/Kg	1200	100%	NA	NA	13	NA			3	1200	160 J	69 J
Benzo(a)pyrene	ug/Kg	1200	100%	NA	NA	13	NA			3	1200	160 J	58 J
Indeno(1,2,3-cd)pyrene	ug/Kg	770	100%	NA	NA	13	NA			3	770	120 J	38 J
Dibenz(a,h)anthracene	ug/Kg	260	33%	NA	NA	NA	NA			NA	260 J	690 UJ	420 U
Benzo(g,h,i)perylene	ug/Kg	790	100%	NA	NA	NA	NA			NA	790	120 J	42 J
PESTICIDES/PCB													
Aldrin	ug/Kg	2.2	33%	NA	NA	1	7.7			1	2.2 J	3.5 UJ	2.2 U
Endosulfan I	ug/Kg	15	67%	7.8	0.30	NA	NA			2	15 J	3 J	2.2 U
4,4'-DDE	ug/Kg	4.3	33%	11000	10	.10	10			1	4.3 J	6.9 UJ	4.2 U
alpha-Chlordane	ug/Kg	8	33%	NA	NA	NA	NA			NA	8 J	3.5 UJ	2.2 U
Aroclor-1242	ug/Kg	120	33%	NA	NA	NA	NA			NA	120	69 UJ	42 U
Aroclor-1260	ug/Kg	56	33%	27608	193	.08	14			1	56 J	69 UJ	42 U

TABLE 4.8-5

SENECA ARMY DEPOT
SEAD-50 EXPANDED SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT ACUTE CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-50 0-0.2 04/19/94 SD50-1 218502 43663	SOIL SEAD-50 0-0.2 04/19/94 SD50-2 218503 43663	SOIL SEAD-50 0-0.2 04/19/94 SD50-3 218504 43663
METALS													
Aluminum	mg/Kg	16300	100%					NA	NA	NA	16300	11000 J	10300
Antimony	mg/Kg	3.3	100%					2	25	1	3.3 J	0.55 J	0.24 J
Arsenic	mg/Kg	62.7	100%					6	33	2	62.7	27.5 J	4.1
Barium	mg/Kg	117	100%					NA	NA	NA	108	117 J	62.9
Beryllium	mg/Kg	0.75	100%					NA	NA	NA	0.75 J	0.53 J	0.48 J
Cadmium	mg/Kg	0.8	100%					.6	9	1	0.57 J	0.8 J	0.23 J
Calcium	mg/Kg	31400	100%					NA	NA	NA	7570	14800 J	31400
Chromium	mg/Kg	25.1	100%					26	110	0	25.1	23.3 J	15.9
Cobalt	mg/Kg	9.3	100%					NA	NA	NA	9.3 J	8.7 J	8.1
Copper	mg/Kg	25.5	100%					16	110	3	25.5	18.9 J	19.9
Iron	mg/Kg	26800	100%					2% (h)	4% (h)	2	26800	20500 J	19700
Lead	mg/Kg	49.6	100%					31	110	1	49.6	25.5 J	10.8
Magnesium	mg/Kg	6400	100%					NA	NA	NA	4980	3780 J	6400
Manganese	mg/Kg	1380	100%					460	1100	1	284 J	1380 J	390 J
Mercury	mg/Kg	0.02	100%					.15	1.3	0	0.05 J R	0.08 J R	0.02 J
Nickel	mg/Kg	29.4	100%					16	50	3	29.4	27.4 J	24.4
Potassium	mg/Kg	2530	100%					NA	NA	NA	2530	1680 J	1580
Sodium	mg/Kg	121	67%					NA	NA	NA	45.1 U	121 J	69.7 J
Vanadium	mg/Kg	28.8	100%					NA	NA	NA	28.8	20.3 J	17.3
Zinc	mg/Kg	243	100%					120	270	2	202	243 J	63.9
OTHER ANALYSES													
Total Solids	%W/W	78.7									54.5	48	78.7

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment isc onsidered contaminated if either criteria is exceeded.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected dut to problems with the analysis.
g) R = The data was rejected during the data validation process.
h) 2% = 20,000 mg/Kg; 4% = 40,000 mg//Kg

4.8.5.3 Pesticides and PCBs

A total of 4 pesticides and 2 PCBs were found in the sediment samples collected at SEAD-50. The pesticides aldrin (2.2J μg/kg), 4,4'-DDE (4.3J μg/kg), and alpha-chlordane (8J μg/kg) and the PCBs Aroclor-1242 (120 μg/kg) and Aroclor-1260 (56J μg/kg) were detected only in sediment sample SD50-1. Endosulfan I was found in sediment sample SD50-1 at a concentration of 15J μg/kg and sediment sample SD50-2 at a concentration of 3J μg/kg. All of the reported concentrations of the 4 pesticides, as well as the PCB Aroclor-1260, were above their respective NYSDEC sediment criteria. Currently, no criteria exist for Aroclor-1242.

4.8.5.4 Metals

A total of 20 metals were detected in the sediment samples collected at SEAD-50. Antimony, arsenic, cadmium, copper, iron, lead, manganese, nickel, and zinc were detected at concentrations which exceeded their respective criteria in one or more of the sediment samples collected at SEAD-50. The reported concentrations of chromium and mercury were below their respective criteria. Currently, no criteria exist for the 10 remaining metals detected in the sediment samples collected at SEAD-50.

4.8.6 Tentatively Identified Compounds

The total concentrations of tentatively identified compounds (TIC) were below 50 mg/kg in all of the samples collected at SEAD-50.

4.9 SEAD-58 BOOSTER STATION (BUILDING 2131)

4.9.1 Introduction

A total of six surface soil samples, twelve subsurface samples, six surface water and six sediment samples were collected at SEAD-58. Four 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-58.

4.9.2 Soils

The analytical results of the 18 soil samples collected as part of the SEAD-58 investigation are presented in Table 4.9-1. The following sections describe the nature and extent of contamination in SEAD-58 soils. The sample locations are shown in Figures 2.11-2.

4.9.2.1 Volatile Organic Compounds

Two volatile organic compounds were detected in 3 subsurface soil samples collected during the SEAD-58 investigation. Methylene chloride was detected in three subsurface soil samples, all of which were from 0.2-3 feet. The concentrations ranged from 2J μg/kg in sample TP58-1-1 to 64 μg/kg in sample SB58-3-1. Toluene was detected in one sample, SB58-3-2, at a concentration of 1J μg/kg. Both volatile organic compounds were found at concentration which were below their associated TAGM values.

4.9.2.2 Semivolatile Organic Compounds

Five semivolatile organic compounds were detected in the soil samples collected at SEAD-58. Three of the detected SVO compounds were polynuclear aromatic hydrocarbons (PAHs) and two were phthalates. All three PAHs were found only in surface soil samples SS58-3 and SB58-2-00. All of the reported concentrations of PAHs were below their respective TAGM values. The remaining SVOs detected were bis(2-Ethylhexyl)phthalate and di-n-octylphthalate. Bis(2-Ethyhexyl)phthalate was detected in 13 of the 18 samples taken with a highest concentration of 260J μg/kg in soil sample SB58-2-00. Di-n-octylphthalate was detected only in soil sample SB58-3-02 at 81J μg/kg. All occurrences of phthalates were below their respective TAGM values.

4.9.2.3 Pesticides and PCBs

Endosuflan I was the only pesticide detected in the soil samples collected at SEAD-58. Of the 18 soil samples collected, only soil sample SB58-3-00 had detectable quantities of Endosulfan I. The measured value of 1.3J μg/kg is well below the TAGM of 900 μg/kg.

TABLE 4.9-1

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

[1]

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-58 0-0.2 04/13/94 SS58-1 217689 43535	SOIL SEAD-58 0-0.2 04/13/94 SS58-2 217690 43535	SOIL SEAD-58 0-0.2 04/13/94 SS58-3 217691 43535	SOIL SEAD-58 0-0.2 06/09/94 SB58-1-00 223689 44694	SOIL SEAD-58 2-4 06/09/94 SB58-1-02 223690 44694	SOIL SEAD-58 4-5 06/09/94 SB58-1-03 223691 44694
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	64	17%	100	0	12 U	13 U	14 U	11 U	11 U	11 U
Toluene	ug/Kg	1	6%	1500	0	12 U	13 U	14 U	11 U	11 U	11 U
SEMIVOLATILE ORGANICS											
Fluoranthene	ug/Kg	26	11%	50000*	0	400 U	430 U	21 J	380 U	360 U	340 U
Pyrene	ug/Kg	22	11%	50000*	0	400 U	430 U	22 J	380 U	360 U	340 U
Chrysene	ug/Kg	18	6%	400	0	400 U	430 U	440 U	380 U	360 U	340 U
bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000*	0	28 J	25 J	23 J	24 J	79 J	49 J
Di-n-octylphthalate	ug/Kg	81	6%	50000*	0	400 U	430 U	440 U	380 U	360 U	340 U
PESTICIDES/PCB											
Endosulfan I	ug/Kg	1.3	6%	900	0	2 U	2.2 U	2.3 U	2 U	1.8 U	1.8 U
METALS											
Aluminum	mg/Kg	19100	100%	14593	2	12600	14300	8350	17000 J	11400 J	10500 J
Antimony	mg/Kg	0.36	11%	3.59	0	0.16 UJ	0.15 UJ	0.14 UJ	0.25 UJ	0.24 UJ	0.26 J
Arsenic	mg/Kg	9	100%	7.5	1	6.6	5	3.8	7	5	4.6
Barium	mg/Kg	111	100%	300	0	111	73.7	51.1	101 J	76.8 J	71.7 J
Beryllium	mg/Kg	0.85	100%	.73	2	0.65 J	0.66 J	0.4 J	0.76 J	0.52 J	0.52 J
Cadmium	mg/Kg	0.92	100%	1	0	0.59 J	0.42 J	0.32 J	0.69 J	0.61 J	0.6 J
Calcium	mg/Kg	106000	100%	101904	1	66000	63400	79900	31300 J	64600 J	81500 J
Chromium	mg/Kg	28.6	100%	22	3	19.3	21.7	12.8	25.6 J	18.9 J	17.3 J
Cobalt	mg/Kg	15.8	100%	30	0	13.6	12.3	8.5	15.8 J	10.2 J	12 J
Copper	mg/Kg	33.4	100%	25	8	28.3	22.8	19	25.7 J	29.4 J	28.4 J
Iron	mg/Kg	32300	100%	26627	4	26100	26800	16400	30900 J	23900 J	21800 J
Lead	mg/Kg	22.5	100%	21.9	0	22.5	13	11.1	17.3	11	8.7
Magnesium	mg/Kg	34100	100%	12222	8	13700	10800	19800	9920 J	11800 J	12300 J
Manganese	mg/Kg	959	100%	669	5	741 J	577 J	315 J	679 J	437 J	576 J
Mercury	mg/Kg	0.07	94%	0.1	0	0.01 J	0.01 J	0.02 J	0.05 J R	0.03 J	0.03 J
Nickel	mg/Kg	44.8	100%	34	5	38.8	35.3	21.8	39.7 J	33 J	32.2 J
Potassium	mg/Kg	3230	100%	1762	8	1440	1630	1450	2640	2150	2040
Selenium	mg/Kg	1	22%	2	0	0.27 U	0.28 J	0.23 U	0.84 J	0.49 U	0.35 U
Sodium	mg/Kg	189	94%	104	8	79.9 J	95.1 J	80.1 J	53.4 J	110 J	117 J
Vanadium	mg/Kg	29.5	100%	150	0	21.5	21.2	15.1	29.5 J	19 J	17.1 J
Zinc	mg/Kg	117	100%	83	6	117	82.1	58.9	100 J	89.3 J	87.8 J
OTHER ANALYSES											
Total Solids	%W/W					82.7	76.9	74.6	87.2	92.4	95.6

TABLE 4.9-1

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-58 0-0.2 06/09/94 SB58-2-00 223692 44694	SOIL SEAD-58 2-4 06/09/94 SB58-2-02 223693 44694	SOIL SEAD-58 4-6 06/09/94 SB58-2-04 223694 44694	SOIL SEAD-58 0-0.2 06/09/94 SB58-3-00 223695 44694	SOIL SEAD-58 0.2-1.5 06/09/94 SB58-3-01 223756 44725	SOIL SEAD-58 1.5-3 06/09/94 SB58-3-02 223757 44725
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	64	17%	100	0	11 U	11 U	11 U	12 UJ	64	3 J
Toluene	ug/Kg	1	6%	1500	0	11 U	11 U	11 U	12 UJ	11 U	1 J
SEMIVOLATILE ORGANICS											
Fluoranthene	ug/Kg	26	11%	50000*	0	26 J	350 U	350 U	410 U	380 U	360 U
Pyrene	ug/Kg	22	11%	50000*	0	22 J	350 U	350 U	410 U	380 U	360 U
Chrysene	ug/Kg	18	6%	400	0	18 J	350 U	350 U	410 U	380 U	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000*	0	260 J	52 J	110 J	25 J	170 J	30 J
Di-n-octylphthalate	ug/Kg	81	6%	50000*	0	380 U	350 U	350 U	410 U	380 U	81 J
PESTICIDES/PCB											
Endosulfan I	ug/Kg	1.3	6%	900	0	2 U	1.8 U	1.8 U	1.3 J	2 U	1.8 U
METALS											
Aluminum	mg/Kg	19100	100%	14593	2	9990 J	10400 J	11700 J	13800 J	19100	14100
Antimony	mg/Kg	0.36	11%	3.59	0	0.36 J	0.22 UJ	0.24 UJ	0.22 UJ	0.29 UJ	0.19 UJ
Arsenic	mg/Kg	9	100%	7.5	1	4.5	4.7	4.5	4.6	3.7	4.9
Barium	mg/Kg	111	100%	300	0	63.2 J	72 J	77.6 J	88.3 J	76.2	62.8
Beryllium	mg/Kg	0.85	100%	.73	2	0.45 J	0.42 J	0.51 J	0.57 J	0.85 J	0.6 J
Cadmium	mg/Kg	0.92	100%	1	0	0.53 J	0.5 J	0.48 J	0.32 J	0.92 J	0.76
Calcium	mg/Kg	106000	100%	101904	1	55000 J	67100 J	91100 J	3250 J	94700	55400
Chromium	mg/Kg	28.6	100%	22	3	15.7 J	17.4 J	19.5 J	19.6 J	28.6	20.8
Cobalt	mg/Kg	15.8	100%	30	0	8.9 J	11.4 J	12.2 J	6.7 J	15	11.9
Copper	mg/Kg	33.4	100%	25	8	21.2 J	25.8 J	20.4 J	15.1 J	20.7	27.6
Iron	mg/Kg	32300	100%	26627	4	19700 J	21900 J	24800 J	23000 J	32300	23400
Lead	mg/Kg	22.5	100%	21.9	0	14.9	10.7	6	16.3	4.1	11.2
Magnesium	mg/Kg	34100	100%	12222	8	9510 J	15600 J	11900 J	3770 J	9580	11800
Manganese	mg/Kg	959	100%	669	5	415 J	414 J	714 J	241 J	872	620
Mercury	mg/Kg	0.07	94%	0.1	0	0.03 J	0.03 J	0.02 J	0.07 J R	0.04 J	0.03 J
Nickel	mg/Kg	44.8	100%	34	5	26.5 J	32.6 J	31 J	21.6 J	44.8	33.5
Potassium	mg/Kg	3230	100%	1762	8	1510	2030	1610	1500	3220 J	3230 J
Selenium	mg/Kg	1	22%	2	0	0.57 J	0.45 U	0.5 U	1	0.6 U	0.39 U
Sodium	mg/Kg	189	94%	104	8	82.9 J	113 J	172 J	16.8 U	189 J	96.5 J
Vanadium	mg/Kg	29.5	100%	150	0	17.2 J	17.6 J	16.8 J	25.4 J	26.1	24.3
Zinc	mg/Kg	117	100%	83	6	81.9 J	81.8 J	51.9 J	63.8 J	76.3	72.2
OTHER ANALYSES											
Total Solids	%W/W					87.1	92.8	93.3	80	86.2	92

TABLE 4.9-1

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-58 2.5 06/10/94 TP58-1-1 223911 44748	SOIL SEAD-58 5 06/11/94 TP58-2-1 223912 44748	SOIL SEAD-58 2 06/11/94 TP58-3-1 223913 44748	SOIL SEAD-58 3 06/11/94 TP58-4 223914 44748	SOIL SEAD-58 5 06/11/94 TP58-5-1 223915 44748	SOIL SEAD-58 2 06/11/94 TP58-6-1 223916 44748
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	64	17%	100	0	2 J	12 U	11 U	11 U	11 U	12 U
Toluene	ug/Kg	1	6%	1500	0	13 U	12 U	11 U	11 U	11 U	12 U
SEMIVOLATILE ORGANICS											
Fluoranthene	ug/Kg	26	11%	50000*	0	380 U	360 U	370 U	380 U	370 U	380 U
Pyrene	ug/Kg	22	11%	50000*	0	380 U	360 U	370 U	380 U	370 U	380 U
Chrysene	ug/Kg	18	6%	400	0	380 U	360 U	370 U	380 U	370 U	380 U
bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000*	0	25 J	360 U	370 U	380 U	370 U	380 U
Di-n-octylphthalate	ug/Kg	81	6%	50000*	0	380 U	360 U	370 U	380 U	370 U	380 U
PESTICIDES/PCB											
Endosulfan I	ug/Kg	1.3	6%	900	0	2 U	1.9 UJ	1.9 U	2 U	1.9 U	2 U
METALS											
Aluminum	mg/Kg	19100	100%	14593	2	9280	8220	9980	10100	8980	14100
Antimony	mg/Kg	0.36	11%	3.59	0	0.17 UJ	0.27 UJ	0.26 UJ	0.16 UJ	0.15 UJ	0.17 UJ
Arsenic	mg/Kg	9	100%	7.5	1	9	3.6	4.3	3.4	4	4.4
Barium	mg/Kg	111	100%	300	0	47	79.7	63.1	40.8	49.8	76.3
Beryllium	mg/Kg	0.85	100%	.73	2	0.49 J	0.38 J	0.46 J	0.47 J	0.43 J	0.66 J
Cadmium	mg/Kg	0.92	100%	1	0	0.5 J	0.38 J	0.37 J	0.39 J	0.42 J	0.54 J
Calcium	mg/Kg	106000	100%	101904	1	106000	69900	72200	91700	101000	45500
Chromium	mg/Kg	28.6	100%	22	3	16.2 J	13.1 J	16.3 J	16.3 J	14.5 J	22.5 J
Cobalt	mg/Kg	15.8	100%	30	0	9.2	8.2 J	10.9	8.8	9.7	9.6
Copper	mg/Kg	33.4	100%	25	8	24	33.4	25.4	18	20.8	23.7
Iron	mg/Kg	32300	100%	26627	4	21900	19600	21000	20400	18700	27900
Lead	mg/Kg	22.5	100%	21.9	0	11.2 R	7.8 R	8.9 R	5.5 R	6.8 R	9.5 R
Magnesium	mg/Kg	34100	100%	12222	8	34100	20900	12900	7740	12900	9680
Manganese	mg/Kg	959	100%	669	5	487	959	498	451	588	436
Mercury	mg/Kg	0.07	94%	0.1	0	0.07 J	0.01 U	0.02 J	0.01 J	0.01 J	0.02 J
Nickel	mg/Kg	44.8	100%	34	5	25.4	33	31.2	25.7	26.6	35.1
Potassium	mg/Kg	3230	100%	1762	8	1370 J	1420 J	1900 J	1480 J	1500 J	1810 J
Selenium	mg/Kg	1	22%	2	0	0.36 U	0.55 U	0.54 U	0.34 U	0.32 U	0.36 U
Sodium	mg/Kg	189	94%	104	8	97.6 J	94.6 J	118 J	108 J	115 J	73.2 J
Vanadium	mg/Kg	29.5	100%	150	0	19.5	15.8	16.7	15.3	14.5	22.9
Zinc	mg/Kg	117	100%	83	6	82.7	104	74.9	62.4	64.8	110
OTHER ANALYSES											
Total Solids	%W/W					87	91.3	90.5	87.2	88.6	87.4

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

4.9.2.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-58.

4.9.2.5 Metals

A variety of soil samples were found to contain metals at concentrations that exceeded their associated TAGM or site background values. Of the 21 metals reported, 13 were found in one or more samples at levels above TAGM limits. Copper, magnesium, potassium, and sodium were above the TAGM in 8 of 18 samples. All other metals which had TAGM exceedances were found at concentrations which only slightly exceed the TAGM limit.

4.9.2.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-58.

4.9.2.7 Indicator Compounds

The analysis for nitrates by method 353.2 was not part of the analytical protocol for SEAD-58.

4.9.3 Groundwater

Four groundwater monitoring wells were installed as part of the SEAD-58 investigation. The summary analytical results are presented in Table 4.9-2. The following sections describe the nature and extent of the groundwater contamination identified at SEAD-58.

4.9.3.1 Volatile Organic Compounds

No VOCs were found in the groundwater samples collected at SEAD-58.

4.9.3.2 Semivolatile Organic Compounds

No SVOs were found in the groundwater samples collected at SEAD-58.

TABLE 4.9-2

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA	FEDERAL DRINKING WATER MCL (g)	NUMBER ABOVE CRITERIA	WATER SEAD-58 07/11/94 MW58-1 226662 45282	WATER SEAD-58 07/11/94 MW58-2 226663 45282	WATER SEAD-58 07/12/94 MW58-3 226795 45332	WATER SEAD-58 07/11/94 MW58-4 226664 45282
METALS										
Aluminum	ug/L	7160	100%	NA	NA	NA	440	262	7160 J	2650
Arsenic	ug/L	2.1	25%	25	50	0	2 U	2 U	2 U	2.1 J
Barium	ug/L	235	100%	1000	2000	0	71.9 J	208	235	111 J
Beryllium	ug/L	0.41	50%	NA	4	0	0.1 U	0.1 U	0.41 J	0.2 J
Calcium	ug/L	171000	100%	NA	NA	NA	113000	104000	171000	162000
Chromium	ug/L	12.3	100%	50	100	0	0.82 J	0.85 J	12.3	4 J
Cobalt	ug/L	9.2	75%	NA	NA	NA	0.64 J	0.5 U	9.2 J	2.9 J
Copper	ug/L	9	100%	200	1300 (h)	0	1.5 J	1.9 J	9 J	4.3 J
Iron	ug/L	14500	100%	300	NA	4	678	560	14500	5310
Lead	ug/L	4.4	75%	25	15 (i)	0	0.89 U	4.4	3	1.2 J
Magnesium	ug/L	29800	100%	NA	NA	NA	17300	21400	29800	22000
Manganese	ug/L	677	100%	300	NA	2	84	86.2	677	406
Mercury	ug/L	0.04	25%	2	2	0	0.04 U	0.04 U	0.04 J	0.04 U
Nickel	ug/L	20.5	100%	NA	100	0	1.6 J	2.2 J	20.5 J	8.1 J
Potassium	ug/L	6150	100%	NA	NA	NA	1460 J	2980 J	6150 J	2080 J
Sodium	ug/L	7180	100%	20000	NA	0	4180 J	5550	7180	4610 J
Vanadium	ug/L	10.8	100%	NA	NA	NA	0.81 J	0.77 J	10.8 J	4.1 J
Zinc	ug/L	37.2	100%	300	NA	0	7.1 J	18.8 J	37.2	14.6 J
OTHER ANALYSES										
pH	Standard Units						7.5	7.9	7.3	7.5
Conductivity	umhos/cm						445	500	480	475
Temperature	°C						13.1	16.1	15	13.3
Turbidity	NTU						49	2.8	1092	812

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) R = The data was rejected during the data validation process.
g) Federal Primary Drinking Water Maximum Contaminant Levels.
h) The value listed is an action level for copper at the tap, and not an MCL.
i) The value listed is an action level for lead at the tap, and not an MCL.

4.9.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the groundwater collected at SEAD-58.

4.9.3.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-58.

4.9.3.5 Metals

A total of 18 metals were detected in the groundwater at SEAD-58. Two metals, iron and manganese, were found at concentrations which were above the associated federal or state criteria. Iron exceeded the NY Class GA groundwater criteria of 300 μg/L in all 4 groundwater samples. Manganese exceeded the NY Class GA groundwater criteria of 300 μg/L only in the groundwater samples from MW58-3 and MW58-4. The highest concentration of iron was 14,500 and the highest concentration of manganese was 677 μg/L. Both of these elevated concentrations were found in groundwater sample MW58-3 and may be attributed to the high turbidity of the sample (over 1000 NTU).

4.9.3.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-58.

4.9.3.7 Indicator Compounds

The analysis for nitrates by method 353.2 was not part of the groundwater samples collected at SEAD-58.

4.9.4 Surface Water

Six surface water samples were collected as part of the SEAD-58 investigation. The summary of the chemical analysis are presented in Table 4.9-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-58.

TABLE 4.9-3

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	WATER SEAD-58 04/17/94 SW58-1 218090 43549	WATER SEAD-58 04/17/94 SW58-2 218091 43549	WATER SEAD-58 04/17/94 SW58-3 218092 43549	WATER SEAD-58 04/17/94 SW58-4 218093 43549	WATER SEAD-58 04/17/94 SW58-5 218094 43549	WATER SEAD-58 04/17/94 SW58-6 218095 43549
METALS											
Aluminum	ug/L	421	100%	100	1	73.5 J	102 J	135 J	421	127 J	138 J
Barium	ug/L	36.5	100%	NA	NA	35.2 J	35 J	36.5 J	28.1 J	26.5 J	25.6 J
Calcium	ug/L	82000	100%	NA	NA	82000	80800	74800	55600	53500	49800
Chromium	ug/L	0.75	67%	390	0	0.4 U	0.51 J	0.4 U	0.75 J	0.66 J	0.42 J
Copper	ug/L	3.8	100%	22.9	0	0.83 J	0.92 J	1.3 J	3.8 J	1.9 J	2.1 J
Iron	ug/L	598	100%	300	1	74.5 J	127	196	598	168	193
Lead	ug/L	1.1	17%	8.6	0	0.8 U	0.79 U	0.8 U	1.1 J	0.79 U	0.8 U
Magnesium	ug/L	11700	100%	NA	NA	11700	11500	11100	8500	8260	7640
Manganese	ug/L	74.4	100%	NA	NA	1.8 J	2.5 J	52.8	74.4	7.3 J	5.2 J
Mercury	ug/L	0.06	67%	.2 (f)	0	0.04 J	0.04 J	0.05 J	0.06 J	0.03 U	0.03 U
Nickel	ug/L	2.6	67%	172	0	1.1 J	0.59 U	0.6 U	2.6 J	1.5 J	1.8 J
Potassium	ug/L	2610	100%	NA	NA	1380 J	1440 J	1520 J	2090 J	2610 J	2500 J
Sodium	ug/L	13400	100%	NA	NA	4970 J	4880 J	13400	3070 J	1900 J	1750 J
Thallium	ug/L	2.7	33%	8	0	1.6 U	1.6 U	1.9 J	2.7 J	1.6 U	1.6 U
Vanadium	ug/L	0.9	17%	14	0	0.7 U	0.69 U	0.7 U	0.9 J	0.69 U	0.7 U
Zinc	ug/L	10.6	100%	159.6	0	3 J	2.5 J	2.2 J	10.6 J	4.8 J	6.3 J
OTHER ANALYSES											
pH	Standard Units					8.6	8.8	8.2	8.6	8.8	8.5
Conductivity	umhos/cm					320	325	285	225	215	200
Temperature	°C					10	11	12	10	10	9
Turbidity	NTU					1.1	1.6	1.6	2.4	1.9	2.2

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) NYSDEC guidance value.

4.9.4.1 Volatile Organic Compounds

No VOCs were found in the surface water collected at SEAD-58.

4.9.4.2 Semivolatile Organic Compounds

No SVOs were found in the surface water collected at SEAD-58.

4.9.4.3 Pesticides and PCBs

No pesticides or PCBs were found in the surface water collected at SEAD-58.

4.9.4.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-58.

4.9.4.5 Metals

Sixteen metals were detected in the surface water samples collected at SEAD-58. Only aluminum and iron were found to exceed the New York Class C surface water criteria in one of the six samples. Surface water sample SW58-4 had an iron concentration of 598 μg/L; the criteria limit is 300 μg/L. The aluminum concentration in that sample was 421 μg/L; the criteria is 100 μg/L. The reported concentrations of chromium, copper, lead, mercury, nickel, thallium, vanadium, and zinc were below their respective criteria. No criteria exist for the 6 remaining metals detected.

4.9.4.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-58.

4.9.4.7 Indicator Compounds

The analysis for nitrates by method 353.2 was not part of the analytical protocol for SEAD-58.

4.9.5 Sediment

A total of six sediment samples were collected as part of the SEAD-58 investigation. The summary chemical analyses are presented in Table 4.9-4. The following sections describe the nature and extent of sediment contamination.

4.9.5.1 Volatile Organic Compounds

No volatile organic compounds were detected in the six sediment samples collected at SEAD-58.

4.9.5.2 Semivolatile Organic Compounds

Sixteen semivolatile organic compounds were detected in the sediment samples collected at SEAD-58. Six of these compounds exceeded the New York sediment criteria for human health. Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were all highest in sediment sample SD58-1. Sediment sample SD58-1 was collected at a location which was upgradient of the SEAD-58 boundaries. The remaining samples (SD58-2, SD58-3, SD58-4, SD58-5, SD58-6) all had total PAH concentrations ranging from 413J μg/L to 839J μg/L. Figure 4.9-1 shows the total PAH concentrations found in the sediment samples collected at SEAD-58.

4.9.5.3 Pesticides and PCBs

No pesticides or PCBs were detected in the six sediment samples collected at SEAD-58.

4.9.5.4 Herbicides

The analysis for herbicides by method 8150 was not part of the analytical protocol for SEAD-58.

TABLE 4.9-4

SENECA ARMY DEPOT
SEAD-58 ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a) (c)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a) (c)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a) (c)	LOWEST EFFECT LEVEL (a) (b)	SEVERE EFFECT LEVEL (a) (b)	NUMBER ABOVE CRITERIA	SOIL SEAD-58 0-0.2 04/17/94 SD58-1 218079 43543	SOIL SEAD-58 0-0.2 04/17/94 SD58-2 218080 43543	SOIL SEAD-58 0-0.2 04/17/94 SD58-3 218081 43543	SOIL SEAD-58 0-0.2 04/17/94 SD58-4 218082 43543	SOIL SEAD-58 0-0.2 04/17/94 SD58-5 218083 43543	SOIL SEAD-58 0-0.2 04/17/94 SD58-6 218084 43543
SEMIVOLATILE ORGANICS															
Phenol	ug/Kg	36	17%	NA	NA	NA			NA	590 U	770 U	36 J	670 U	610 U	650 U
4-Methylphenol	ug/Kg	120	17%	NA	NA	NA			NA	590 U	770 U	120 J	670 U	610 U	650 U
Phenanthrene	ug/Kg	120	100%	1200 (j)	NA	NA			0	120 J	63 J	71 J	80 J	66 J	72 J
Anthracene	ug/Kg	30	17%	NA	NA	NA			NA	30 J	770 U	630 U	670 U	610 U	650 U
Di-n-butylphthalate	ug/Kg	130	50%	NA	NA	NA			NA	130 J	120 J	80 J	670 U	610 U	650 U
Fluoranthene	ug/Kg	180	100%	10200 (j)	NA	NA			0	180 J	100 J	130 J	100 J	110 J	130 J
Pyrene	ug/Kg	210	100%	NA	NA	NA			NA	210 J	92 J	160 J	100 J	74 J	85 J
Benzo(a)anthracene	ug/Kg	92	50%	NA	13	NA			3	92 J	770 U	630 U	670 U	64 J	72 J
Chrysene	ug/Kg	110	67%	NA	13	NA			4	110 J	76 J	96 J	68 J	610 U	650 U
bis(2-Ethylhexyl)phthalate	ug/Kg	100	67%	1995 (j)	NA	NA			0	590 U	770 U	38 J	61 J	52 J	100 J
Benzo(b)fluoranthene	ug/Kg	130	67%	NA	13	NA			4	110 J	92 J	130 J	69 J	610 U	650 U
Benzo(k)fluoranthene	ug/Kg	100	67%	NA	13	NA			4	100 J	55 J	70 J	58 J	610 U	650 U
Benzo(a)pyrene	ug/Kg	110	67%	NA	13	NA			4	110 J	71 J	95 J	62 J	610 U	650 U
Indeno(1,2,3-cd)pyrene	ug/Kg	110	67%	NA	13	NA			4	110 J	770 U	87 J	670 U	76 J	84 J
Dibenz(a,h)anthracene	ug/Kg	63	33%	NA	NA	NA			NA	590 U	770 U	630 U	670 U	53 J	63 J
Benzo(g,h,i)perylene	ug/Kg	110	50%	NA	NA	NA			NA	110 J	770 U	630 U	670 U	80 J	86 J
METALS															
Aluminum	mg/Kg	20100	100%				NA	NA	NA	18200	17800	14900	20100	16000	18200
Antimony	mg/Kg	0.37	50%				2	25	0	0.31 J	0.36 UJ	0.22 UJ	0.35 UJ	0.36 J	0.37 J
Arsenic	mg/Kg	5.9	100%				6	33	0	5.5	5.7	4.9	5.9	5.6	5.7
Barium	mg/Kg	142	100%				NA	NA	NA	139	142	86.9	130	114	130
Beryllium	mg/Kg	0.98	100%				NA	NA	NA	0.83 J	0.9 J	0.71 J	0.98 J	0.81 J	0.86 J
Cadmium	mg/Kg	0.7	100%				.6	9	1	0.42 J	0.58 J	0.5 J	0.7 J	0.52 J	0.53 J
Calcium	mg/Kg	70500	100%				NA	NA	NA	10900	15600	70500	6970	7960	8300
Chromium	mg/Kg	28.2	100%				26	110	1	24.8	25.2	23.7	28.2	23.2	25.3
Cobalt	mg/Kg	11.6	100%				NA	NA	NA	9 J	10.1 J	11.6	10.5 J	8.9 J	8.8 J
Copper	mg/Kg	37	100%				16	110	6	24	24.7	23.1	37	30.6	24.8
Iron	mg/Kg	29300	100%				2% (d)	4% (d)	6	26100	28900	27600	29300	25700	26300
Lead	mg/Kg	28.8	100%				31	110	0	20.9	23.5	20	28.8	27.8	25.6
Magnesium	mg/Kg	12100	100%				NA	NA	NA	6030	6040	12100	5520	4730	4980
Manganese	mg/Kg	735	100%				460	1100	3	564	632	735	447	382	373
Mercury	mg/Kg	0.12	100%				.15	1.3	0	0.1 J	0.06 J	0.05 J	0.11 J	0.12 J	0.11 J
Nickel	mg/Kg	33.5	100%				16	50	6	29.3	29.9	32.2	33.5	29.9	28.9
Potassium	mg/Kg	3170	100%				NA	NA	NA	2400	2430	2340	3170	2400	2940
Selenium	mg/Kg	0.89	83%				NA	NA	NA	0.79 J	0.89 J	0.37 U	0.7 J	0.68 J	0.66 J
Sodium	mg/Kg	134	17%				NA	NA	NA	44.6 U	57.3 U	134 J	55.9 U	47.5 U	55.7 U
Thallium	mg/Kg	0.55	33%				NA	NA	NA	0.55 J	0.58 U	0.35 U	0.56 U	0.51 J	0.56 U
Vanadium	mg/Kg	33.7	100%				NA	NA	NA	27.9	29.6	24.5	33.7	27.2	29.8
Zinc	mg/Kg	131	100%				120	270	1	106	131	86.6	119	119	109
OTHER ANALYSES															
Total Solids	%W/W	56								56	43.2	52.4	48.9	54.3	51.3

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) Sediment criteria are based on a soil organic carbon content of 1%.
d) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg.
e) NA = Not Available.
f) U = The compound was not detected below this concentration.
g) J = The reported value is an estimated concentration.
h) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
i) R = The data was rejected during the data validation process.
(j) NYSDEC Sediment Chronic Criteria for Aquatic Life.

E 739500
E 739250
E 739000
E 738750
N 1000500
N 1000250
N 1000000
N 999750
N 999500
616
615
614
613
612
611
610
609
537
SWSD58-4
615.90
MW58-1
SWSD58-1
1,282
549
SWSD58-2
613.98
MW58-2
609.62
MW58-4
MW58-3
609.13
413
SWSD58-5
592
SWSD58-6
839
SWSD58-3
BOOSTER STATION 2131
KENDAIA CREEK
WEST PATROL ROAD

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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- SEDIMENT SAMPLE
- 413 TOTAL PAHs (ug/kg) IN SEDIMENT
- MW58-4 / 609.62 MONITORING WELL WITH WATER TABLE ELEVATION
- 610 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(Feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	DWG. NO.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.9-1
SEAD-58 DEBRIS AREA NEAR BOOSTER STA. 2131
TOTAL PAHs IN SEDIMENT

SCALE	DATE	REV
1" = 100'	4/14/95	A

ACAD\SENE SWMUACADFIG\SD58PH.DWG

4.9.5.5 Metals

A total of 22 metals were detected in the sediment samples collected at SEAD-58. Of these, cadmium, copper, chromium, manganese, iron, nickel and zinc were detected at concentrations which were in excess of the NYSDEC sediment criteria. Five or more of these metals were found in each sample above their respective criteria.

4.9.5.6 Nitroaromatics

The analysis for explosives by method 8330 was not part of the analytical protocol for SEAD-58.

4.9.5.7 Indicator Compounds

The analysis for nitrates by method 353.2 was not part of the analytical protocol for SEAD-58.

4.9.6 Tentatively Identified Compounds

Tentatively Identified Compounds (TICs) were found at total concentrations greater than 50 mg/kg in 2 of the sediment samples analyzed. SD58-2 was located in the unamed creek flowing east to west, along the southern boundary of the site. The total TIC concentrations reported in this sample was 68.9 mg/kg. The second sediment sample with a total TIC concentration greater than 50 mg/kg was SD58-5 (51.6 mg/kg) which was collected from a drainage swale located in the western portion of the site. The occurence of elevated TIC concentrations in these samples correlates to the occurrence of SVOCs in the same samples.

4.10 SEAD-59 FILL AREA (WEST OF BUILDING 135)

4.10.1 Introduction

A total of 21 soil samples and 3 groundwater samples were collected as part of the SEAD-59 investigation. One additional solids sample (sample TP59-3X) was submitted for VOC analysis only. This additional sample was collected from the contents of an unearthed drum. The following sections describe the nature and extent of contamination identified at SEAD-59.

4.10.2 Soil

The analytical results for the 21 soil samples and 1 additional solids sample, collected as part of the SEAD-59 investigation, are presented in Table 4.10-1. The following sections describe the nature and extent of contamination at SEAD-59. The sample locations are shown in Figure 2.12-2.

4.10.2.1 Volatile Organic Compounds

A total of 10 volatile organic compounds were detected in the samples collected at SEAD-59. BTEX contaminants were detected in 4 of the samples collected at SEAD-59. Benzene (5,900J μg/kg), toluene (83,000 μg/kg), ethylbenzene (26,000), and xylene-total (1,000,000 μg/kg) were found at concentrations which exceeded their respective TAGM values in the soil sample from test pit TP59-1. These elevated concentrations were attributed to the paint staining of the soils at this location. A reported concentration of 2,000J μg/kg of benzene in the solids sample TP59-3X was also above its associated TAGM value (60 μg/kg). Toluene was detected in soil samples TP59-4 (220J μg/kg) and TP59-5 (2J μg/kg) and in the solids sample TP59-3x (440J μg/kg) at concentrations which were below its associated TAGM value (1,500 μg/kg). Xylene (total)(410J μg/kg) was also detected in soil sample TP59-4 at a concentration which was below its associated TAGM value (1,200 μg/kg). Figure 4.10-1 shows the total reported BTEX concentrations found in the soil samples collected at SEAD-59. The six remaining VOCs, chloromethane, methylene chloride, acetone, carbon disulfide, 2-butanone, and trichloroethene, were detected in 4 soil samples at concentrations which were below their respective TAGM values.

4.10.2.2 Semivolatile Organic Compounds

A total of 23 semivolatile organic compounds were detected at varying concentrations in 14 of the 21 samples collected at SEAD-59. Eight PAH compounds exceeded their associated TAGM values and at least one PAH exceedance was noted in all 14 samples which had detectable concentrations of SVOs. Maximum concentrations of benzo(a)anthracene (6,400 μg/kg), chrysene (6,200 μg/kg), benzo(b)fluoranthene (6,300 μg/kg), benzo(a)pyrene (5,800 μg/kg), indeno(1,2,3-cd)pyrene (5,300 μg/kg), and dibenz(a,h)Anthracene (1,900 μg/kg) were found in soil sample SB59-5-00, which was collected 0 to 0.2 feet below ground surface. The maximum concentration of benzo(k)fluoranthene (6,100 μg/kg) was found in soil sample SB59-1.04 which was collected from 6 to 8 feet below ground surface. The maximum

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 0-0.2 02/20/94 SB59-1.01 212224 42494	SOIL SEAD-59 6-8 02/20/94 SB59-1.04 212225 42494	SOIL SEAD-59 10-12 02/20/94 SB59-1.06 212226 42494	SOIL SEAD-59 0-0.2 05/26/94 SB59-2-00 222479 44410
VOLATILE ORGANICS									
Chloromethane	ug/Kg	3	5%	NA	NA	12 U	13 U	12 U	11 U
Methylene Chloride	ug/Kg	2	10%	100	0	12 U	13 U	12 U	11 U
Acetone	ug/Kg	30	5%	200	0	12 U	47 U	23 U	11 U
Carbon Disulfide	ug/Kg	4	5%	2700	0	12 U	13 U	12 U	11 U
2-Butanone	ug/Kg	12	10%	300	0	12 U	14 U	12 U	11 U
Trichloroethene	ug/Kg	1	5%	700	0	12 U	13 U	12 U	11 U
Benzene	ug/Kg	5900	10%	60	2	12 U	13 U	12 U	11 U
Toluene	ug/Kg	830000	14%	1500	1	12 U	13 U	12 U	11 U
Ethylbenzene	ug/Kg	260000	5%	5500	1	12 U	13 U	12 U	11 U
Xylene (total)	ug/Kg	1000000	14%	1200	1	12 U	13 U	12 U	11 U
SEMIVOLATILE ORGANICS									
4-Methylphenol	ug/Kg	28	5%	900	0	1500 U	420 U	530 U	740 U
Naphthalene	ug/Kg	290	60%	13000	0	130 J	160 J	110 J	78 J
2-Methylnaphthalene	ug/Kg	67000	55%	36400	1	150 J	150 J	78 J	75 J
Acenaphthylene	ug/Kg	1100	60%	41000	0	660 J	640 J	97 J	490 J
Acenaphthene	ug/Kg	870	60%	50000*	0	390 J	390 J	190 J	110 J
Dibenzofuran	ug/Kg	280	50%	6200	0	280 J	280 J	130 J	83 J
Fluorene	ug/Kg	22000	65%	50000*	0	730 J	730 J	280 J	220 J
Phenanthrene	ug/Kg	46000	70%	50000*	0	6100	6200	1800	2100 J
Anthracene	ug/Kg	2100	60%	50000*	0	1400 J	1400 J	600	560 J
Carbazole	ug/Kg	1500	55%	50000*	0	1200 J	1300 J	260 J	190 J
Di-n-butylphthalate	ug/Kg	250	30%	8100	0	1500 U	30 J	29 J	740 U
Fluoranthene	ug/Kg	10000	75%	50000*	0	9700	9900	2600	4400 J
Pyrene	ug/Kg	17000	75%	50000*	0	12000	13000	2200	5800 J
Butylbenzylphthalate	ug/Kg	320	5%	50000*	0	1500 U	420 U	530 U	740 U
Benzo(a)anthracene	ug/Kg	6400	70%	220	13	4700	5000	1200	3500 J
Chrysene	ug/Kg	6200	70%	400	12	4800	5100	1200	2700 J
bis(2-Ethylhexyl)phthalate	ug/Kg	15000	40%	50000*	0	1500 U	80 J	260 J	67 J
Benzo(b)fluoranthene	ug/Kg	6300	70%	1100	8	5000 J	5100 J	860	4400
Benzo(k)fluoranthene	ug/Kg	6100	65%	1100	7	5800 J	6100 J	810	2100 J
Benzo(a)pyrene	ug/Kg	5800	65%	61	12	5400 J	5500 J	1100	3000
Indeno(1,2,3-cd)pyrene	ug/Kg	5300	65%	3200	1	2000 J	2200 J	590	2200
Dibenz(a,h)anthracene	ug/Kg	1900	45%	14	8	930 J	420 U	530 U	870
Benzo(g,h,i)perylene	ug/Kg	2400	50%	50000*	0	1900 J	2400 J	560	1500

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 0-0.2 02/20/94 SB59-1.01 212224 42494	SOIL SEAD-59 6-8 02/20/94 SB59-1.04 212225 42494	SOIL SEAD-59 10-12 02/20/94 SB59-1.06 212226 42494	SOIL SEAD-59 0-0.2 05/26/94 SB59-2-00 222479 44410
PESTICIDES/PCB									
delta-BHC	ug/Kg	2.2	5%	300	0	2 U	2.2 U	2.1 U	1.9 UJ
Aldrin	ug/Kg	1.2	10%	41	0	2 U	2.2 U	2.1 U	0.96 J
Heptachlor epoxide	ug/Kg	2.2	5%	20	0	2 U	2.2 U	2.1 U	1.9 UJ
Endosulfan I	ug/Kg	22	25%	900	0	2 U	2.2 U	2.1 U	22 J
Dieldrin	ug/Kg	3.6	5%	440	0	3.8 U	4.2 U	4 U	3.7 UJ
4,4'-DDE	ug/Kg	140	70%	2100	0	11 J	25	7.3 J	11 J
Endrin	ug/Kg	3.9	5%	100	0	3.8 U	4.2 U	4 U	3.9 J
Endosulfan II	ug/Kg	7.1	15%	900	0	5.1 J	4.2 U	4 U	4 J
4,4'-DDD	ug/Kg	450	70%	2900	0	5.9	36	11	4.8 J
Endosulfan sulfate	ug/Kg	2.6	5%	1000	0	3.8 U	4.2 U	4 U	3.7 UJ
4,4'-DDT	ug/Kg	350	55%	2100	0	38 J	25	21	26 J
Endrin aldehyde	ug/Kg	13	20%	NA	NA	5.6 J	4.2 U	3.9 J	3.7 UJ
alpha-Chlordane	ug/Kg	5.2	20%	540	0	2 U	2.2 U	2.1 U	3.4 J
gamma-Chlordane	ug/Kg	7.4	15%	540	0	2 U	2.2 U	2.1 U	1.9 UJ
Aroclor-1254	ug/Kg	63	10%	1000/10000(a)	0	38 U	42 U	40 U	37 UJ
METALS									
Aluminum	mg/Kg	16000	100%	14593	2	11200 J	13000 J	11800 J	11800
Antimony	mg/Kg	424	55%	3.59	1	0.56 J	0.74 J	0.24 J	0.43 J
Arsenic	mg/Kg	6.1	100%	7.5	0	5 J	4.4 J	3.8 J	5.7
Barium	mg/Kg	304	100%	300	1	77.6 J	108 J	75.7 J	79.5
Beryllium	mg/Kg	0.72	100%	.73	0	0.46 J	0.58 J	0.48 J	0.53 J
Cadmium	mg/Kg	3.2	100%	1	2	0.5 J	0.37 J	0.1 J	0.87 J
Calcium	mg/Kg	214000	100%	101904	4	150000 J	83700 J	37400 J	135000
Chromium	mg/Kg	23.8	100%	22	2	18.4 J	18.4 J	18.1 J	21.2
Cobalt	mg/Kg	14.7	100%	30	0	9.4 J	7.1 J	8.6 J	12.3
Copper	mg/Kg	32.9	100%	25	8	25.4 J	32.9 J	23.5 J	28.9
Iron	mg/Kg	33300	100%	26627	1	20400 J	18300 J	20500 J	24500
Lead	mg/Kg	139	100%	21.9	11	51.6 J	38.4 J	10.5 J	49.8
Magnesium	mg/Kg	34400	100%	12222	8	8690 J	8610 J	14500 J	15200
Manganese	mg/Kg	1050	100%	669	2	516 J	418 J	329 J	542
Mercury	mg/Kg	1.6	100%	0.1	4	0.05 J	0.16 J	0.03 J	1.6 J
Nickel	mg/Kg	41.3	100%	34	2	27 J	23 J	27.9 J	32.3
Potassium	mg/Kg	2520	100%	1762	6	2140 J	2290 J	2520 J	1750 J
Selenium	mg/Kg	1.9	60%	2	0	0.27 J	1 J	0.42 J	0.81 J
Silver	mg/Kg	0.32	10%	0.4	0	0.16 U	0.15 U	0.12 U	0.09 UJ
Sodium	mg/Kg	2310	100%	104	18	135 J	353 J	164 J	189 J
Vanadium	mg/Kg	41.9	100%	150	0	41.9 J	24.8 J	22 J	21.3
Zinc	mg/Kg	1550	100%	83	10	86.4 J	116 J	69.7 J	102
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/Kg	7870	90%			380	220	78	951
Total Solids	%W/W					85.3	78.1	82.3	89.4

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 2-4 05/26/94 SB59-2-02 222481 44410	SOIL SEAD-59 6-7 05/26/94 SB59-2-04 222482 44410	SOIL SEAD-59 0-0.2 05/25/94 SB59-3-00 222428 44345	SOIL SEAD-59 2-4 05/25/94 SB59-3-02 222429 44345	SOIL SEAD-59 6-8 05/25/94 SB59-3-04 222430 44345	SOIL SEAD-59 0-0.2 05/25/94 SB59-4-00 222431 44345
VOLATILE ORGANICS											
Chloromethane	ug/Kg	3	5%	NA	NA	12 U	12 U	11 U	12 U	11 U	11 U
Methylene Chloride	ug/Kg	2	10%	100	0	12 U	12 U	11 U	12 U	11 U	11 U
Acetone	ug/Kg	30	5%	200	0	45 U	23 U	11 U	12 U	11 U	11 U
Carbon Disulfide	ug/Kg	4	5%	2700	0	12 U	12 U	11 U	12 U	11 U	11 U
2-Butanone	ug/Kg	12	10%	300	0	12 J	12 U	11 U	12 U	11 U	11 U
Trichloroethene	ug/Kg	1	5%	700	0	12 U	12 U	11 U	12 U	11 U	11 U
Benzene	ug/Kg	5900	10%	60	2	12 U	12 U	11 U	12 U	11 U	11 U
Toluene	ug/Kg	830000	14%	1500	1	12 U	12 U	11 U	12 U	11 U	11 U
Ethylbenzene	ug/Kg	260000	5%	5500	1	12 U	12 U	11 U	12 U	11 U	11 U
Xylene (total)	ug/Kg	1000000	14%	1200	1	12 U	12 U	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS											
4-Methylphenol	ug/Kg	28	5%	900	0	820 U	28 J	370 U	380 U	360 U	740 U
Naphthalene	ug/Kg	290	60%	13000	0	170 J	160 J	21 J	380 U	360 U	95 J
2-Methylnaphthalene	ug/Kg	67000	55%	36400	1	160 J	150 J	370 U	380 U	360 U	56 J
Acenaphthylene	ug/Kg	1100	60%	41000	0	100 J	23 J	120 J	380 U	360 U	610 J
Acenaphthene	ug/Kg	870	60%	50000*	0	230 J	100 J	56 J	380 U	360 U	63 J
Dibenzofuran	ug/Kg	280	50%	6200	0	820 U	82 J	26 J	380 U	360 U	45 J
Fluorene	ug/Kg	22000	65%	50000*	0	380 J	160 J	79 J	380 U	360 U	90 J
Phenanthrene	ug/Kg	46000	70%	50000*	0	1800	620	740	380 U	360 U	1100
Anthracene	ug/Kg	2100	60%	50000*	0	440 J	160 J	290 J	380 U	360 U	740 J
Carbazole	ug/Kg	1500	55%	50000*	0	220 J	64 J	39 J	380 U	360 U	63 J
Di-n-butylphthalate	ug/Kg	250	30%	8100	0	820 U	390 U	67 J	380 U	360 U	250 J
Fluoranthene	ug/Kg	10000	75%	50000*	0	3200	750	1700	67 J	360 U	3200
Pyrene	ug/Kg	17000	75%	50000*	0	3200	510	190 J	32 J	360 U	1200
Butylbenzylphthalate	ug/Kg	320	5%	50000*	0	820 U	390 U	370 U	380 U	360 U	740 U
Benzo(a)anthracene	ug/Kg	6400	70%	220	13	1600	260 J	910	34 J	360 U	2100
Chrysene	ug/Kg	6200	70%	400	12	1500	270 J	700	42 J	360 U	1800
bis(2-Ethylhexyl)phthalate	ug/Kg	15000	40%	50000*	0	72 J	35 J	660	1300	360 U	740 U
Benzo(b)fluoranthene	ug/Kg	6300	70%	1100	8	3100 J	290 J	430	45 J	360 U	2200
Benzo(k)fluoranthene	ug/Kg	6100	65%	1100	7	820 UJ	270 J	440	28 J	360 U	1500
Benzo(a)pyrene	ug/Kg	5800	65%	61	12	1500	250 J	47 J	380 U	360 U	420 J
Indeno(1,2,3-cd)pyrene	ug/Kg	5300	65%	3200	1	940	130 J	82 J	380 U	360 U	470 J
Dibenz(a,h)anthracene	ug/Kg	1900	45%	14	8	470 J	84 J	160 J	380 U	360 U	570 J
Benzo(g,h,i)perylene	ug/Kg	2400	50%	50000*	0	740 J	130 J	370 U	380 U	360 U	740 U

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 2-4 05/26/94 SB59-2-02 222481 44410	SOIL SEAD-59 6-7 05/26/94 SB59-2-04 222482 44410	SOIL SEAD-59 0-0.2 05/25/94 SB59-3-00 222428 44345	SOIL SEAD-59 2-4 05/25/94 SB59-3-02 222429 44345	SOIL SEAD-59 6-8 05/25/94 SB59-3-04 222430 44345	SOIL SEAD-59 0-0.2 05/25/94 SB59-4-00 222431 44345
PESTICIDES/PCB											
delta-BHC	ug/Kg	2.2	5%	300	0	2.1 UJ	2 UJ	3.8 U	2 U	1.9 UJ	3.8 U
Aldrin	ug/Kg	1.2	10%	41	0	1.2 J	2 UJ	3.8 U	2 U	1.9 UJ	3.8 U
Heptachlor epoxide	ug/Kg	2.2	5%	20	0	2.1 UJ	2 UJ	3.8 U	2 U	1.9 UJ	3.8 U
Endosulfan I	ug/Kg	22	25%	900	0	16 J	4.1 J	3.8 U	2 U	1.9 UJ	3.8 U
Dieldrin	ug/Kg	3.6	5%	440	0	4.1 UJ	3.9 UJ	7.3 U	3.8 U	3.6 UJ	7.4 U
4,4'-DDE	ug/Kg	140	70%	2100	0	81 J	8.2 J	19 J	3.8 U	3.6 UJ	7.3 J
Endrin	ug/Kg	3.9	5%	100	0	4.1 UJ	3.9 UJ	7.3 U	3.8 U	3.6 UJ	7.4 U
Endosulfan II	ug/Kg	7.1	15%	900	0	4.1 UJ	3.9 UJ	7.3 U	3.8 U	3.6 UJ	7.4 U
4,4'-DDD	ug/Kg	450	70%	2900	0	48 J	5.4 J	7.7 J	3.8 U	3.6 UJ	6.1 J
Endosulfan sulfate	ug/Kg	2.6	5%	1000	0	4.1 UJ	3.9 UJ	7.3 U	3.8 U	3.6 UJ	7.4 U
4,4'-DDT	ug/Kg	350	55%	2100	0	16 J	3.9 UJ	33	3.8 U	3.6 UJ	15 J
Endrin aldehyde	ug/Kg	13	20%	NA	NA	4.1 UJ	3.9 UJ	13 J	3.8 U	3.6 UJ	7.4 U
alpha-Chlordane	ug/Kg	5.2	20%	540	0	5.2 J	2 UJ	5.1 J	2 U	1.9 UJ	3.8 U
gamma-Chlordane	ug/Kg	7.4	15%	540	0	2.1 UJ	2 UJ	7.4	2 U	1.9 UJ	2.7 J
Aroclor-1254	ug/Kg	63	10%	1000/10000(a)	0	41 UJ	39 UJ	73 U	30 J	36 UJ	74 U
METALS											
Aluminum	mg/Kg	16000	100%	14593	2	12500	9340	9020	11700	8020	13100
Antimony	mg/Kg	424	55%	3.59	1	0.84 J	0.26 J	0.15 UJ	0.17 UJ	0.15 UJ	0.17 UJ
Arsenic	mg/Kg	6.1	100%	7.5	0	6	3.8	5.1	4.3	4.4	5.3
Barium	mg/Kg	304	100%	300	1	93.4	66	59.1	77.5	62.9	90.1
Beryllium	mg/Kg	0.72	100%	.73	0	0.67 J	0.42 J	0.48 J	0.54 J	0.39 J	0.62 J
Cadmium	mg/Kg	3.2	100%	1	2	0.9 J	0.41 J	0.75	0.55 J	0.52 J	1
Calcium	mg/Kg	214000	100%	101904	4	44500	65800	108000	69500	71100	51000
Chromium	mg/Kg	23.8	100%	22	2	21.1	15.5	15.2	17.7	13.3	20.8
Cobalt	mg/Kg	14.7	100%	30	0	11.7	9.1	8.7	8.1 J	7.9	10.7
Copper	mg/Kg	32.9	100%	25	8	28.1	19.7	21.1	24.2	18.4	31
Iron	mg/Kg	33300	100%	26627	1	24600	20900	18100	19400	17600	23800
Lead	mg/Kg	139	100%	21.9	11	50.3	12.9	29.2 J	11.4 J	9.3 J	59.8 J
Magnesium	mg/Kg	34400	100%	12222	8	8540	9190	11500	17500	18500	10600
Manganese	mg/Kg	1050	100%	669	2	664	836	555	411	403	653
Mercury	mg/Kg	1.6	100%	0.1	4	0.08 J	0.04 J	0.04 J	0.05 J	0.03 J	0.08
Nickel	mg/Kg	41.3	100%	34	2	31.8	24.7	23.4	29	22.5	41.3
Potassium	mg/Kg	2520	100%	1762	6	1690 J	1280 J	1460 J	1880 J	1370 J	1850 J
Selenium	mg/Kg	1.9	60%	2	0	1.3	0.49 J	0.38 J	0.3 U	0.26 U	0.28 U
Silver	mg/Kg	0.32	10%	0.4	0	0.32 J	0.08 UJ	0.1 UJ	0.12 UJ	0.11 UJ	0.12 UJ
Sodium	mg/Kg	2310	100%	104	18	168 J	148 J	183 J	556 J	198 J	80 J
Vanadium	mg/Kg	41.9	100%	150	0	24.2	16.4	17.3	19.9	13.6	23.2
Zinc	mg/Kg	1550	100%	83	10	115	75.5	75	59.1	53.6	131
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/Kg	7870	90%			513	69	1360	29 U	29 U	594
Total Solids	%W/W					79.6	84.9	89.6	85.6	91	89.2

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 8-10 05/25/94 SB59-4-05 222432 44345	SOIL SEAD-59 10-20 05/25/94 SB59-4-10 222433 44345	SOIL SEAD-59 0-0.2 05/25/94 SB59-5-00 222434 44345	SOIL SEAD-59 4-6 05/25/94 SB59-5-03 222435 44345	SOIL SEAD-59 10-12 05/25/94 SB59-5-06 222436 44345	SOIL SEAD-59 2 06/08/94 TP59-1 223514 44694
VOLATILE ORGANICS											
Chloromethane	ug/Kg	3	5%	NA	NA	18 U	11 U	11 U	11 U	11 U	30000 U
Methylene Chloride	ug/Kg	2	10%	100	0	2 J	11 U	11 U	11 U	11 U	30000 U
Acetone	ug/Kg	30	5%	200	0	18 U	11 U	11 U	11 U	11 U	30000 U
Carbon Disulfide	ug/Kg	4	5%	2700	0	4 J	11 U	11 U	11 U	11 U	30000 U
2-Butanone	ug/Kg	12	10%	300	0	18 U	11 U	11 U	11 U	11 U	30000 U
Trichloroethene	ug/Kg	1	5%	700	0	18 U	11 U	11 U	1 J	11 U	30000 U
Benzene	ug/Kg	5900	10%	60	2	18 U	11 U	11 U	11 U	11 U	5900 J
Toluene	ug/Kg	830000	14%	1500	1	18 U	11 U	11 U	11 U	11 U	830000
Ethylbenzene	ug/Kg	260000	5%	5500	1	18 U	11 U	11 U	11 U	11 U	260000
Xylene (total)	ug/Kg	1000000	14%	1200	1	18 U	11 U	11 U	11 U	11 U	1000000
SEMIVOLATILE ORGANICS											
4-Methylphenol	ug/Kg	28	5%	900	0	420 U	360 U	1800 U	370 U	380 U	87000 U
Naphthalene	ug/Kg	290	60%	13000	0	100 J	360 U	240 J	55 J	380 U	87000 U
2-Methylnaphthalene	ug/Kg	67000	55%	36400	1	37 J	360 U	1800 U	55 J	380 U	87000 U
Acenaphthylene	ug/Kg	1100	60%	41000	0	52 J	360 U	1100 J	250 J	380 U	87000 U
Acenaphthene	ug/Kg	870	60%	50000*	0	93 J	360 U	310 J	50 J	380 U	87000 U
Dibenzofuran	ug/Kg	280	50%	6200	0	64 J	360 U	1800 U	42 J	380 U	87000 U
Fluorene	ug/Kg	22000	65%	50000*	0	100 J	360 U	300 J	110 J	380 U	87000 U
Phenanthrene	ug/Kg	46000	70%	50000*	0	1100	360 U	4300	1500 J	380 U	87000 U
Anthracene	ug/Kg	2100	60%	50000*	0	250 J	360 U	1500 J	550 J	380 U	87000 U
Carbazole	ug/Kg	1500	55%	50000*	0	160 J	360 U	180 J	370 U	380 U	87000 U
Di-n-butylphthalate	ug/Kg	250	30%	8100	0	120 J	360 U	1800 U	150 J	380 U	87000 U
Fluoranthene	ug/Kg	10000	75%	50000*	0	1900	19 J	9900	3100 J	380 U	87000 U
Pyrene	ug/Kg	17000	75%	50000*	0	940	28 J	10000	3300	380 U	87000 U
Butylbenzylphthalate	ug/Kg	320	5%	50000*	0	420 U	360 U	1800 U	370 U	380 U	87000 U
Benzo(a)anthracene	ug/Kg	6400	70%	220	13	740	360 U	6400	1800	380 U	87000 U
Chrysene	ug/Kg	6200	70%	400	12	820	360 U	6200	1900	380 U	87000 U
bis(2-Ethylhexyl)phthalate	ug/Kg	15000	40%	50000*	0	420 U	360 U	1800 U	370 U	380 U	15000 J
Benzo(b)fluoranthene	ug/Kg	6300	70%	1100	8	730	360 U	6300	1300 J	380 U	87000 U
Benzo(k)fluoranthene	ug/Kg	6100	65%	1100	7	590	360 U	4600	1400 J	380 U	87000 U
Benzo(a)pyrene	ug/Kg	5800	65%	61	12	360 J	360 U	5800	1500 J	380 U	87000 U
Indeno(1,2,3-cd)pyrene	ug/Kg	5300	65%	3200	1	300 J	360 U	5300	790 J	380 U	87000 U
Dibenz(a,h)anthracene	ug/Kg	1900	45%	14	8	160 J	360 U	1900	320 J	380 U	87000 U
Benzo(g,h,i)perylene	ug/Kg	2400	50%	50000*	0	420 U	360 U	790 J	200 J	380 U	87000 U

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 8-10 05/25/94 SB59-4-05 222432 44345	SOIL SEAD-59 10-20 05/25/94 SB59-4-10 222433 44345	SOIL SEAD-59 0-0.2 05/25/94 SB59-5-00 222434 44345	SOIL SEAD-59 4-6 05/25/94 SB59-5-03 222435 44345	SOIL SEAD-59 10-12 05/25/94 SB59-5-06 222436 44345	SOIL SEAD-59 2 06/08/94 TP59-1 223514 44694
PESTICIDES/PCB											
delta-BHC	ug/Kg	2.2	5%	300	0	22 U	1.8 UJ	19 U	3.9 U	2 U	2.2 J
Aldrin	ug/Kg	1.2	10%	41	0	22 U	1.8 UJ	19 U	3.9 U	2 U	2.2 U
Heptachlor epoxide	ug/Kg	2.2	5%	20	0	22 U	1.8 UJ	19 U	3.9 U	2 U	2.2 U
Endosulfan I	ug/Kg	22	25%	900	0	22 U	1.8 UJ	19 U	3.9 U	2 U	1.5 J
Dieldrin	ug/Kg	3.6	5%	440	0	42 U	3.6 UJ	37 U	7.5 U	3.8 U	3.6 J
4,4'-DDE	ug/Kg	140	70%	2100	0	140	3.6 UJ	37 U	21	3.8 U	13 J
Endrin	ug/Kg	3.9	5%	100	0	42 U	3.6 UJ	37 U	7.5 U	3.8 U	4.3 U
Endosulfan II	ug/Kg	7.1	15%	900	0	42 U	3.6 UJ	37 U	7.5 U	3.8 U	4.3 U
4,4'-DDD	ug/Kg	450	70%	2900	0	450	3.6 UJ	37 U	22 J	3.8 U	7
Endosulfan sulfate	ug/Kg	2.6	5%	1000	0	42 U	3.6 UJ	37 U	7.5 U	3.8 U	4.3 U
4,4'-DDT	ug/Kg	350	55%	2100	0	350	3.6 UJ	37 U	23 J	3.8 U	4.3 U
Endrin aldehyde	ug/Kg	13	20%	NA	NA	42 U	3.6 UJ	37 U	7.5 U	3.8 U	4.3 U
alpha-Chlordane	ug/Kg	5.2	20%	540	0	22 U	1.8 UJ	19 U	3.9 U	2 U	1.3 J
gamma-Chlordane	ug/Kg	7.4	15%	540	0	22 U	1.8 UJ	19 U	2.2 J	2 U	2.2 U
Aroclor-1254	ug/Kg	63	10%	1000/10000(a)	0	420 U	36 UJ	370 U	75 U	38 U	43 U
METALS											
Aluminum	mg/Kg	16000	100%	14593	2	4200	7550	12600	12800	7030	16000 J
Antimony	mg/Kg	424	55%	3.59	1	424 J	0.22 UJ	0.41 J	0.2 UJ	0.18 UJ	0.26 UJ
Arsenic	mg/Kg	6.1	100%	7.5	0	3.8	3.7	5.1	5.5	5.1	6.1
Barium	mg/Kg	304	100%	300	1	304	21.1 J	101	81.9	36 J	120 J
Beryllium	mg/Kg	0.72	100%	.73	0	0.37 J	0.38 J	0.63 J	0.61 J	0.42 J	0.61 J
Cadmium	mg/Kg	3.2	100%	1	2	3.2	0.42 J	1.3	0.91 J	0.61 J	0.6 J
Calcium	mg/Kg	214000	100%	101904	4	214000	61700	59500	62800	85200	7690 J
Chromium	mg/Kg	23.8	100%	22	2	14.7	12.8	22.1	20.1	13.1	23.8 J
Cobalt	mg/Kg	14.7	100%	30	0	4 J	7.7 J	11.3	10.8	8.1 J	14.7 J
Copper	mg/Kg	32.9	100%	25	8	14.2	15.6	32.5	26	18.8	19.6 J
Iron	mg/Kg	33300	100%	26627	1	6540	17300	24800	24100	18100	33300 J
Lead	mg/Kg	139	100%	21.9	11	139 J	9.5 J	91.9 J	42.1 J	12.3 J	15
Magnesium	mg/Kg	34400	100%	12222	8	7980	14600	8640	11500	34400	5210 J
Manganese	mg/Kg	1050	100%	669	2	298	328	586	640	477	507 J
Mercury	mg/Kg	1.6	100%	0.1	4	0.11	0.03 J	0.04 J	0.15	0.04 J	0.07 J R
Nickel	mg/Kg	41.3	100%	34	2	10.6	21.3	33.1	29.8	27	34.4 J
Potassium	mg/Kg	2520	100%	1762	6	845 J	1100 J	1620 J	1710 J	922 J	1540
Selenium	mg/Kg	1.9	60%	2	0	0.28 J	0.96 J	0.37 U	0.53 J	0.31 U	1.2
Silver	mg/Kg	0.32	10%	0.4	0	0.11 J	0.15 UJ	0.15 UJ	0.14 UJ	0.13 UJ	0.1 UJ
Sodium	mg/Kg	2310	100%	104	18	125 J	140 J	79.1 J	161 J	274 J	140 J
Vanadium	mg/Kg	41.9	100%	150	0	13.9	12.1	22.1	23.2	13.3	25.3 J
Zinc	mg/Kg	1550	100%	83	10	341	54.9	106	101	64.9	1550 J
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/Kg	7870	90%			778	40	527	637	70	3820
Total Solids	%W/W					78.8	92	90.3	87.6	86.7	76

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

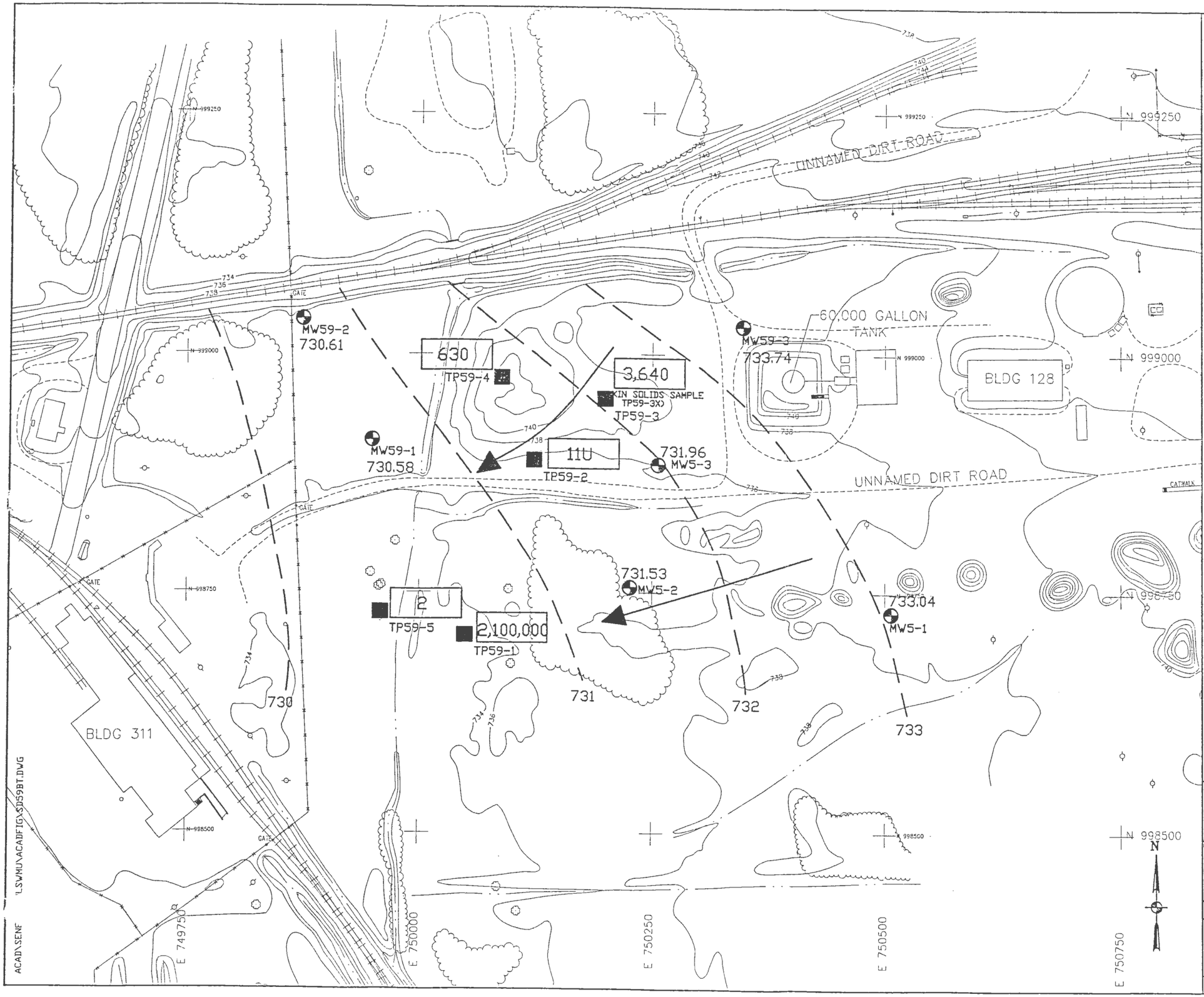
COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 7 02/20/94 TP59-2 212043 42494	SOIL SEAD-59 3 06/08/94 TP59-3 223515 44694	SOIL SEAD-59 1.5 06/28/94 TP59-3 225801 45062	SOIL SEAD-59 1.5 06/28/94 TP59-3X 225802 45062	SOIL SEAD-59 2 06/08/94 TP59-4 223516 44694	SOIL SEAD-59 2.5 06/08/94 TP59-5 223517 44694
VOLATILE ORGANICS											
Chloromethane	ug/Kg	3	5%	NA	NA	11 U		12 U	3300 U	1800 U	3 J
Methylene Chloride	ug/Kg	2	10%	100	0	11 U		12 U	3300 U	1800 U	1 J
Acetone	ug/Kg	30	5%	200	0	17 U		16 U	3300 U	1800 U	30
Carbon Disulfide	ug/Kg	4	5%	2700	0	11 U		12 U	3300 U	1800 U	12 U
2-Butanone	ug/Kg	12	10%	300	0	11 U		12 U	3300 U	1800 U	12
Trichloroethene	ug/Kg	1	5%	700	0	11 U		12 U	3300 U	1800 U	12 U
Benzene	ug/Kg	5900	10%	60	2	11 U		12 U	2000 J	1800 U	12 U
Toluene	ug/Kg	830000	14%	1500	1	11 U		12 U	440 J	220 J	2 J
Ethylbenzene	ug/Kg	260000	5%	5500	1	11 U		12 U	3300 U	1800 U	12 U
Xylene (total)	ug/Kg	1000000	14%	1200	1	11 U		12 U	1200 J	410 J	12 U
SEMIVOLATILE ORGANICS											
4-Methylphenol	ug/Kg	28	5%	900	0	1800 U	4000 U			98000 U	390 U
Naphthalene	ug/Kg	290	60%	13000	0	340 J	4000 U			98000 U	390 U
2-Methylnaphthalene	ug/Kg	67000	55%	36400	1	430 J	4000 U			67000 J	390 U
Acenaphthylene	ug/Kg	1100	60%	41000	0	460 J	4000 U			98000 U	390 U
Acenaphthene	ug/Kg	870	60%	50000*	0	960 J	4000 U			98000 U	390 U
Dibenzofuran	ug/Kg	280	50%	6200	0	560 J	4000 U			98000 U	390 U
Fluorene	ug/Kg	22000	65%	50000*	0	1300 J	4000 U			22000 J	390 U
Phenanthrene	ug/Kg	46000	70%	50000*	0	9000	980 J			46000 J	390 U
Anthracene	ug/Kg	2100	60%	50000*	0	2400 J	4000 U			98000 U	390 U
Carbazole	ug/Kg	1500	55%	50000*	0	1800 J	4000 U			98000 U	390 U
Di-n-butylphthalate	ug/Kg	250	30%	8100	0	1800 U	4000 U			98000 U	390 U
Fluoranthene	ug/Kg	10000	75%	50000*	0	11000	1500 J			98000 U	390 U
Pyrene	ug/Kg	17000	75%	50000*	0	17000 J	1700 J			98000 U	390 U
Butylbenzylphthalate	ug/Kg	320	5%	50000*	0	1800 U	320 J			98000 U	390 U
Benzo(a)anthracene	ug/Kg	6400	70%	220	13	4900 J	930 J			98000 U	390 U
Chrysene	ug/Kg	6200	70%	400	12	5000 J	1100 J			98000 U	390 U
bis(2-Ethylhexyl)phthalate	ug/Kg	15000	40%	50000*	0	200 J	4000 U			98000 U	46 J
Benzo(b)fluoranthene	ug/Kg	6300	70%	1100	8	5300 J	830 J			98000 U	390 U
Benzo(k)fluoranthene	ug/Kg	6100	65%	1100	7	5700 J	710 J			98000 U	390 U
Benzo(a)pyrene	ug/Kg	5800	65%	61	12	5300 J	900 J			98000 U	390 U
Indeno(1,2,3-cd)pyrene	ug/Kg	5300	65%	3200	1	1800 J	520 J			98000 U	390 U
Dibenz(a,h)anthracene	ug/Kg	1900	45%	14	8	1800 UJ	4000 U			98000 U	390 U
Benzo(g,h,i)perylene	ug/Kg	2400	50%	50000*	0	1400 J	640 J			98000 U	390 U

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-59 7 02/20/94 TP59-2 212043 42494	SOIL SEAD-59 3 06/08/94 TP59-3 223515 44694	SOIL SEAD-59 1.5 06/28/94 TP59-3 225801 45062	SOIL SEAD-59 1.5 06/28/94 TP59-3X 225802 45062	SOIL SEAD-59 2 06/08/94 TP59-4 223516 44694	SOIL SEAD-59 2.5 06/08/94 TP59-5 223517 44694
PESTICIDES/PCB											
delta-BHC	ug/Kg	2.2	5%	300	0	3.8 U	2.1 U			2.5 U	2 U
Aldrin	ug/Kg	1.2	10%	41	0	3.8 U	2.1 U			2.5 U	2 U
Heptachlor epoxide	ug/Kg	2.2	5%	20	0	2.2 J	2.1 U			2.5 U	2 U
Endosulfan I	ug/Kg	22	25%	900	0	3.8 U	2.1 U			1.5 J	2 U
Dieldrin	ug/Kg	3.6	5%	440	0	7.3 U	4 U			4.9 U	3.9 U
4,4'-DDE	ug/Kg	140	70%	2100	0	26 J	7.7 J			12	3.9 U
Endrin	ug/Kg	3.9	5%	100	0	7.3 U	4 U			4.9 U	3.9 U
Endosulfan II	ug/Kg	7.1	15%	900	0	7.1 J	4 U			4.9 U	3.9 U
4,4'-DDD	ug/Kg	450	70%	2900	0	15	7 J			25 J	3.9 U
Endosulfan sulfate	ug/Kg	2.6	5%	1000	0	7.3 U	2.6 J			4.9 U	3.9 U
4,4'-DDT	ug/Kg	350	55%	2100	0	20 J	8.2 J			4.9 U	3.9 U
Endrin aldehyde	ug/Kg	13	20%	NA	NA	6.3 J	4 U			4.9 U	3.9 U
alpha-Chlordane	ug/Kg	5.2	20%	540	0	3.8 U	2.1 U			2.5 U	2 U
gamma-Chlordane	ug/Kg	7.4	15%	540	0	3.8 U	2.1 U			2.5 U	2 U
Aroclor-1254	ug/Kg	63	10%	1000/10000(a)	0	73 U	63			49 U	39 U
METALS											
Aluminum	mg/Kg	16000	100%	14593	2	10200 J	12300 J			14600 J	8730 J
Antimony	mg/Kg	424	55%	3.59	1	0.47 J	0.32 J			0.65 J	0.25 UJ
Arsenic	mg/Kg	6.1	100%	7.5	0	4.8 J	4.6			4.9	4.1
Barium	mg/Kg	304	100%	300	1	52.6 J	104 J			114 J	72 J
Beryllium	mg/Kg	0.72	100%	.73	0	0.43 J	0.52 J			0.72 J	0.33 J
Cadmium	mg/Kg	3.2	100%	1	2	0.4 J	0.63 J			0.74 J	0.38 J
Calcium	mg/Kg	214000	100%	101904	4	42700 J	53100 J			7780 J	77700 J
Chromium	mg/Kg	23.8	100%	22	2	16.9 J	20.7 J			19.9 J	13.2 J
Cobalt	mg/Kg	14.7	100%	30	0	9.1 J	9.8 J			7.9 J	6.3 J
Copper	mg/Kg	32.9	100%	25	8	24 J	26.9 J			23.2 J	17.2 J
Iron	mg/Kg	33300	100%	26627	1	19700 J	23600 J			21000 J	16800 J
Lead	mg/Kg	139	100%	21.9	11	29.7 J	31.2			19.9	10.2
Magnesium	mg/Kg	34400	100%	12222	8	6380 J	14600 J			2710 J	15400 J
Manganese	mg/Kg	1050	100%	669	2	425 J	426 J			1050 J	326 J
Mercury	mg/Kg	1.6	100%	0.1	4	0.04 J	0.11 R			0.17 R	0.05 J R
Nickel	mg/Kg	41.3	100%	34	2	25.3 J	30.1 J			17.2 J	21.1 J
Potassium	mg/Kg	2520	100%	1762	6	1350 J	1820			1320	1310
Selenium	mg/Kg	1.9	60%	2	0	0.12 U	0.49 U			1.9	0.52 U
Silver	mg/Kg	0.32	10%	0.4	0	0.09 U	0.09 UJ			0.13 UJ	0.1 UJ
Sodium	mg/Kg	2310	100%	104	18	116 J	272 J			2310	169 J
Vanadium	mg/Kg	41.9	100%	150	0	18.7 J	22.1 J			24 J	15.2 J
Zinc	mg/Kg	1550	100%	83	10	72.3 J	89.7 J			73.1 J	52.5 J
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/Kg	7870	90%			1790	440			7870	47
Total Solids	%W/W					89.1	81.9			67.4	84.6

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.



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
- OVERHEAD UTILITY POLE
- MAILBOX/RR SIGNAL

LEGEND

- ■ TEST PIT
- 3,640 — BTEX (ug/kg) IN SOIL/SOLIDS
- MW59-1 / 733.74 — MONITORING WELL WITH WATER TABLE ELEVATION
- 733 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.10-1
SEAD-59 FILL AREA WEST OF BLDG. 135
BTEX IN SOILS

SCALE	DATE	REV
1" = 100'	4/14/95	A

ACAD\SENF\SWMU\ACADFIG\SD59BT.DWG

concentration of 2-methylnaphthalene (67,000 μg/kg) was found in soil sample TP59-4, which was collected from a stained soil layer 2 feet below the ground surface. Figure 4.10-2 shows the total PAH concentrations found in the soil samples collected at SEAD-59. It should be noted that the detection limits for SVOs were greatly increased in samples TP59-1, TP59-3, and TP59-4. These increases were presumably due to interferences in the chemical analyses. The presence of paint in sample TP59-1 and a petroleum product (probably diesel fuel) in sample TP59-4 would be expected as the cause of the elevated detection limits in these two samples. The cause of the elevated detection limits for sample TP59-3 could not be attributed to any field observations noted during the sample collection.

4.10.2.3 Pesticides and PCBs

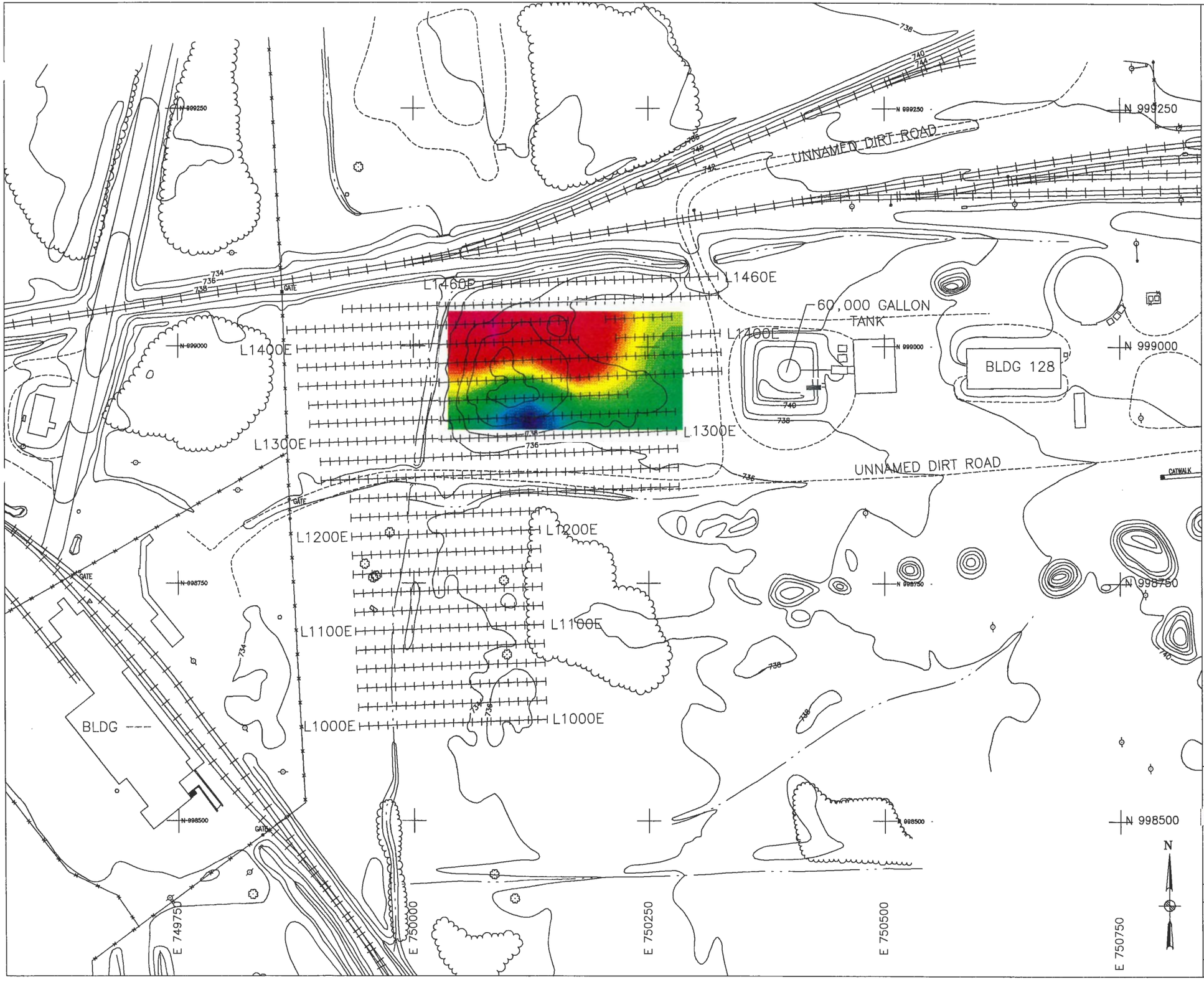
A total of 9 pesticides and 1 PCB compound (Aroclor-1254) were detected at varying concentrations in 15 of the 20 soil samples collected at SEAD-59. The PCB and all of the pesticides, except endrin aldehyde, were found at concentrations which were below their respective TAGM values. Currently, no TAGM value exists for endrin aldehyde in soil.

4.10.2.4 Metals

A total of 22 metals were detected in the soil samples collected at SEAD-59. Sixteen metals were detected in one or more samples at concentrations which exceeded their respective TAGM values. Exceedances were reported in all 20 of the soil samples collected at SEAD-59. Antimony, lead, mercury, zinc, and sodium were found at concentrations which exceeded their respective TAGM values by at least an order of magnitude. In addition, lead and zinc were found at concentrations which were above their respective TAGM values in at least 45 percent of the soil samples collected at SEAD-59. The remaining 11 metals which were found at elevated concentrations only slightly exceeded their respective TAGM values.

4.10.2.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (TPH) were detected in all but 2 of the 20 soil samples collected at SEAD-59. The reported concentrations of TPH ranged from 40 mg/kg in soil sample SB59-4-10 to 7,870 mg/kg in soil sample TP59-4. Currently, no TAGM value exists for detected concentrations of TPH in soils.



PAHs IN SURFACE SOILS (ug/kg)

67234
65851
60319
57553
54787
52021
49255
46489
43723
40957
38192
35426
32660
29894
27128
24362
21596
16064
13298
10532
7766
5000

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDOUS TREE
GUIDE POST
POLE
FIRE HYDRANT
MAILBOX/RR SIGNAL
UTILITY BOX
OVERHEAD UTILITY POLE
MANHOLE
CORDINATE GRID (250' GRID)
L1000E GPR TRANSECT
L1200E EM TRANSECT
50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION
8 MODERATELY-LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIROMENTAL ENGINEERING	720519-01002

FIGURE 4.10-2
SEAD-59
TOTAL PAHs IN SURFACE SOILS

SCALE	DATE	REV
1" = 100'	01/06/95	A

4.10.3 Groundwater

The analytical results for the three groundwater samples collected at SEAD-59 are presented in Table 4.10-2. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-59. The locations of the monitoring wells are shown in Figure 2.12-2.

4.10.3.1 Volatile Organic Compounds

No volatile organic compounds were found in the groundwater samples collected at SEAD-59.

4.10.3.2 Semivolatile Organic Compounds

Phenol was found in the groundwater samples collected at monitoring wells MW59-2 and MW59-3. The reported concentrations were 2J μg/L in MW59-2 and 1J μg/L in MW59-3. The NY AWQS Class GA groundwater criteria for phenol is 1 μg/L.

4.10.3.3 Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-59.

4.10.3.4 Metals

A total of 18 metals were detected in the groundwater samples collected at SEAD-59. Four metals, iron, manganese, sodium, and thallium were detected at concentrations which were above the associated federal or state criteria. Sodium was found at concentrations which were above its associated NY AWQS Class GA groundwater criteria value of 20,000 μg/kg in all three groundwater samples collected at SEAD-59. Iron was found above its associated criteria value of 300 μg/kg in groundwater samples MW59-1 and MW59-3. Manganese was found above its associated criteria value of 300 μg/kg only in groundwater sample MW59-1. The maximum reported concentrations of iron (3,940 μg/kg) and sodium (239,000 μg/kg) were found in the groundwater sample collected at MW50-3. The highest concentration of manganese (780 μg/kg) was found in groundwater sample MW50-1. Thallium was found above the federal MCL of 2 μg/L in groundwater samples MW59-2 and MW59-3.

TABLE 4.10-2

SENECA ARMY DEPOT
SEAD-59 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	FEDERAL DRINKING WATER MCL (f)	NUMBER ABOVE CRITERIA	WATER SEAD-59 03/30/94 MW59-1 216048 43179	WATER SEAD-59 07/21/94 MW59-2 227726 45448	WATER SEAD-59 07/21/94 MW59-3 227727 45448
SEMIVOLATILE ORGANICS									
Phenol	ug/L	2	67%	1	NA	1	10 U	2 J	1 J
METALS									
Aluminum	ug/L	2680	100%	NA	NA	NA	1940	299	2680
Arsenic	ug/L	2	33%	25	50	0	2 J	2 U	2 U
Barium	ug/L	103	100%	1000	2000	0	102 J	99.6 J	103 J
Calcium	ug/L	146000	100%	NA	NA	NA	140000	125000	146000
Chromium	ug/L	3.6	100%	50	100	0	3.4 J	0.78 J	3.6 J
Cobalt	ug/L	3.5	100%	NA	NA	NA	3.5 J	1.1 J	2.1 J
Copper	ug/L	4.3	67%	200	1300 (g)	0	4.3 J	0.5 U	3.6 J
Iron	ug/L	3940	100%	300	NA	3	3120	731 J	3940 J
Lead	ug/L	2.4	67%	25	15 (h)	0	2.4 J	0.9 U	1.5 J
Magnesium	ug/L	29200	100%	NA	NA	NA	29000	29200	21200
Manganese	ug/L	780	100%	300	NA	1	780	109	253
Mercury	ug/L	0.06	67%	2	2	0	0.03 U	0.05 J	0.06 J
Nickel	ug/L	7.6	100%	NA	100	0	7.6 J	1.9 J	6.7 J
Potassium	ug/L	4150	100%	NA	NA	NA	2110 J	2640 J	4150 J
Sodium	ug/L	239000	100%	20000	NA	3	66000	32100	239000
Thallium	ug/L	4	67%	NA	2	2	1.6 U	4 J	2.8 J
Vanadium	ug/L	4.7	100%	NA	NA	NA	3.4 J	1.1 J	4.7 J
Zinc	ug/L	26.2	100%	300	NA	0	21.8	4 J	26.2
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/L	2.6		NA	NA	NA	2.6 J	1.38	0.34 U
pH	Standard Units						7.2	7.9	7.1
Conductivity	umhos/cm						650	750	1600
Temperature	°C						3.9	14.6	17.6
Turbidity	NTU						146	14	56

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) Federal Primary Drinking Water Maximum Contaminant Levels.
g) The value listed is an action level for copper at the tap, and not an M
h) The value listed is an action level for lead at the tap, and not an MCL

4.10.3.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (TPH) were detected in 2 of the 3 groundwater samples collected at SEAD-59. A TPH concentration of 2.6 mg/L was found in groundwater sample MW59-1 and a TPH concentration of 1.38 mg/L was found in groundwater sample MW59-2. Currently, no criteria exist for detected concentrations of TPH in groundwater.

4.10.4 Tentatively Identified Compounds

Six soil samples had TIC concentration greater than 50 mg/kg. Soil samples SB59-1-01, SB59-5-00, SB59-5-00, SB59-5-03, TP59-1, TP59-2, and TP59-4 had Total TIC concentrations ranging from 53.7 to 1328. mg/kg. The occurrence of elevated TIC concentrations in these samples correlates to the elevated occurrence of VOCs and SVOs in the same samples.

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 eight AOCs.

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.

In preparing this document, residential future use is considered as a conservative criterion for eliminating an AOC from future investigation. This does not suggest, however, that the Army intends to remediate any site to such standards. Actual degrees of remediation will be proposed on a site-by-site basis and the future plans for the site will be taken into account.

In July 1995, the BAse Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Congress approved the recommendation, which became public law on October 1, 1995. According to BRAC regulations, future uses of the site will be determined by the Army.

In accordance with BRAC regulations, 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 of the sites 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.

Information about potential future land use in the area of the SEDA was obtained from the Romulus Town Clerk to determine if any master plans exist for this area or if any land use restriction could apply to the future use of portions of the SEDA facility. No zoning maps or master plans were found to exist for the site or surrounding area in the town of Romulus. 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 surrounding the SEDA facility is generally agricultural with sparse housing. Large tracts of undeveloped land are widely available for future development however, the area is not experiencing a high degree of growth nor is it expected to.

Information was obtained about potential offsite receptors by reviewing tax maps for the two towns which surround the SEDA facility (Varick and Romulus), conducting field reconnaissance of the area adjacent to SEDA to identify locations of potential receptors, and evaluating current land use maps for the area surrounding SEDA.

Land use adjacent to and off-site of the SEDA facility is sparse residential areas with some farmland. The population density in the two towns of Varick and Romulus is 67 people per square mile based on the 1990 U.S. Census. Potential off-site receptors would include any recreators such as waders who may use downstream portions of Kendaia Creek, Hicks Gully, or any drainage ditches, which flow off-site, on a seasonal basis. The nearest sensitive subgroup (receptor) location is the Central School in Romulus Village, approximately 1,000 feet from the eastern boundary of the SEDA. Additionally, recreation activities take place at Sampson State Park approximately 1 mile from the western boundary of the SEDA facility.

Residential communities surrounding the depot use potable water wells for drinking water supplies, which, however unlikely, could be a possible route of exposure to any contaminants released from the 8 AOCs. The use of the overburden aquifer as a source of drinking water is unlikely due to the limited aquifer yields and the high turbidity of the well water. As a result, well water supplies are bedrock wells rather than overburden wells.

The use of TAGM values as the criteria for comparison of detected concentrations of constituents from the sites provides some uncertainty in the determination of threats. The TAGM criteria are conservative values derived on exposure factors for residential land use. The land use of the sites at SEDA are currently industrial and any change to this usage in the future will require more extensive evaluations and risk determinations to be performed by the Army. The use of TAGM values in this analysis implies a future residential land use and results in conservative conclusions.

5.1 EXPOSURE PATHWAY SUMMARIES

A preliminary exposure pathway summary was developed for each of the eight 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-5 SEWAGE SLUDGE WASTE PILES

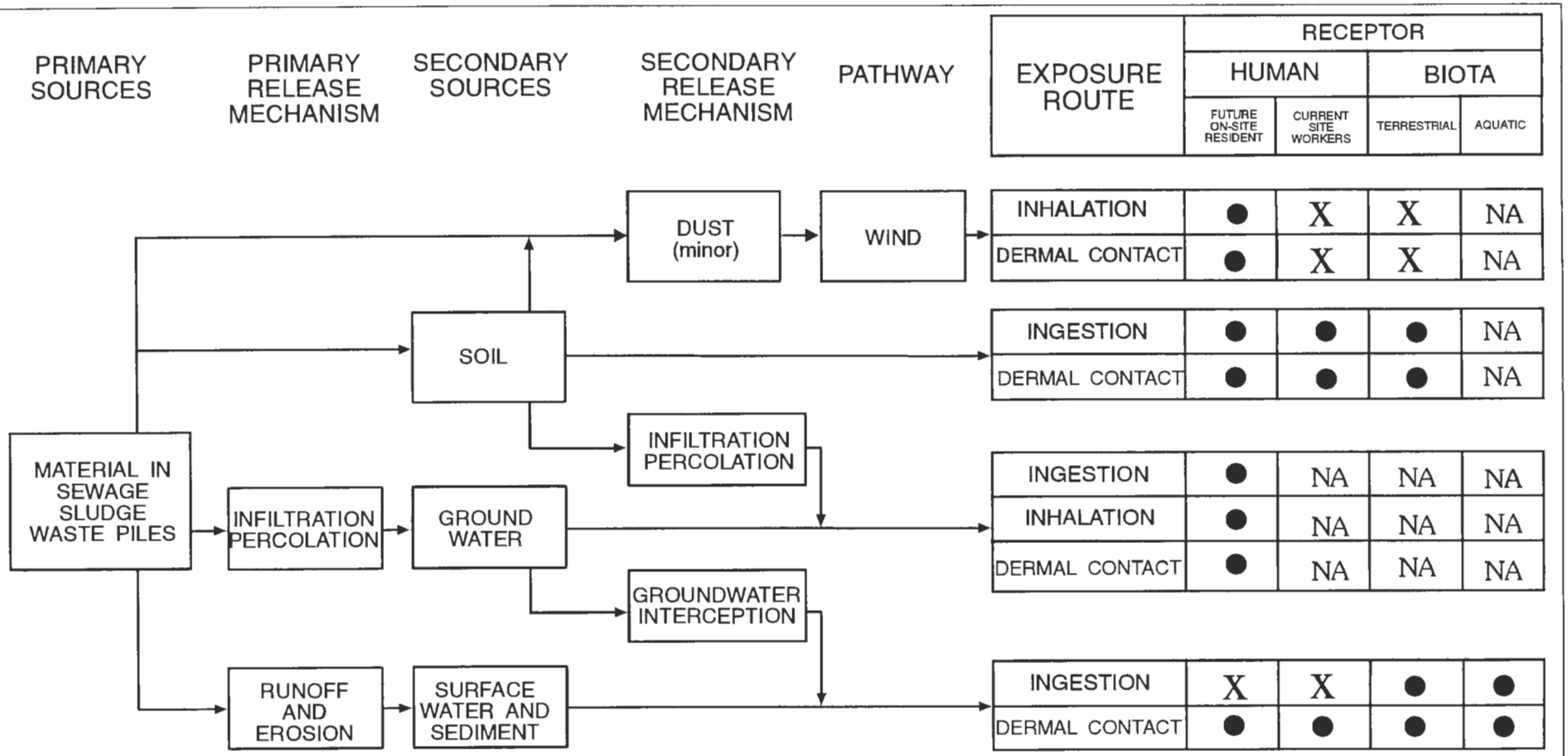
5.2.1 Potential Source Areas and Release Mechanisms

SEAD-5 is the location of 5 sewage sludge waste piles located immediately south of a dirt road that provides access to maintenance equipment storage areas. The materials buried in the soil piles are the primary source of a release. The primary release mechanisms from the 5 soil piles are surface water runoff and infiltration of precipitation. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are secondary sources. Dust is not a significant release mechanism because the piles and surrounding area is mostly covered by grass.

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions. The site is not located in the ammunition area.

There are three primary receptor populations for potential releases of contaminants from SEAD-5:



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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720519-01002

FIGURE 5.2-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-5

SCALE NA | DATE DECEMBER 1994

H:\ENG\SENECA\8SWMU\5EXP.CDR

1. Future on-site residents;
2. SEDA personnel or visitors to the site; and
3. Terrestrial biota on or near the sewage sludge piles.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.2.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

The 5 sewage sludge waste piles are located on relatively flat terrain and there are no well developed drainage ditches near the site. The nearest drainage ditch is located approximately 200 feet west of the site. Thus, this pathway is considered to be an unlikely risk for the applicable receptors. In the unlikely event that surface water and sediment are impacted by the site, the primary human and environmental receptors which would be affected are discussed below.

The primary human receptors of any surface water and sediment impacts are site visitors and future residents. Visitors to the site, as well as hunters or SEDA workers, could experience dermal exposure from walking in the drainage ditch, but they would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. SEDA workers could visit the site for security reasons. 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 drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from any impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

There are no anticipated off-site human or environmental receptors.

5.2.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for current site workers, and visitors, future on-site residents, and terrestrial biota.

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 5 soil piles is currently not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is unlikely that groundwater from the site will impact off-site receptors. 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 biota. Groundwater beneath the site flows to the west. The potential groundwater contribution to the surface water (i.e., water-filled drainage ditches) during periods of high groundwater 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, although minor, exposure pathways for future on-site residents. Currently, the site is vegetated and dust is not likely to be a release mechanism.

5.2.3 Summary of Affected Media

The impacts to the SEAD-5 site media (soil, groundwater, surface water, and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

The soils which comprise the 5 sludge piles located at SEAD-5 have been impacted by semivolatile organic compounds (primarily PAH compounds) and inorganic elements. Other constituents that were detected include pesticides, nitrate/nitrite nitrogen and cyanide. All of the detected concentrations of pesticides were below their respective TAGM values. No criteria exist for concentrations of nitrate/nitrite nitrogen or cyanide in soils.

Six PAH compounds, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and benzo(a)pyrene, were detected at concentrations which were above their respective TAGMs in four of the five soil samples collected at SEAD-5. Only test pit sample TP5-4 had reported concentrations of PAHs which were all below their respective TAGMs. Significant concentrations of heavy metals were detected in all 5 of the soil samples collected at SEAD-5. Copper, mercury, silver, and zinc were detected at concentrations which were at least an order of magnitude greater than their respective TAGM values.

Groundwater

Groundwater at the site has not been impacted by any of the constituents that were detected in the sewage sludge piles at SEAD-5. Iron, sodium and manganese were the only metals that were found at concentrations which were above their respective federal or state criteria for groundwater. All 3 elements were detected at insignificant concentrations in the soil samples collected in the sewage sludge piles. The only other compound detected in the groundwater at SEAD-5 was nitrate/nitrite nitrogen. All of the reported concentrations of nitrate/nitrite nitrogen were below the federal or state criteria of 10 mg/L.

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.3 SEAD-9 OLD SCRAP WOOD PILE

5.3.1 Potential Source Areas and Release Mechanisms

SEAD-9 was used for the disposal of scrap wood and potentially other waste materials. The site was also reported to have been used for fire training exercises. The suspected source at the site is a landfilled area that may contain hazardous materials. Infiltration from precipitation is a primary release mechanism to groundwater. If infiltration of precipitation

occurs then groundwater would be a secondary source. Surface water runoff across the site is also a primary release mechanism. Soil, surface water and sediment are also secondary sources.

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions. The site is not located in the ammunition area.

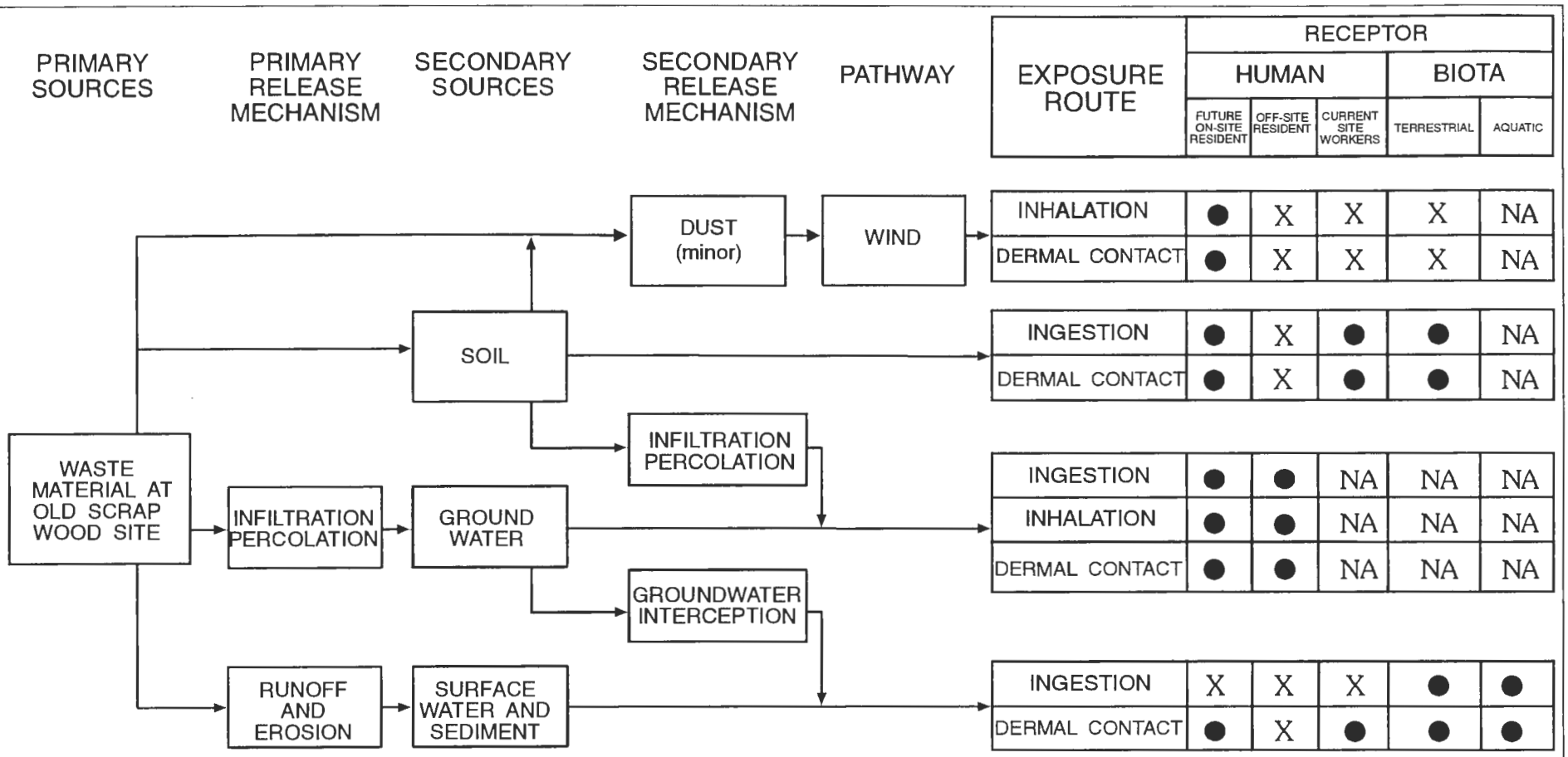
There are four primary receptor populations for potential releases of contaminants from SEAD-9:

1. Future on-site residents;
2. SEDA personnel and other people who might occasionally visit the site (because this is not an active site, these receptors are periodic);
3. Terrestrial biota on or near the site; and
4. Off-site residents.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.3.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water runoff via overland flow is controlled predominantly by the west-sloping topography, however, there are no well developed drainage ditches to collect the runoff on-site. The nature of the primary source (i.e., buried wastes) and the lack of substantial surface water and sediment media indicate that this pathway is considered to pose an unlikely risk to receptors. In the unlikely event that surface water and sediment media are impacted by the site, the primary human and environmental receptors which could be affected are identified below.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY CONSIDERED TO POSE UNLIKELY RISK

NA NOT APPLICABLE RECEPTOR

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

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DWG NO. 720519-01002

FIGURE 5.3-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-9

SCALE NA

DATE DECEMBER 1994

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The primary human receptors of any surface water and sediment impacts are site visitors and future residents. Visitors to the site, as well as hunters or SEDA workers, could experience dermal exposure from walking in an impacted drainage ditch, but they would be considered to have an unlikely risk of exposure from the ingestion of surface water or sediment. SEDA workers could visit the site for security reasons. 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 drainage ditches. 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., water-filled drainage ditches) may also be affected.

There are no anticipated off-site human or environmental receptors.

5.3.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.3.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-9 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 (ingestion, inhalation and dermal contact) 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 to the west-northwest. The potential groundwater contribution to the surface water (i.e., water-filled drainage ditches) during periods of high groundwater could result in the exposures identified for surface water and sediments above. Because of the site's proximity to the SEDA

boundary near the Village of Romulus, potential off-site receptors are residents who ingest or come in dermal contact with groundwater from off-site wells which may be impacted by groundwater from SEAD-9. This is unlikely because well water supplies are bedrock wells rather than overburden wells.

5.3.2.4 Dust Inhalation and Dermal Contact

The nature of the primary source (i.e., buried wastes) and the lack of substantial unvegetated land at the site indicate that the dust exposure pathway is not significant. Because the site is vegetated, it is highly unlikely that dust inhalation and dermal contact would occur on-site under the current use scenario. These exposure routes may become valid under a future use scenario.

5.3.3 Summary of Affected Media

The impacts to the SEAD-9 site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by semivolatile organic compounds (primarily PAHs) and total petroleum hydrocarbons. Five PAH compounds, benzo(a)anthracene, chrysene, benzo(b)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene, were detected at concentrations which exceeded their respective TAGM values in all of the surface soil samples. At depth, the concentrations of these constituents was reduced and only two subsurface soil samples, collected from the 4 to 6 foot depth interval, had PAH exceedances. Total petroleum hydrocarbons were detected in all but one of the soil samples at concentrations ranging from 33 to 15,900 mg/kg. Constituents that were detected, but are considered to pose an insignificant risk to receptors because of their low reported concentrations, include volatile organic compounds, pesticides, and one PCB compound. All of the reported concentrations of VOCs, pesticides and PCBs were below their respective TAGM values and only a small number of metals samples slightly exceeded their respective TAGMs.

Groundwater

Groundwater downgradient of SEAD-9 has been moderately impacted by total petroleum hydrocarbons. The upgradient groundwater quality at SEAD-9 was undetermined during this ESI due to a lack of recharge in the upgradient monitoring well at the time of groundwater sampling. The reported concentrations of TPH in samples MW9-2 and MW9-3 were 0.59 mg/L and 3 mg/L, respectively. Iron, manganese, and sodium were the only additional constituented which were found at elevated concentrations in the groundwater at SEAD-9. Iron was found in groundwater samples MW9-2 and MW9-3 at concentrations which were at least an order of magnitude above the federal or state groundwater criteria. Manganese and sodium were present at low concentrations and only slightly exceeded their respective criteria.

Surface Water

Surface water is not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment is not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.4 SEAD-12A RADIOACTIVE WASTE BURIAL SITE

5.4.1 Potential Source Areas and Release Mechanisms

Buried radioactive and other waste material are the potential source for hazardous materials at SEAD-12A. Infiltration from precipitation is a primary release mechanism to groundwater. If infiltration of precipitation occurs then groundwater would be a secondary source. Surface water runoff across the site is also a primary release mechanism. Soil, surface water and sediment are also secondary sources.

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions. Since this site is within the ammunition storage area, further access is restricted.

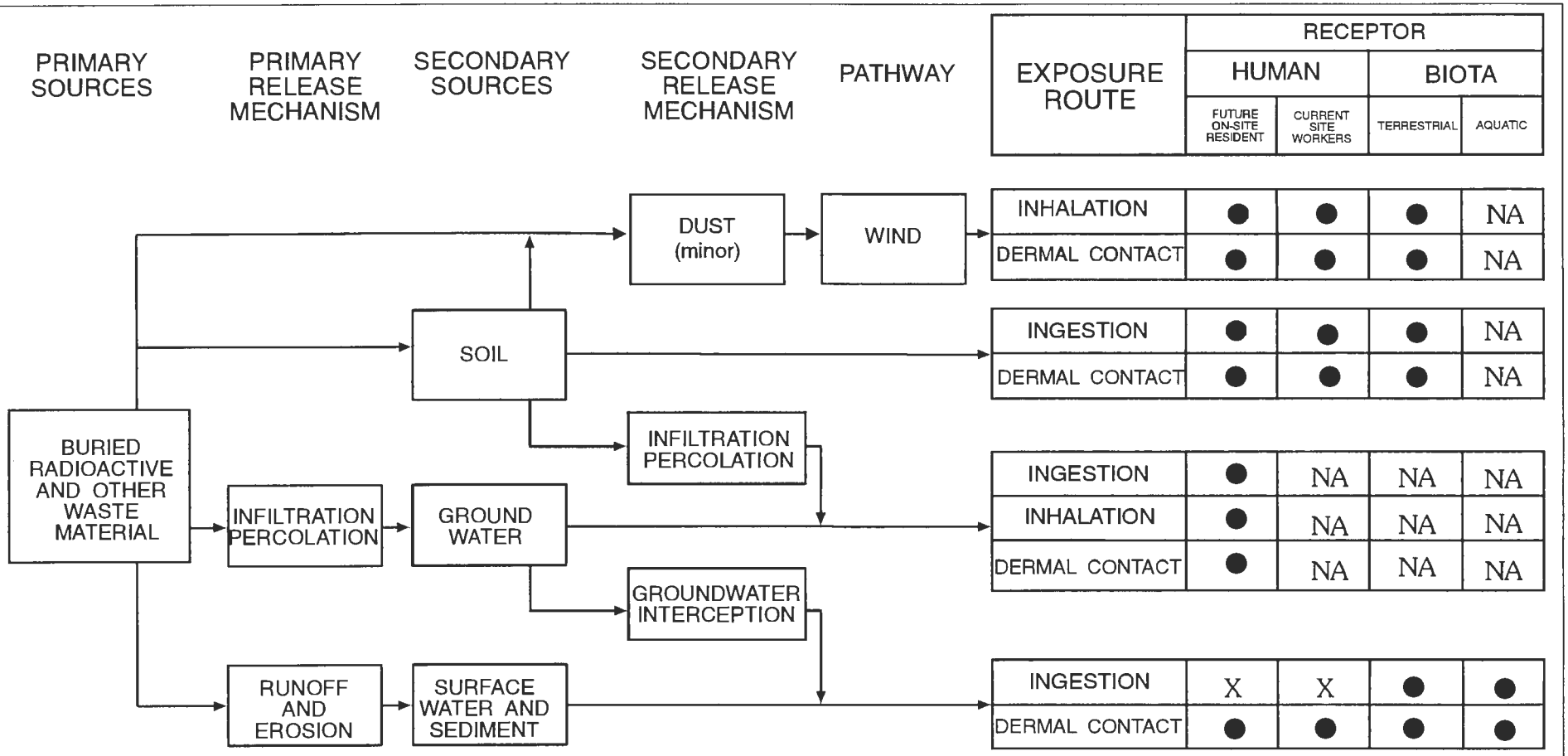
There are three primary receptor populations for potential releases of contaminants from SEAD-12A:

1. Future on-site residents;
2. SEDA personnel or visitors who may go to the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered 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 via overland flow is controlled by the generally west-sloping surface topography and by drainage ditches along Patrol Road and Service Road No. 1. A small elevated area in the eastern portion of the site is likely to direct some overland flow east toward the ditch along Patrol Road. In addition, a subtle elongate depression is also likely to collect surface water via overland flow. A sustained stream is located in the southern portion of the site and flows under Service Road No. 1. There is also a small circular depression at the location of a burial pit, which likely formed from the settling of soil, in the southeast-central portion of the site. The ditches and stream are believed to be ephemeral and any transport of impacted surface water and sediment to them would likely occur during precipitation or spring snow melt events via overland flow. The circular depression is also likely to receive water during precipitation or snow melt events. Due to these events, these features may fill with water for extended periods of time.



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 720519-01002

FIGURE 5.4-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-12A

SCALE NA

DATE DECEMBER 1994

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The primary human receptors of the surface water and sediment impacts are site visitors and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches, intermittent stream or the circular depression. They would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. No hunting occurs in the fenced area where SEAD-12A is located. Future residents could come in contact with surface water and sediment at the site.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. 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., water-filled drainage ditches) may also be affected.

There are no anticipated off-site human or environmental receptors.

5.4.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.4.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-12A is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is unlikely that groundwater from the site will impact off-site receptors. 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 (ingestion, inhalation and dermal contact) 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 to the west.

The potential groundwater contribution to the surface water (i.e., the drainage ditch, intermittent stream and circular depression) during periods of high groundwater could result in the exposures identified for surface water and sediments above.

5.4.2.4 Dust/Radon Gas Inhalation and Dermal Contact

The majority of the site is vegetated and exposure to dust and/or radon gas (a volatile daughter product of radium) is considered to pose and unlikely risk. However, dust/radon gas inhalation, dermal contact with dust, and submersion in radon gas are considered to pose a potential risk for the sparsely vegetated and unvegetated central and north-central portions of the site. The unvegetated land surface of the burial pits in the southeastern portion of the site are also considered to pose a potential risk for exposure to dust. Additionally, at the locations of animal burrows in the burial pits, subsurface soil has been brought to the land surface.

The dust and/or radon emissions could be inhaled by, or come in contact with, future on-site residents and terrestrial biota.

5.4.3 Summary of Affected Media

The impacts to the SEAD-12A site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been significantly impacted by radium-226 and its associated decay products (ra-226+D), and the heavy metal cadmium. The calculated annual radiation dose from the reported concentrations of ra-226+D in the samples collected from test pit TP12A-1 (492 mrem/year in sample TP12A-1-1 and 1,342 mrem/year in sample TP12A-1-2) exceeded both the New York state TAGM (90 mrem/year) and proposed federal criteria for the protection of the general public (proposed 10 CFR 834,180 mrem/year). Cadmium was found at significant concentrations in 5 of the soil samples collected from test pits TP12A-1, TP12A-2 and TP12A-3. The reported concentrations of cadmium in the 5 soil samples ranged from 3.6 mg/kg in sample TP12A-3-1 to 94.3 mg/kg in sample TP12A-1-2. The TAGM for cadmium in soil is 1 mg/kg. Additional constituents that were detected include volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and metals. The

volatile organic compounds, semivolatile organic compounds, pesticides, and PCBs were detected at low concentrations and only 2 semivolatile compounds were found at a concentrations which slightly exceeded their respective TAGMs. All of the soil samples contained various heavy metals at concentrations which exceeded their respective TAGMs. The only significant occurrences of heavy metals (in addition to cadmium) were the reported concentrations of lead (431 mg/kg) in soil sample TP12A-6-2 and the reported concentrations of lead (366 mg/kg) and silver (11.9 mg/kg) in soil sample TP12A-1-2.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include one volatile organic compound, metals, and gross alpha and gross beta radiation. The reported concentrations of acetone in groundwater sample MW12A-3 and the reported concentration of iron in all three groundwater samples were considered to pose little impact because they were either present at low concentrations or were found at elevated concentrations which could be attributed to the high turbidity of the groundwater at SEAD-12A. The radioactivity results indicate that the groundwater in monitoring well MW12A-2 (located hydraulically downgradient of two disposal pits) is being impacted by gross alpha radiation. The concentration of gross alpha radiation in monitoring well MW12A-2 exceeded the NYS AWQS Class GA and federal drinking water criteria by a factor of two.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include semivolatile organic compounds, metals, and potassium-40. Gross alpha and gross beta radiation were also detected in all of the surface water samples collected at SEAD-12A. All of these constituents were considered to pose an insignificant risk to receptors because all were found at low concentrations and only pentachlorophenol, benzo(a)pyrene, and iron were each found in only one sample at concentrations which exceeded their respective TAGMS. Aluminum and silver were found in two samples above their TAGM values.

Sediment

Sediment at the site has not been significantly impacted by any of the constituents analyzed for during this ESI. Semivolatile organic compounds, radionuclides, and heavy metals were the only constituents which were found in the sediment samples collected at SEAD-12A. The metals iron, nickel and manganese were the only constituents which were found at concentrations exceeding both the lowest effect level and severe effect level. Nickel was found at a concentration of 52.8 mg/kg in sediment sample SD12A-1. The severe effect level is 50 mg/kg. Manganese was found at a concentration of 13,500 mg/kg in sediment sample SD12A-4. The severe effect level is 1100 mg/kg. The reported concentrations of the SVOs fluoranthene and di-n-butylphthalate found in the sediment collected at SEAD-12A were detected at low concentrations. The radionuclides lead-210, radium-226, radium-228, thorium-228, uranium-235, and uranium-238 were detected at calculated annual doses which were below the proposed 10 CFR 834 value of 100 mrem/yr above background.

5.5 SEAD-12B RADIOACTIVE WASTE BURIAL SITE

5.5.1 Potential Source Areas and Release Mechanisms

The suspected sources are buried radioactive and possibly other wastes contained in a pit and radioactive wastewater in a 5,000-gallon underground storage tank. The primary release mechanism from the buried radioactive materials is infiltration and percolation and to a lesser extent runoff and erosion. Leakage from the underground storage tank is a primary release mechanism. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions. Since this site is within the ammunition storage area, further access is restricted.

There are three primary receptor populations for potential releases of contaminants from SEAD-12B:

1. Future on-site residents;
2. SEDA personnel and visitors who may go on or near the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.5.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water runoff via overland flow is controlled generally by the west-sloping topography on-site. A small drainage ditch parallels Patrol Road in the northwestern portion of the site. Another drainage ditch is located immediately adjacent to the site along its southern boundary. Both ditches are ephemeral. The nature of the primary source (i.e., buried wastes) and the lack of substantial surface water and sediment media indicate that this pathway is considered to pose an unlikely risk to receptors. In the unlikely event that surface water and sediment media are impacted by the site, the primary human and environmental receptors which could be affected are identified below.

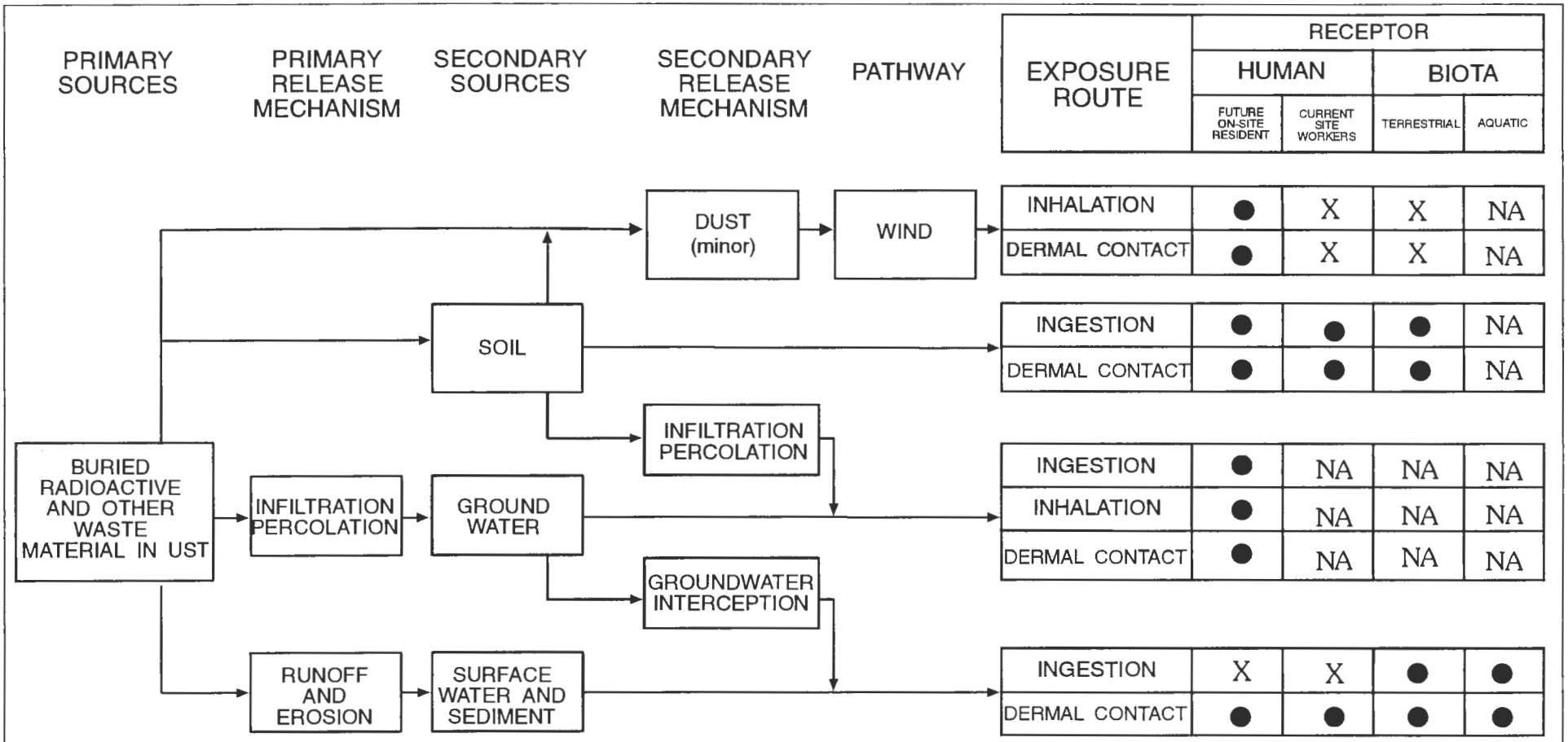
The primary human receptors of any surface water and sediment impacts are site visitors and future residents. Visitors to the site, as well as hunters or SEDA workers, could experience dermal exposure from walking in the drainage ditches, but they would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. SEDA workers could visit the site for security reasons. 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 drainage ditches. 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., water-filled drainage ditches) may also be affected.

There are no anticipated off-site human or environmental receptors.

5.5.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on



EXPOSURE ROUTE	RECEPTOR: HUMAN — FUTURE ON-SITE RESIDENT	RECEPTOR: HUMAN — CURRENT SITE WORKERS	RECEPTOR: BIOTA — TERRESTRIAL	RECEPTOR: BIOTA — AQUATIC
INHALATION	●	X	X	NA
DERMAL CONTACT	●	X	X	NA
INGESTION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	NA	NA	NA
INHALATION	●	NA	NA	NA
DERMAL CONTACT	●	NA	NA	NA
INGESTION	X	X	●	●
DERMAL CONTACT	●	●	●	●

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY CONSIDERED TO POSE UNLIKELY RISK

NA NOT APPLICABLE RECEPTOR

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FIGURE 5.5-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-12B

SCALE NA | DATE DECEMBER 1994

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occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.5.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-12B is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is unlikely that groundwater from the site will impact off-site receptors. 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 (ingestion, inhalation, and dermal contact) 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 south. There is little potential for groundwater contribution to the surface water (i.e., the drainage ditches) that could result in the exposures identified for surface water and sediments above.

5.5.2.4 Dust/Radon Gas Inhalation and Dermal Contact

The majority of the site is vegetated and exposure to dust and/or radon gas (a volatile daughter product of radium) is considered to pose and unlikely risk. However, dust/radon gas inhalation and dermal contact are considered to pose a potential risk for the sparsely vegetated central and eastern portions of the site.

The dust and/or radon emissions could be inhaled by, or come in contact with, future on-site residents and terrestrial biota.

5.5.3 Summary of Affected Media

The impacts to the SEAD-12B site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, and metals. The principal and/or associated radionuclides of the thorium, uranium and actinium decay series were also detected in the soil samples collected at SEAD-12B. All of the reported concentrations of these constituents were low and only seven heavy metals and one total radiation dose (from soil sample MW12B-1-03) slightly exceeded their associated TAGM values.

Groundwater

Groundwater at SEAD-12B has been impacted by 3 radionuclides, gross alpha and gross beta radiation, and one heavy metal. Radium-226, several of the associated radionuclides from the uranium decay series, and uranium-235 were detected in the groundwater sample collected from monitoring well MW12B-1. The reported concentration of radium-226 was above the proposed MCL and the federal health advisory criteria. No criteria exist for the detected concentrations of the lead-210 decay products. The reported concentration of uranium-235 in the groundwater from monitoring well MW12B-1 was only slightly above the proposed MCL for this radionuclide. Gross alpha radiation was detected at concentrations that exceeded its respective criteria in all of the groundwater samples collected at SEAD-12B. Iron was the only additional constituent which was found at significant concentrations in all three of the groundwater samples collected at SEAD-12B.

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.6 SEAD 43: OLD MISSILE PROPELLANT TEST LABORATORY SEAD 56: HERBICIDE/PESTICIDE STORAGE (BLDG. 606) SEAD 69: BUILDING 606 DISPOSAL AREA

5.6.1 Potential Source Areas and Release Mechanisms

The suspected source(s) are explosive materials from former missile propellant test laboratory Building 606, herbicides and pesticides that were also stored in Building 606, and a disposal area associated with these operations. A septic system for these areas is also a suspected source area. The primary release mechanisms from the site area are surface water runoff and erosion, and infiltration and percolation. If infiltration of precipitation occurs, then groundwater would be a secondary source. Soil, surface water, and sediment are also secondary sources.

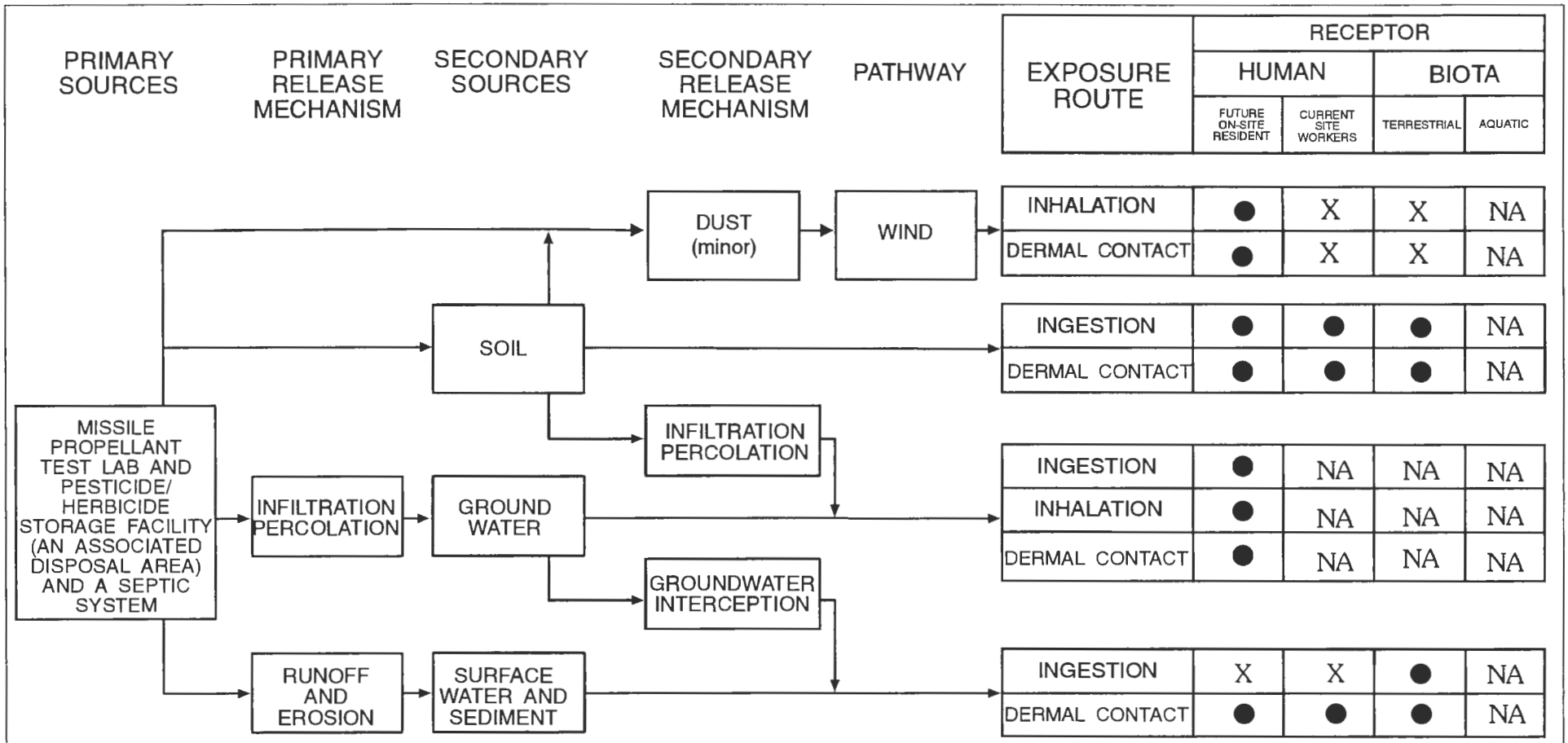
5.6.2 Potential Exposure Pathways and Receptors

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions.

There are three primary receptor populations for potential releases of contaminants from SEADs 43, 56, 69:

1. Future on-site residents;
2. SEDA personnel who might work on or near the site and visitors to the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on and near the site.

Aquatic biota are not considered 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 effect the various receptors.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY CONSIDERED TO POSE UNLIKELY RISK

NA NOT APPLICABLE RECEPTOR

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FIGURE 5.6-1

EXPOSURE PATHWAY SUMMARY FOR SEADs-43,56,69

SCALE NA | DATE DECEMBER 1994

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5.6.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off via overland flow is controlled by the generally west-sloping topography and the drainage ditches. There is a local surface water divide located immediately northeast of Building 606; in this area two northeast draining ditches join to form one ditch which extends beyond the northeastern border of the site. South west of Building 606 surface water in the ditches would be expected to flow south and west. The drainage ditches that flank the road in the southern portion of the site originate near the disposal area at SEAD-69 and the septic system at SEAD-43. North of the septic system, drainage is expected to be generally west along the road that provides access to the former missile propellant testing laboratory. In the far northwestern portion of the site, drainage is to the west. Ultimately, these ditches drain west beyond the ammunition storage area fence line.

The drainage ditches are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. Hunters could be impacted by the same mechanism. They would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. 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 drainage ditches. 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., water-filled drainage ditches) may also be affected.

There are no anticipated human or environmental off-site receptors.

5.6.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.6.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath the site (SEADs 43, 56, 69) 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.

There are no anticipated off-site receptors of the groundwater.

5.6.2.4 Dust Inhalation and Dermal Contact

The nature of the primary source and the lack of substantial unvegetated land at the site indicate that the dust exposure pathway is not significant. Because the site is mostly vegetated, it is highly unlikely that dust inhalation and dermal contact would occur under the current use scenario at this site. These exposure routes may be valid under a future land use scenario.

5.6.3 Summary of Affected Media

The impacts to the SEAD-43,-56,-69 site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been moderately impacted only by semivolatile organic compounds. Six PAH compounds were detected at concentrations which exceeded their respective TAGM values. All of the TAGM exceedances were limited to three soil samples, one collected from the SB43-3 soil boring and two collected from the SB43-4 soil boring. The distribution of detected PAH compounds in the soil samples collected at SEADs-43, 56, and 69 (figure 4.5-1) indicated that the highest concentrations of PAHs were found in close proximity to Building 606.

Constituents that were detected, but are considered to pose an insignificant risk to receptors, include volatile organic compounds, pesticides, metals, and nitrate/nitrite nitrogen. These constituents were detected at low to moderate concentrations and sixteen of the metals were detected at concentrations which slightly exceeded their respective TAGMs.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. The herbicide 2,4,5-TP (silvex), metals, and nitrate/nitrite nitrogen were the only constituents detected in the groundwater samples collected at SEADs 43, 56, and 69. Iron and thallium were the only metals found above the associated federal or state groundwater criteria. This constituent was considered to pose an insignificant risk to receptors because the significant concentrations of iron, which were found in samples MW43-1 and MW43-3, and the concentration of thallium, which was found in sample MW43-1, were correlated to the high turbidity of these groundwater samples.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include volatile organic compounds, metals, and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to receptors because they are either present at low concentrations or only a small number of samples exceed their NYS Class C surface water criteria for inorganic constituents.

Sediment

Sediment at the site has not been significantly impacted by any of the constituents analyzed for during the investigation of the site. Constituents that were detected, but are considered to pose little risk, include volatile organic compounds, herbicides, nitroaromatics, metals, and nitrate/nitrite nitrogen. These constituents are present at low concentrations and only a small number of samples slightly exceeded their respective NYSDEC sediment criteria for inorganic constituents.

5.7 SEAD-44A QUALITY ASSURANCE TEST LABORATORY

5.7.1 Potential Source Areas and Release Mechanisms

The suspected source is waste materials associated with munitions and pyrotechniques that may have been disposed of at the site. The primary release mechanisms from the site is surface water runoff and infiltration of precipitation. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

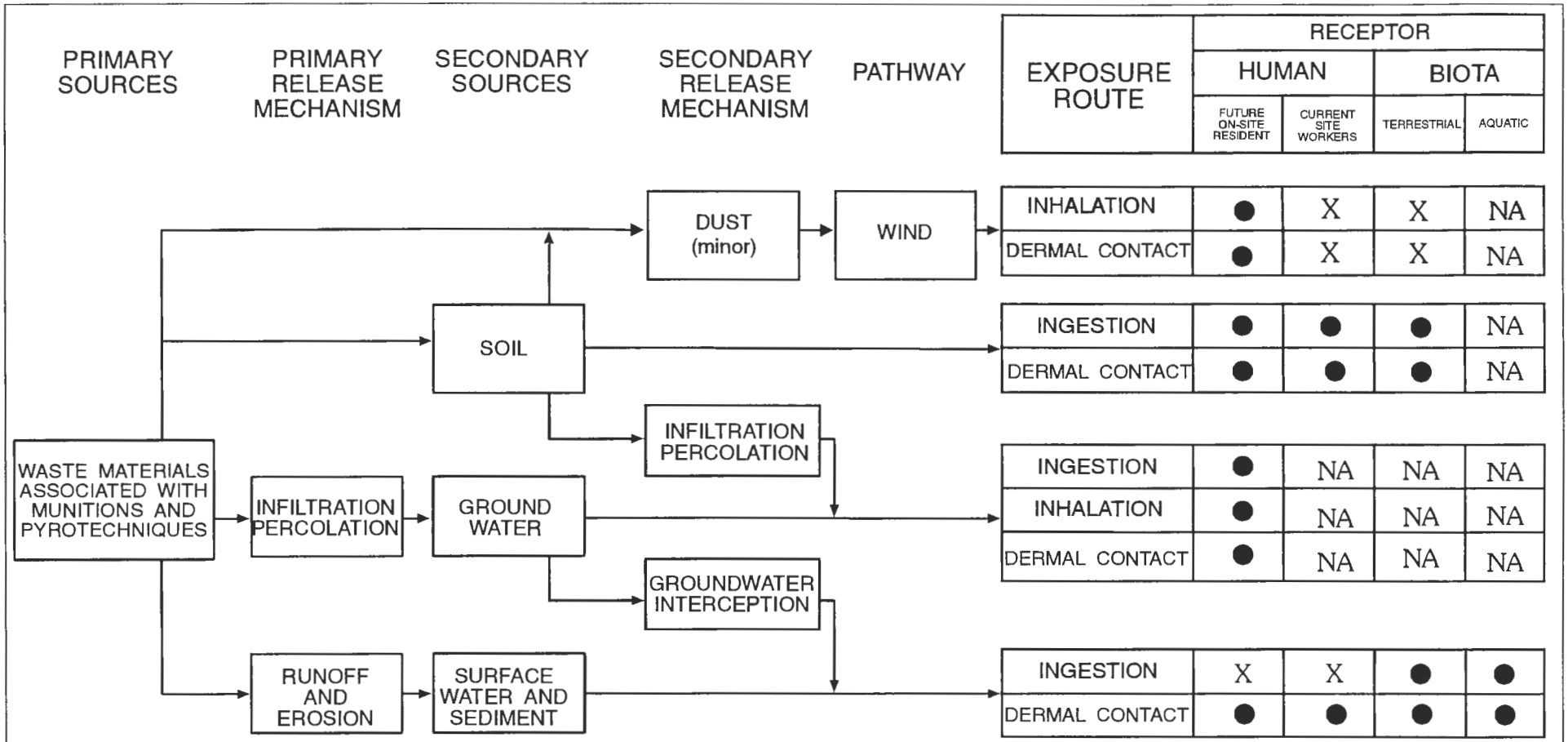
5.7.2 Potential Exposure Pathways and Receptors

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions.

There are three primary receptor populations for potential releases of contaminants from SEAD-44A:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota and aquatic biota on or near the site.

The exposure pathways and media of exposure are described below as they may affect the various receptors.



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SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

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FIGURE 5.7-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-44A

SCALE NA | DATE DECEMBER 1994

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5.7.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off via overland flow is controlled by the generally west-sloping topography. Drainage ditches bound the access road to the site and a small stream flows east to west in the southern portion of the site. These ditches and the stream are believed to be ephemeral and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches and stream may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. Hunters could be impacted by the same mechanism. These receptors would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. 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 drainage ditches. 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., water-filled drainage ditches) and the stream may also be affected.

There are no anticipated human or environmental off-site receptors.

5.7.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.7.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-44A is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is unlikely that groundwater from the site will impact off-site receptors. 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.

5.7.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is an unlikely scenario as the site is completely vegetated. Under a different scenario, dust could be inhaled by, or come in contact with, future on-site residents.

5.7.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at SEAD-44A have not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected, but are considered to pose an insignificant risk to receptors because of their low reported concentrations include volatile organic compounds, the nitroaromatic compound 2,4,6-trinitrotoluene, semivolatile organic compounds, pesticides and metals. All of these constituents, except 4 of the SVOs, were detected at low concentrations and only a small number of metals samples were found at concentrations above their respective TAGMs. The SVOs benzo(a)anthracene, chrysene, benzo(a)pyrene, and dibenz(a,h)anthracene were detected at concentrations which were above their respective TAGM values only in the samples collected from the berm excavations. No exceedances for these compounds were found in the surface soil samples collected throughout SEAD-44A.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include two volatile organic compounds, heavy metals, and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to receptors because they are present at low concentrations and only one groundwater sample had a reported concentration of iron which exceeded its associated federal or state groundwater criteria.

Surface Water

Surface water has not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected include heavy metals and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to receptors because they are present at low concentrations and only aluminum, iron, nickel, and zinc were found at concentrations which exceeded their respective NYS Class C surface water criteria.

Sediment

Sediment at SEAD-44A has not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected include two semivolatile organic compounds, heavy metals and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to receptors because they are present at low concentrations and only copper, manganese, and nickel were found at concentrations which slightly exceeded their respective NYSDEC sediment criteria for aquatic life.

5.8 SEAD-44B QUALITY ASSURANCE TEST LABORATORY

5.8.1 Potential Source Areas and Release Mechanisms

The suspected source area is waste materials associated with munitions and pyrotechniques activities which have occurred at SEAD-44B. The primary release mechanisms are surface water infiltration and percolation, and surface water runoff and erosion. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, sediment, and to a lesser extent surface water, are also secondary sources.

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. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions.

There are three primary receptor populations for potential releases of contaminants from SEAD-44B:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered 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.

5.8.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the generally west-sloping topography, and drainage ditches along the eastern and southern boundaries of the site.

The ditches are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches and stream would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. Hunters could be impacted by the same mechanism. These receptors would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

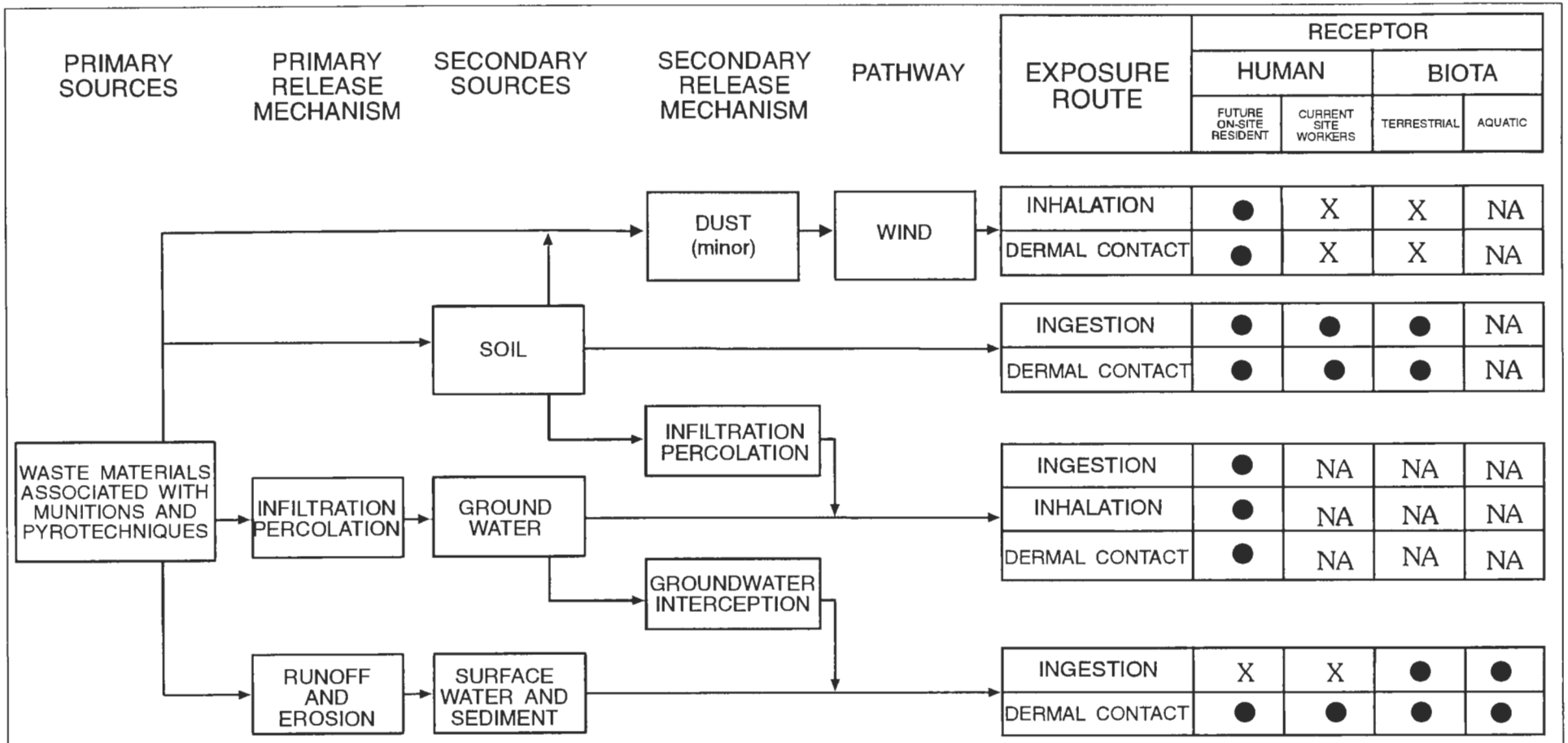

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FIGURE 5.8-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-44B

SCALE NA | DATE DECEMBER 1994

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The primary environmental receptors of any impacted surface water and sediment are the biota of the intermittent stream and drainage ditches. 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., water-filled drainage ditches) may also be affected.

There are no anticipated human or environmental off-site receptors.

5.8.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.8.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-44B is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is unlikely that groundwater from the site will impact off-site receptors. Under current uses, it is not anticipated that there will be direct exposure to the groundwater from the site 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 to the west and it also has the potential to recharge the drainage ditches during periods of high water. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.8.2.4 Dust Inhalation and Dermal Contact

Inhalation of, and dermal contact with dust, is an unlikely scenario as the site is completely vegetated. Under a different land use scenario, dust could be inhaled by, or come in contact with, future on-site residents.

5.8.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected, but considered to pose an unlikely risk to receptors because of their low reported concentrations, include volatile organic compounds, semivolatile organic compounds, pesticides, metals, and nitrate/nitrite nitrogen. Several heavy metals were found at concentrations which slightly exceeded their associated TAGM values and only one sample slightly exceeded its TAGM values for benzo(a)pyrene and dibenz(a,h)anthracene.

Groundwater

Groundwater at the site has not been impacted by any of the constituents analyzed for during this ESI. The only constituents detected were inorganic elements, and iron and thallium were the only elements found at concentrations which slightly exceeded their associated federal or state groundwater criteria. Trace concentrations of nitrate/nitrite nitrogen were also detected in the groundwater samples collected at SEAD-44B, and all of the reported concentrations were well below the associated federal or state groundwater criterium.

Surface Water

Surface water at SEAD-44B has not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected include heavy metals and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to

receptors because they were all present at low concentrations and none were found at concentrations which exceeded their respective NYS Class C surface water criteria.

Sediment

Sediment at SEAD-44A has not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected include two volatile organic compounds, one semivolatile organic compound, heavy metals, and nitrate/nitrite nitrogen. These constituents were considered to pose an insignificant risk to receptors because they were detected at low concentrations and only arsenic, copper, iron, manganese, and nickel were found at concentrations which exceeded their associated NYSDEC sediment criteria.

5.9 SEAD-50 TANK FARM

5.9.1 Potential Source Areas and Release Mechanisms

The suspected sources are waste materials associated with bulk storage of minerals, ores, and asbestos. The primary release mechanisms are infiltration and percolation and surface water runoff and erosion. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, sediment, and to a lesser extent surface water, are also secondary sources.

5.9.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways, from sources to receptors, are shown schematically in Figure 5.9-1. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions.

There are four primary receptor populations for potential releases of contaminants from SEAD-50:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic);

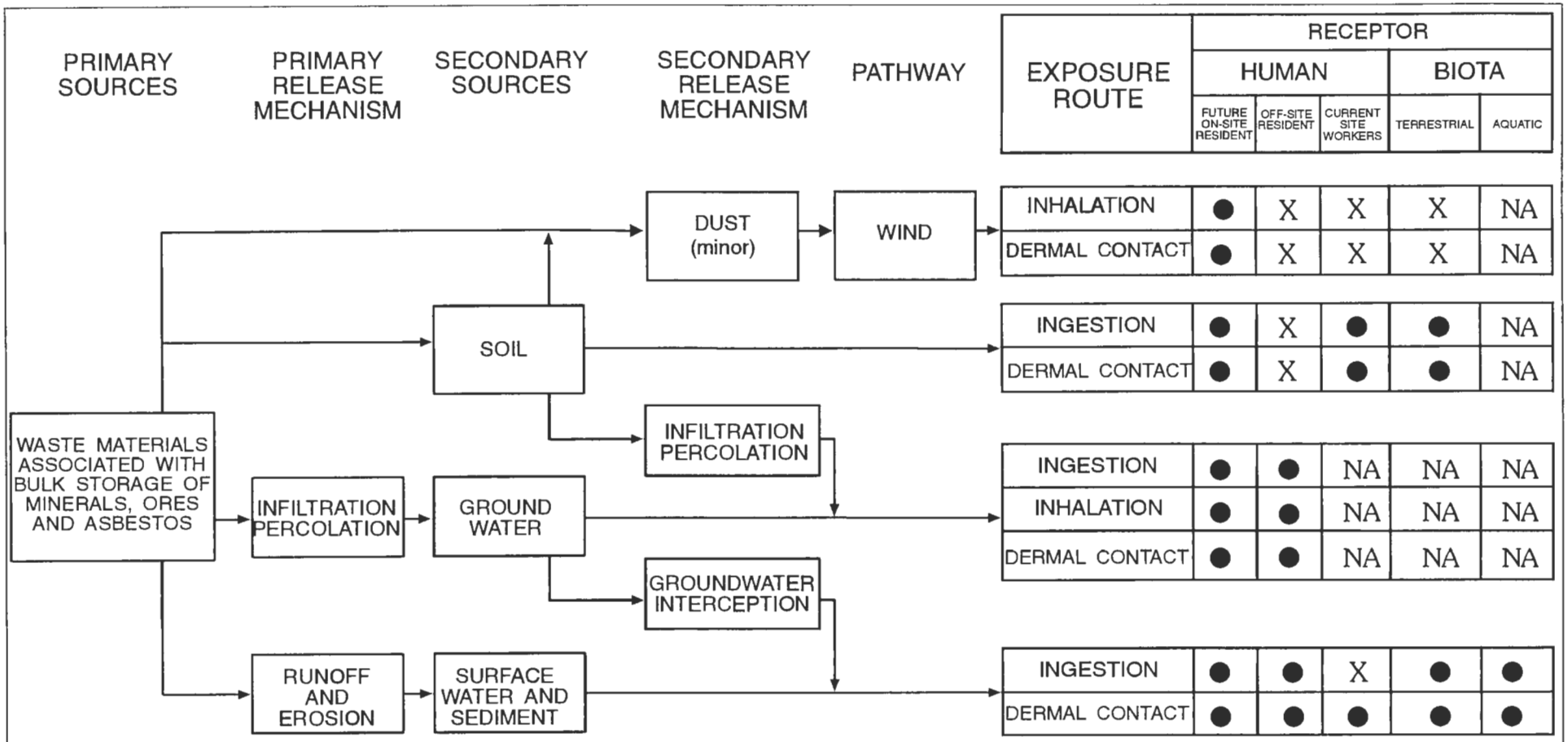

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FIGURE 5.9-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-50

SCALE NA | DATE DECEMBER 1994

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3. Current off-site residents; and
4. Aquatic and/or terrestrial biota on or near the site.

The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.9.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the east-northeast-sloping topography, numerous drainage ditches, and to a lesser extent, by a small stream (Hicks Gully) in the eastern portion of the site. Numerous east-west trending drainage ditches are present throughout the site and help direct surface water to a well developed ditch that parallels the western side of East Patrol Road. The northern extension of this ditch directs surface water off-site to the east, across the SEDA boundary to Route 96 where it is eventually discharged to the south into Hicks Gully. In the southern extension of this ditch, surface water flow would likely be to the south and then into Hicks Gully or it would be directly discharged into Hicks Gully. Hicks Gully is believed to be characterized by year round flow as it was observed to contain water during the late summer when the saturated thickness of the overburden aquifer at SEDA (the ground water data is from another area of SEDA, the Ash Landfill) is near its minimum for the year. The late summer would correspond to the minimum baseflow for Hicks Gully. Hicks Gully would likely receive influxes of surface water and sediment via overland flow during precipitation or spring snow melt events.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters, off-site recreators, and future on-site residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from wading in impacted surface water or sediment in Hicks Gully. These receptors would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future on-site residents could ingest or experience dermal exposure to surface water and sediment. Potential off-site receptors are recreators or hunters who wade in portions of Hicks Gully and the drainage ditches, which run off-site and are impacted by surface water from SEAD-50.

The primary environmental receptors of any impacted surface water and sediment are the aquatic biota of Hicks Gully both on and off-site. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from the impacted stream or eat aquatic biota may also be affected.

5.9.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.9.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-50 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.

Because of the site's proximity to the SEDA boundary near the Village of Romulus, potential off-site receptors may include residents who obtain their water from off-site wells, which may be impacted by groundwater from SEAD-50. This is an unlikely route because well water supplies are bedrock wells rather than overburden wells.

Groundwater beneath the site flows to the east-northeast and likely provides recharge to Hicks Gully. The potential groundwater contribution to the surface water could result in the exposures identified above for surface water and sediments. Groundwater at this site is believed to be very close to the regional groundwater divide that exists on the elevated till plane between Seneca and Cayuga Lakes.

5.9.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is an unlikely scenario as the site is completely vegetated with grass lands, thick brush, and several stands of trees. Dust could be inhaled by, or come in contact with, future on-site residents.

5.9.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by semivolatile organic compounds, predominantly PAHs, heavy metals, and to a lesser extent, asbestos. TAGM exceedances for 6 PAH compounds were found mostly in surface soil samples SS50-11 and SS50-14. These two sample locations are situated in the north-central portion of SEAD-50 (figure 4.6-1). Chromium, lead, and zinc were all found at concentrations which exceeded their associated TAGM values in at least 66 percent of the soil samples collected at SEAD-50. Arsenic was also detected at significant concentrations, however, arsenic exceedences were found in only 4 of the 15 surface soil samples. TAGM exceedences for all other metals were generally evenly distributed throughout the surface soil samples and none were found at significant concentrations. Chrysotile asbestos comprised between 10 to 15 percent of surface soil sample SS50-1. Asbestos was not found in any of the remaining 14 surface soil samples collected at SEAD-50. Other constituents that were detected, but were considered to pose little impact, include 1 volatile organic compound, pesticides and PCBs. All of the reported concentrations of these constituents were well below their respective TAGMs.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. The constituents which were detected in the groundwater samples collected at SEAD-50, but considered to pose an insignificant risk to receptors because of their low reported concentrations, include one semivolatile organic compound and metals. The reported concentrations of these constituents were generally

below their associated criteria values. Specifically, iron, manganese, sodium and thallium were the only elements found above their associated federal or state groundwater criteria.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents that were detected. The metals which were detected in the surface water samples collected at SEAD-50 were considered to pose an insignificant risk to receptors because they were detected at low concentrations and only one sample slightly exceeded the NYS class C surface water criteria for iron, and for aluminum.

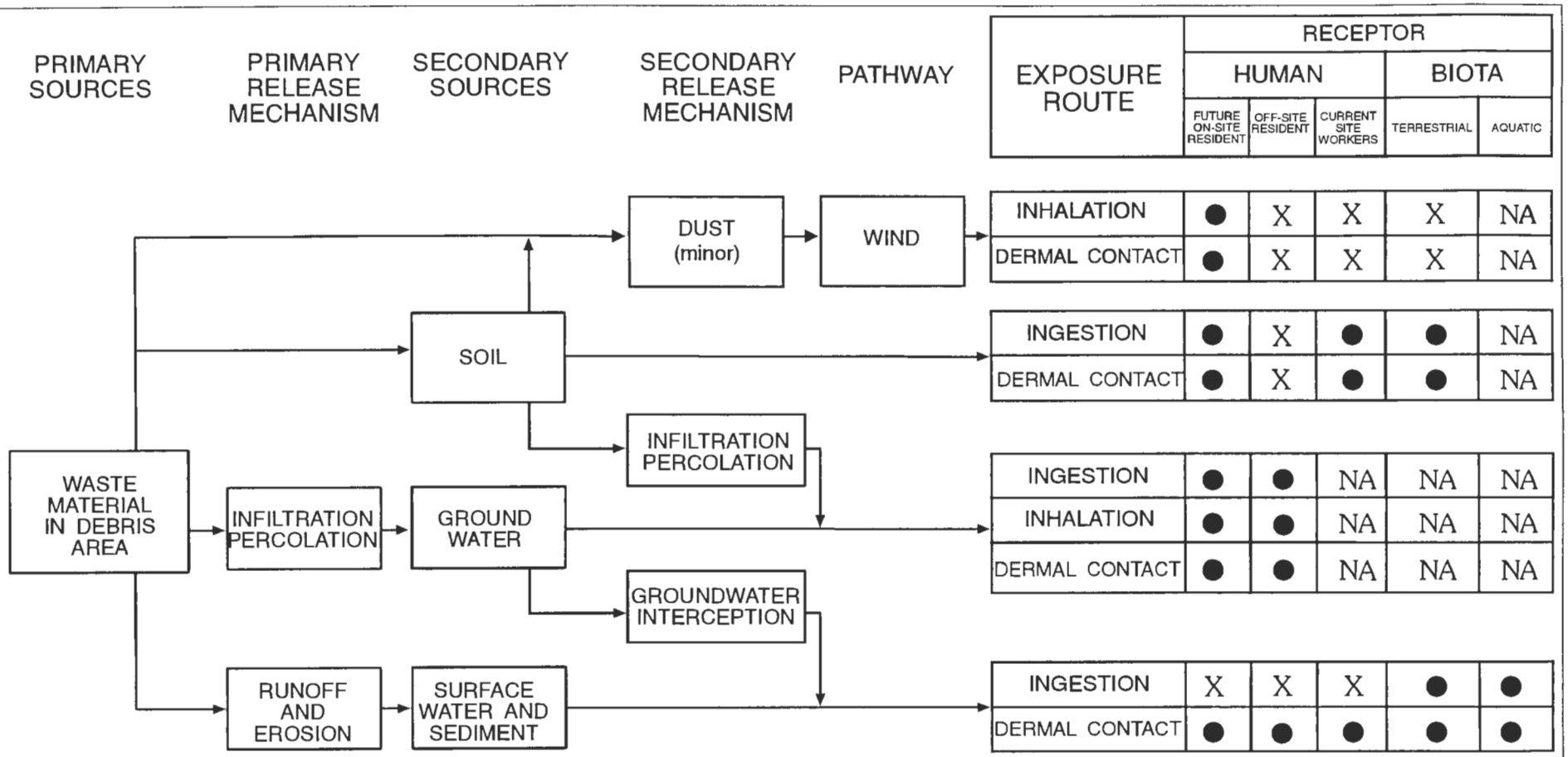
Sediment

Sediment at the site has been impacted by semivolatile organic compounds (mostly PAHs) and pesticides, and PCBs. PAHs were found at concentrations which were above their respective TAGM values in all 3 of the sediment samples collected at SEAD-50. Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were found in sediment samples SD50-1 and SD50-2 at concentrations which were at least an order of magnitude greater than their respective NYSDEC sediment criteria for human health. The pesticides aldrin, endosulfan I, 4,4'-DDE, and alpha-Chlordane and the PCB Arochlor-1260 were found in sediment sample SD50-1 at concentrations which exceeded their respective NYSDEC sediment criteria for human and/or aquatic life. Other constituents which were detected in the sediment samples collected at SEAD-50 include one volatile organic compound and metals. These constituents were considered to pose an insignificant risk to receptors because they were present at low concentrations and only a small number of samples had reported concentrations of metals which slightly exceeded their respective sediment criteria.

5.10 SEAD-58 DEBRIS AREA NEAR BOOSTER STATION 2131

5.10.1 Potential Source Areas and Release Mechanisms

The suspected source is waste material associated with 1 debris area and an area of stressed vegetation located northeast of Booster Station 2131. The primary release mechanisms are infiltration and percolation of precipitation, and surface water runoff and erosion. If



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY CONSIDERED TO POSE UNLIKELY RISK

NA NOT APPLICABLE RECEPTOR

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FIGURE 5.10-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-58

SCALE NA

DATE DECEMBER 1994

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infiltration of precipitation occurs then groundwater would be a secondary source. Soil, sediment and surface water are also secondary sources.

5.10.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways, from sources to receptors, are shown schematically in Figure 5.10-1. Human and vehicular access to the site is restricted by a chain-link fence.and a locking gate that are part of SEDA's general security provisions.

There are four primary receptor populations for potential releases of contaminants from SEAD-58:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic);
3. Terrestrial and aquatic biota on or near the site; and
4. Off-site recreators.

The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.10.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the generally west-sloping topography on the site, a drainage ditch that separates the debris area and the area of stressed vegetation, and a small stream in the southern portion of the site. The small stream is a tributary to Kendaia Creek, which is within several hundred feet of the debris areas. The ditch is believed to be ephemeral, and any transport of impacted surface water and sediment to the ditch would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditch may fill with water for extended periods of time. The small stream is believed to contain water throughout the year.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters, off-site recreators, and future residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from walking in the impacted drainage ditch and/or stream. Hunters could be impacted by the

same mechanism. These receptors would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment. Potential off-site receptors are recreators or hunters who wade in downstream portions of Kendaia Creek which have been impacted by surface water and sediment from SEAD-58.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms that 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., water-filled drainage ditches) or eat aquatic biota may also be affected. Potential off-site environmental receptors are those aquatic biota living in Kendaia Creek.

5.10.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.10.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-58 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 to the west; it has the potential to recharge the drainage

ditch during periods of high water. The small stream and Kendaia Creek are also likely to be recharged locally by groundwater. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.10.2.4 Dust Inhalation and Dermal Contact

Inhalation of, and dermal contact with, dust is an unlikely scenario as the site is completely vegetated. Dust could be inhaled by, or come in contact with, future on-site residents.

5.10.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at SEAD-58 have not been significantly impacted by any of the constituents analyzed for during this ESI. Constituents that were detected, but considered to pose an unlikely risk to receptors because of their low reported concentrations, include volatile organic compounds, semivolatile organic compounds, pesticides, and metals. All of these constituents were detected at concentrations which were below their respective TAGM values except for several heavy metals which were found at concentrations which slightly exceeded their associated TAGM values.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during this ESI. Metals were the only constituents detected in the groundwater samples collected at SEAD-58. Iron and manganese were the only constituents detected at concentrations which exceeded their respective federal or state Groundwater Criteria. However, all of the significant concentrations of these elements may be attributed to the high turbidity of the groundwater samples.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents which were detected in the surface water samples collected at SEAD-58. The metals were considered to pose little impact because only iron was found at a concentration which slightly exceeded the criteria for NYS Class C surface water in 1 of the 6 surface water samples collected.

Sediment

Sediment at the site has been impacted by semivolatile organic compounds. Six PAH compounds were found at concentrations which exceeded their respective NYSDEC sediment criteria for human health. TAGM exceedences were detected in all 6 sediment samples collected at SEAD-58. However, the highest reported concentrations of all 6 PAHs were found in sediment sample SD58-1, which was collected at a location which was upgradient of the SEAD-58 boundaries. Metals were the only other constituents detected. Metals were considered to pose little impact because they were detected at low concentrations and only seven elements were found at concentrations which slightly exceed their respective TAGMs.

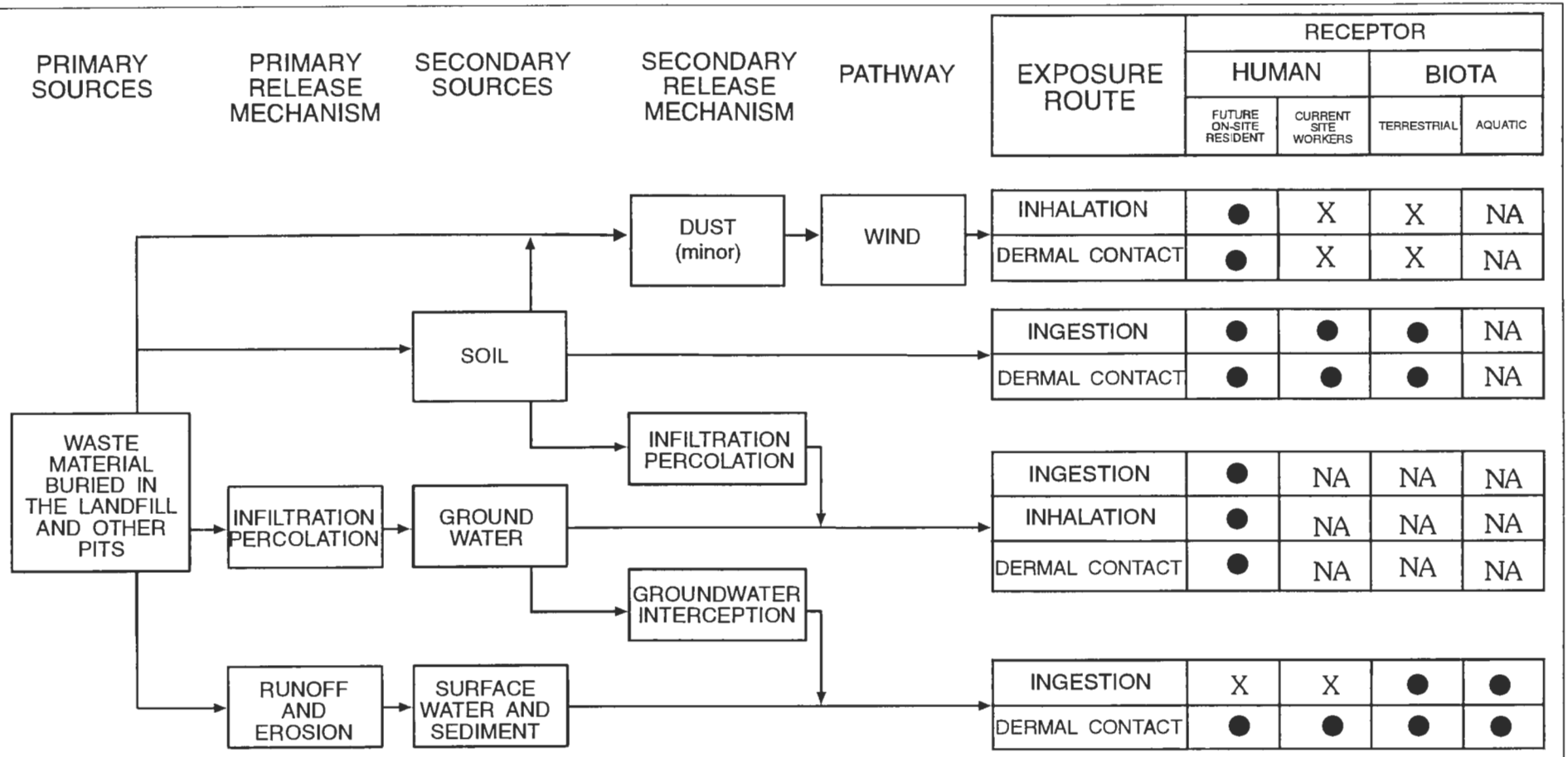
5.11 SEAD-59 FILL AREA WEST OF BUILDING 135

5.11.1 Potential Source Areas and Release Mechanisms

The suspected source is waste material buried in a small landfill and in small disposal pits. The primary release mechanisms are infiltration and percolation of precipitation, and surface water runoff and erosion. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, and to a lesser extent surface water and sediment, are also secondary sources.

5.11.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways, from sources to receptors, are shown schematically in Figure 5.11-1. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that are part of SEDA's general security provisions.



EXPOSURE ROUTE	RECEPTOR: HUMAN – FUTURE ON-SITE RESIDENT	RECEPTOR: HUMAN – CURRENT SITE WORKERS	RECEPTOR: BIOTA – TERRESTRIAL	RECEPTOR: BIOTA – AQUATIC
INHALATION	●	X	X	NA
DERMAL CONTACT	●	X	X	NA
INGESTION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	NA	NA	NA
INHALATION	●	NA	NA	NA
DERMAL CONTACT	●	NA	NA	NA
INGESTION	X	X	●	●
DERMAL CONTACT	●	●	●	●

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY CONSIDERED TO POSE UNLIKELY RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
8 MODERATELY LOW PRIORITY AOCs

DEPT ENVIRONMENTAL ENGINEERING | DWG NO. 720519-01002

FIGURE 5.11-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-59

SCALE NA | DATE DECEMBER 1994

H:\ENG\SENECA\8SWMU\59EXP.CDR

There are three primary receptor populations for potential releases of contaminants from SEAD-59:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site; and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure, as they may affect the various receptors, are described below.

5.11.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water runoff on-site is controlled by the variable land surface topography and a well developed drainage ditch. At the landfill, (located in the northeastern portion of the site) overland flow is likely to be radial toward drainage ditches that surround the landfilled area. These ditches eventually flow into another well developed ditch that drains north beyond the site boundary; this drainage ditch is likely to receive overland flow from most of the site. These ditches are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events.

The primary human receptors of any surface water and sediment impacts would be on-site visitors, hunters and future residents. Visitors (i.e., SEDA workers) to the site are likely to be present on a periodic basis as the site is immediately adjacent to a maintenance vehicle storage and refueling area. Visitors could experience dermal exposure from wading in impacted surface water or sediment in the main drainage ditch. Hunters could be impacted by the same mechanism. These receptors would be considered to have an unlikely risk from ingesting surface water or sediment. 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 drainage ditches. Organisms that 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 (i.e., water filled drainage ditches) may also be affected.

There are no anticipated human or environmental off-site receptors.

5.11.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils. This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential pathway for future on-site residents, current site workers and visitors, and terrestrial biota.

5.11.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-59 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 to the west-southwest; it has the potential to recharge the drainage ditches during periods of high water. The potential groundwater contribution to the surface water could result in the exposures identified above for surface water and sediments. There are no anticipated off-site receptors of the groundwater from the site.

5.11.2.4 Dust Inhalation and Dermal Contact

Inhalation of, and dermal contact with, dust is an unlikely scenario as the site is well vegetated. Dust could be inhaled by, or come in contact with, future on-site residents.

5.11.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, metals. Benzene, toluene, ethylbenzene, and xylene (total) were detected at varying concentrations in 4 of the soil samples collected at SEAD-59. All 4 of these contaminants were found at concentrations which exceeded their respective TAGM values in soil sample TP59-1. Benzene was also detected at a concentration which exceeded its associated TAGM in the solids sample TP59-3X. A total of 23 SVOs were detected in 14 of the 21 samples collected at SEAD-59. The PAH compounds benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene were the only compounds which were found at concentrations which exceeded their respective TAGM values. At least one TAGM exceedence was noted in all 14 of the samples having reported concentrations of SVOs. TAGM exceedances for PAHs were generally more numerous in the surface soil samples, however, significant concentrations of PAHs (above TAGM values) were detected in samples collected at depths of 12 feet below grade. Total petroleum hydrocarbons were detected in 18 of 20 samples collected at SEAD-59. Reported concentrations ranged from 40 mg/kg to 7,870 mg/kg. Exceedance of TAGM values for metals were observed in all 20 of the soil samples collected. Antimony, lead, mercury, zinc, and sodium were detected at concentrations which exceeded their respective TAGM values by at least an order of magnitude. Pesticides and one PCB compound were the only additional constituents which were detected in the soil samples collected at SEAD-59. These constituents were considered to pose an insignificant risk to receptors because they were all detected at low concentrations and none were found at concentrations which exceeded their respective TAGMs.

Groundwater

Groundwater at the site has been impacted by total petroleum hydrocarbons and, to a lesser extent, metals and one semivolatile organic compound. Total petroleum hydrocarbons were detected at concentrations of 2.6 and 1.38 mg/L in groundwater samples MW59-1 and MW59-2, respectively. Iron, manganese, sodium, and thallium were the only metals which were detected at concentrations which exceeded associated federal or state groundwater criteria. Iron was found in groundwater samples MW59-1 and MW59-3 at concentrations which exceeded its associated criterium by an order of magnitude. Sodium was also detected in groundwater sample MW59-3 at a concentration which exceeded its associated criterium by an order of magnitude.

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.12 SUMMARY OF HEALTH AND ENVIRONMENTAL CONCERNS

Table 5.12-1 presents a summary of sites and media which may pose a threat to health and the environment. Determination of threats was performed by comparing detected concentrations of constituents with their respective TAGM values or environmental standards.

TABLE 5.12-1
SENECA ARMY DEPOT
SUMMARY OF SITES AND MEDIA
PRESENTING A THREAT TO HEALTH AND THE ENVIRONMENT

Site	Media	Threat	Constituents with Concentrations Exceeding Criteria
SEAD-5	Sludge Piles	Yes	Metals, PAHS
	Soil	Yes	Metals, PAHs
	Groundwater	Yes	Iron, manganese, sodium
	Surface Water	No	
	Sediment	No	
SEAD-9	Soil	Yes	PAHs, metals
	Groundwater	Yes	Iron, sodium, manganese
	Surface Water	No	
	Sediment	No	
SEAD-12a	Soil	Yes	Metals, PAHS, radionuclides
	Groundwater	Yes	Iron, gross alpha and beta radiation
	Surface Water	Yes	Pentachlorophenol, iron
	Sediment	Yes	Metals
SEAD-12b	Soil	Yes	Metals, radionuclides
	Groundwater	Yes	Iron, manganese, radionuclides
	Surface Water	No	
	Sediment	No	
SEADS-43,56,69	Soil	Yes	PAHs, metals
	Groundwater	Yes	Iron
	Surface Water	Yes	Iron, zinc
	Sediment	Yes	Metals
SEADS-44a/44b	Soil	Yes	PAHs, Metals
	Groundwater	Yes	Iron
	Surface Water	Yes	Iron, zinc
	Sediment	Yes	Arsenic, copper, iron, manganese, nickel
SEAD-50	Soil	Yes	PAHs, metals, asbestos
	Groundwater	Yes	Iron, manganese, sodium
	Surface Water	No	Iron
	Sediment	Yes	PAHs, pesticides, metals
SEAD-58	Soil	Yes	Metals
	Groundwater	Yes	Iron, manganese
	Surface Water	Yes	Iron
	Sediment	Yes	PAHs, metals
SEAD-59	Soil	Yes	BTEX, PAHs, metals
	Groundwater	Yes	Phenol, metals
	Surface Water	No	
	Sediment	No	

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 99.2 to 100% at the eight moderately low 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. Thirteen rinsates and 17 duplicates were obtained for the ESIs at the eight AOCs which represents 6 and 8% of the total samples, respectively. 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).

The data qualifiers associated with the chemical analysis data were applied by the laboratory and during the data evaluation process. They improve data quality by providing an indication of the accuracy and reliability of the data. The data qualifiers used in this report are described at the beginning of Appendix E.

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.

6.2 DATA QUALITY OBJECTIVES

Field Work

The amount of field work proposed in the workplan and performed at each of the eight moderately low priority 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 EM-31 and GPR were used at SEADs-9, 12B, 58, and 59. At SEAD-9, the EM-31 survey was performed over a larger area than proposed in the Work Plan. The GPR survey was performed over EM-31 anomalies. In SEAD-12B, the EM-31 and GPR survey area was extended approximately 90 feet west and 50 feet east of the area delineated in the Work Plan. At SEAD-58, an area 550 feet (NW-SE) by 350 feet (NE-SW) on the northerly side of the unnamed stream was surveyed. A smaller area at the same location was proposed in the Work Plan. At SEAD-59, the surveyed area was extended 100 feet south and 150 feet east.

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 in the field so that there would be an upgradient and a downgradient monitoring well at each SEAD.

At SEAD-9, the upgradient well was dry and could not be sampled.

At SEAD-12A, modifications to the sampling plan, based on the geophysical survey results, were submitted to the EPA Region II and NYSDEC for review and approval. NYSDEC approved the modifications proposed by Parsons ES. EPA recommendations to the proposed modifications were issued in a letter dated June 29, 1994. The sampling plan was modified and conducted in accordance with the EPA recommendations. As a result, eight test pits were excavated instead of five test pits and two borings. Also, 13 soil samples were obtained from the test pits and 3 soil samples were obtained from the background monitoring well boring instead of 10 samples from test pits and 6 samples from borings. The subsurface explanations and soil samples obtained were performed in accordance with the amended sampling plan. A surface water and sediment sample was going to be taken from a pit containing suspected laboratory trash. The pit was dry; therefore, only the sediment was sampled.

At SEAD-12B, modifications to the sampling plan, based on the geophysical survey results, were submitted to the EPA Region II and NYSDEC for review and approval. NYSDEC approved the modifications proposed by Parsons ES. EPA recommendations to the proposed modifications were issued in a letter dated June 29, 1994. The sampling plan was modified and, with the exception of sample collection from inside the underground tank, conducted in accordance with the EPA recommendations. The modified plan called for the collection of one soil sample from each of four test pits and the collection of these soil samples from the background monitoring well location. The field work consisted of three test pits with one soil sample from each test pit, one soil sample obtained from a boring drilled in the area of the 5,000 gallon underground tank, and three soil samples obtained from the background monitoring well location. No samples were obtained from inside the 5,000 gallon underground tank. The geophysical survey detected the top of an object approximately 18 feet below ground surface at the reported location of the tank. An attempt to punch a hole in the object to obtain samples failed.

The turbidity of the groundwater samples analyzed for metals was greater than 200 NTUs for 8 wells, greater than 100 and less than 200 NTUs for 11 wells, and less than 50 NTUs for 12 wells. Review of the well installation details, well development data, and sampling data for the eight wells with turbidities greater than 200 NTUs indicate they were installed, developed, and sampled in accordance with the Work Plan.

At SEADs-43, 56, and 69, no soil samples were obtained at the background monitoring well as proposed in the Work Plan. No samples were taken from buried tanks outside Building 606.

At SEAD-50, the number of surface soil samples (0 to 0.2 feet) and near-surface soil samples (0 to 1.0 feet) was changed from about seven or eight of each to six surface samples and nine near surface samples.

At SEAD-58, the GPR profile spacing was 40 feet, instead of 50 feet as stated in the Work Plan. One location for sampling surface water and sediment was moved from the unnamed stream to Kendaia Creek immediately downstream of where the stream enters Kendaia Creek.

TABLE 6.2 - 1
COMPARISON OF PROPOSED FIELD WORK TO ACTUAL FIELD WORK

SENECA ARMY DEPOT
8 MODERATELY LOW AOCs

	SEAD-5	SEAD-9	SEAD-12A (c)	SEAD-12B (c)	SEAD-43,56,69	SEAD-44A	SEAD-44B	SEAD-50	SEAD-58	SEAD-59
Geophysical Surveys										
Seismic Refraction	480/460 (a)	480/460	480/680 (b)	480/680 (b)	480/460	-	480/460	480/460	480/460	480/ 460
GPR	-	8800/18800	50600/47490	3300/4480	5800/6000	-	-	-	7900/ 12470	3200/6960
EM - 31	-	4400/5040	21000/17860	1400/3010	2600/3585	-	-	-	3400/4430	1600/3820
Explorations										
Soil Borings	-	3/3	2/0	2/1	10/10	-	-	-	3/3	5/5
Test Pits	5/5	3/3	5/8	2/3	3/3	9/9	-	-	6/6	5/5
Monitoring Wells	3/3	3/3	3/3	3/3	4/4	3/3	3/3	3/3	4/4	3/3
Samples Analyzed										
Surface Soil	-	-	-	-	-	6/6	3/3	15/15	3/3	-
Subsurface Soil from Borings	-	9/9	6/3	9/1	33/30	-	-	-	9/9	15/15
Subsurface Soil from Test Pits	5/5	-	10/13	2/3	-	9/9	-	-	6/6	5/5
Subsurface Soil from Monitoring Wel	-	-	-	0/3	-	-	-	-	-	-
Groundwater	3/3	3/2	3/3	3/3	4/4	3/3	3/3	3/3	4/4	3/3
Surface Water	-	-	4/3	-	5/5	4/4	2/2	3/3	6/6	-
Sediment	-	-	4/4	-	5/5	4/4	2/2	3/3	6/6	-
Tank	-	-	-	3/0	2/0	-	-	-	-	-

NOTES:

a) The data in the body of the table, such as "480/460", represent "proposed/actual" numbers. The proposed numbers are from the Workplan.
b) 680 feet of seismic refraction surveys encompasses SEADs- 12A and 12B.
c) EPA approved modifications to the sampling plan for SEAD 12B after field work began based on the geophysical results.

Sample Analyses

Analysis Methods

The analysis methods proposed in the Work Plan were used to analyze the samples.

Analyses Performed

The types of analysis performed on the samples from each SEAD did not vary from the Work Plan.

Quantitation Limits

The determination 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 Contract Required Quantitation Limits (CRQLs) in the Work Plan and the detection limits reported in the chemical analysis data sheets.

The updated reporting limits and CRQLs are presented in Appendix G of this report. The slight variations between the detection limits and CRQLs result from the detection limits being reported 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, either the sample size was less than the recommended amount of sample in the analysis or interferences occurred due to other analytes or other materials in the sample matrix.

7.0 RECOMMENDATIONS FOR FUTURE ACTION

7.1 INTRODUCTION

The expanded site inspections completed at the 8 moderately low priority 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 these sites.

A mini risk assessment may be performed for a site to determine whether a risk actually does exist. This risk assessment will follow the same procedures that would be performed during a RI but would not include such items as toxicity profiles or screening of constituents. Instead only the quantitative analysis of risk would be provided. More specifically, a mini risk assessment will include conducting a numerical risk assessment for all reasonable exposure scenarios. The analysis will be based on data from the ESI, which will be worse case conditions because data was collected from locations that had the greatest potential to be sources of contamination based on historical use and visual observations. The results, including both carcinogenic and non-carcinogenic risks, will be presented in table format. This assessment will not include a complete writeup with full description of the toxicology profile of the chemicals involved. No uncertainty analysis or ecological risk assessment will be conducted.

7.2 SEAD-5: SEWAGE SLUDGE WASTE PILES

The ESI conducted at SEAD-5 identified releases of PAH compounds and heavy metals in the sewage sludge piles at this site.

The primary media impacted was the material comprising the sewage sludge piles. The PAH compounds detected included benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene. These organic compounds were found at concentrations which exceeded their respective TAGM values by an order of magnitude in soil samples TP5-1 and TP5-3, and by a factor of 2 in soil samples TP5-2 and TP5-5. The inorganic elements detected include copper, mercury, and silver. These inorganic metals were detected at concentrations that exceeded their respective TAGMs by up to an order of magnitude in soil samples TP5-2 and TP5-5. Nitrate/nitrite nitrogen was also detected at all 5 of the soil samples collected at SEAD-5. No TAGM value exists for nitrate/nitrite nitrogen.

The analytical results also indicate that the inorganic elements iron, manganese, and sodium are present at elevated concentrations in the groundwater at SEAD-5. These inorganic metals were detected at concentrations that exceeded lowest associated federal or state criteria in the upgradient and downgradient monitoring wells. Iron, manganese, and sodium were present at low concentrations in the soil samples collected from the sewage sludge piles investigated at SEAD-5. The inorganic metals silver and mercury, which were found at significant concentrations in the sewage sludge piles, were undetected in the groundwater samples collected at SEAD-5. Copper, which was also detected at significant concentrations in the sludge piles, was detected in the downgradient monitoring wells at concentrations that were comparable to the concentration reported in the upgradient monitoring well. The organic constituents that were detected in the sewage sludge piles were undetected in the groundwater samples collected at SEAD-5.

The ESI performed at SEAD-5 has revealed a significant release of PAHs in the material of the sewage sludge piles which were investigated by the test pit excavations TP5-1 and TP5-3. Significant releases of inorganic metals were found in the material of the sewage sludge piles that were investigated by test pit excavations TP5-2 and TP5-5. The results of this ESI have also demonstrated that infiltration and percolation of rain water/surface water is not leaching the constituents found in the sewage sludge piles into the groundwater beneath SEAD-5. However, due to the concentrations of PAHs and inorganic elements in several of these above ground sewage sludge piles, the ingestion of soil and/or dust from these piles could pose a significant risk to the receptors identified in Section 5 of this report. Therefore, it is recommended that a remedial investigation/feasibility study be initiated in order to fully delineate the extent of impacted media at SEAD-5.

7.3 SEAD-9: OLD SCRAP WOOD SITE

The results of the ESI conducted at SEAD-9 indicated that releases of PAHs, total petroleum hydrocarbons, and inorganic metals have occurred in the fill material of the site. These results also indicated that total petroleum hydrocarbons have impacted the groundwater downgradient of the site. In, addition, several areas were identified which were likely to have been used as burning pits.

The PAH compounds that have impacted the fill material at SEAD-9 include benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene. These compounds were detected at concentrations which exceeded

their respective TAGMs by up to an order of magnitude in all 3 of the surface soil samples collected at SEAD-9. At depth, the concentration of these compounds was generally reduced and only 2 subsurface soil samples had reported values which exceeded their respective criteria. Subsurface samples SB9-1-03 and SB9-2-03 had reported concentrations of PAHs which exceeded their respective criteria by an order of magnitude and a factor of 4, respectively. Total petroleum hydrocarbons were also detected in all but one of the soil samples collected at SEAD-9. No TAGM exists for the occurrence of total petroleum hydrocarbons in soils.

The results of the groundwater analyses indicate that the groundwater downgradient of SEAD-9 has been moderately impacted by total petroleum hydrocarbons (TPH). The background groundwater quality is unknown due to insufficient groundwater recharge at the upgradient monitoring well location. The reported TPH concentrations in the downgradient monitoring wells were 0.59 mg/L in MW9-2 and 3.0 mg/L in MW9-3. These results are indicative that infiltration and percolation of rain water/surface water are leaching trace quantities of TPH from the fill material into the groundwater beneath SEAD-9. The semivolatile compounds that were detected in the fill material were undetected in the groundwater samples collected downgradient of SEAD-9. The semivolatile compounds detected in the fill have a high affinity for organic matter and low water solubility. When present in soil or sediment, these compounds tend to remain bound to the soil particles and dissolve slowly into the groundwater.

The results of the ESI conducted at SEAD-9 indicate that releases of PAHs have occurred in the fill material of the old scrap wood pile. In addition, trace quantities of total petroleum hydrocarbons, which were detected in the fill material, are presumably being leached into the groundwater beneath the site. Therefore, it is recommended that a mini-risk assessment be performed at SEAD-9 to evaluate the potential risk to receptors (as identified in section 5 of this report) from the exposure to these affected media. The results of this mini-risk assessment could then be utilized to support a Completion Report and a Record of Decision (ROD) for SEAD-9.

7.4 SEAD-12A: RADIOACTIVE WASTE BURIAL SITE NORTHEAST OF BUILDING 813
SEAD-12B: RADIOACTIVE WASTE BURIAL SITE NORTH OF BUILDING 804

The results of the ESI conducted at SEADs-12A and 12B indicate that impacts to fill materials at SEAD-12A, and to a lesser extent, groundwater at SEAD-12B, have occurred.

The fill material sampled from the TP12A-1 excavation has been impacted by a release of radium-226 and its associated radionuclides. The fill material sampled from the TP12A-1, TP12A-2, TP12A-3, and TP12A-6 excavations have been impacted by heavy metals. Radium-226 and its associated radionuclides were detected at concentrations of 8 and 24 pCi/g in samples TP12A-1-1 and TP12A-1-2, respectively. These concentrations are significantly higher than the mean radium-226 concentration of 2.68 pCi/g calculated from all of the reported radium-226 concentrations in the SEAD-12A and SEAD-12B soil samples. The reported concentrations of cadmium in the samples collected from the TP12A-1, TP12A-2, and TP12A-3 test pit excavations exceeded the TAGM for cadmium by at least a factor of 3. In three samples (TP12A-1-2, TP12A-2-1, and TP12A-2-2) the reported concentrations of cadmium were an order of magnitude greater than the TAGM. Silver was detected in sample TP12A-1-2, and lead was detected in samples TP12A-1-2 and TP12A-6-2 at concentrations which exceeded their respective TAGMs by an order of magnitude.

The sediment samples collected at SEAD-12A had reported concentrations of cadmium and manganese which were found at elevated levels in sediment samples SD12A-1 and SD12A-4. The SD12A-1 sample location is situated upgradient of the SEAD-12A boundaries and is unlikely to have been affected by the constituents found within SEAD-12A. Sediment sample SD12A-4 was collected from within a depression in a disposal pit at SEAD-12A. This depression collects surface water/precipitation only during snow thaw events and periods of heavy rain fall. This area was also investigated by test pit excavation TP12A-1. The elevated concentrations of cadmium in sediment sample SD12A-4 correlated to the high concentration of cadmium in soil samples TP12A-1-1 and TP12A-1-2.

The analytical results indicate that the groundwater in the area of monitoring well MW12B-1 has been impacted by radium-226, lead-210, and uranium-235. These constituents were undetected in the downgradient monitoring wells. In addition, the reported concentrations of gross alpha radiation were above their respective criteria in the upgradient and downgradient groundwater samples collected at SEAD-12B.

These results indicate that a significant release of radionuclides has occurred in one of the disposal pits identified at SEAD-12A. In addition, significant concentrations of cadmium, lead, and silver were found in the samples collected from test pit excavations TP12A-1, TP12A-2, TP12A-3, and TP12A-6. The results of the groundwater analyses at SEAD-12B indicate that the groundwater at the MW12B-1 location has been impacted by a release of radionuclides. However, the low reported concentrations of the same radionuclides in the soil samples collected from the MW12B-1 soil boring indicate that these constituents are present only in the groundwater at this location. These results suggest that the ingestion of soil and inhalation of dust/radon gas (radon-222 is an associated radionuclide of cadium-226) from SEAD-12A and the ingestion groundwater at SEAD-12B could pose a significant risk to the receptors identified in Section 5 of this report. Therefore, it is recommended that a remedial investigation and feasibility study program be initiated to fully delineate the extent of impacted media at SEAD-12A and SEAD-12B.

7.5 SEAD 43: BUILDING 606 - OLD MISSILE PROPELLANT TEST LABORATORY
SEAD 56: BUILDING 606 - HERBICIDE AND PESTICIDE STORAGE
SEAD 69: BUILDING 606 - DISPOSAL AREA

The results of the ESI conducted at SEADs 43,56,and 69 indicate that no significant impacts have occurred to any of the media investigated at this site. Limited releases of PAHs were detected in the soil samples collected in close proximity to Building 606. Benzo(a)pyrene, benzo(a)anthracene, and dibenz(a,h) anthracene were found at concentrations which exceeded their respective criteria by at least a factor of 6 in 2 of the soil samples collected from soil boring SB43-4 (located adjacent to Building 606). All of the remaining PAHs that were detected at SEADs 43, 56, and 69 were found at concentrations which were either below their respective TAGMs or exceeded their respective TAGMs by less that a factor of three. Metals were the only additional constituents which were detected at concentrations which slightly exceeded their respective criteria for soils, groundwater, surface water, and sediment. However, no significant concentrations of heavy metals were found at SEADs 43, 56, and 69, and the reported concentrations from downgradient sampling locations were comparable to those reported from upgradient (background) sampling locations.

The analytical results of this ESI indicate that the media investigated at SEADs 43, 56 and 69 have not been significantly impacted by any of the constituents analyzed for during this

investigation. Therefore, it is recommended that a mini-risk assessment and a Completion Report be performed to support a Record of Decision (ROD) for SEADs 43, 56, and 69.

7.6 SEAD-44A: QA TEST LABORATORY, WEST OF BUILDING 616 SEAD-44B: QA TEST LABORATORY, BRADY ROAD

The results of the ESI conducted at SEADs-44A and 44B indicate that no significant impacts have occurred at these sites. The constituents that were detected at these sites include volatile organic compounds, semivolatile organic compounds, one nitroaromatic compound, pesticides and metals. At SEAD-44A, the PAH compounds benzo(a)anthracene, chrysene, benzo(a)pyrene, and dibenz(a,h)anthracene were the only organic compounds that were detected at concentrations which exceeded their respective TAGM values for soil. All of the exceedances for these compounds were limited to the soil samples collected from the bermed areas. Of these 4 PAHs found at elevated concentrations, only benzo(a)pyrene (in 4 samples) and dibenz(a,h)anthracene (in 1 sample) were found at concentrations which exceeded their respective TAGMs by an order of magnitude. In general, the remaining concentrations of PAHs were reported at levels that were less than 3 times their respective TAGM values. All of the reported concentrations of PAHs in the surface soil samples collected around the bermed areas were below their respective TAGMs. At SEAD-44B, benzo(a)pyrene, and dibenz(a,h)anthracene were the only PAH compounds detected at concentrations which exceeded their respective TAGMs in surface soil sample SS44B-4. Each of these compounds was found at concentrations which exceeded their respective TAGM values by less than a factor of 2.

The groundwater at SEADs 44A and 44B has not been impacted by any of the constituents detected in the surface soil and berm excavation samples. Iron was the only constituent which was found at concentrations which were up to an order of magnitude above its associated criteria at one downgradient location. Iron was detected at insignificant concentrations in the surface soil and berm excavation samples collected at these sites.

The surface water and sediment at SEADs 44A and 44B have not been impacted by the constituents detected in the surface soil and berm excavation samples collected at these sites. Inorganic elements were the only constituents found at concentrations which exceeded their respective criteria (typically by a factor of 2 or less). Arsenic was the only element found in one downgradient sediment sample at a concentration which was an order of magnitude above its associated criteria. In addition, the reported concentrations of inorganic elements in the

samples collected from within, or downgradient of, these sites were comparable to those reported in the upgradient surface water and sediment sample SW/SD44A-1.

The results of the ESI conducted at SEADs 44A and 44B indicate that there have been no significant releases of organic or inorganic constituents to the media investigated at these sites. The results presented in this report have demonstrated that the organic compounds which were detected at elevated concentrations in the berm excavation samples at SEAD-44A have not migrated into the surface soils, groundwater, surface water or sediments of this site. Therefore, it is recommended that a mini-risk assessment be performed for SEAD-44A and SEAD-44B. The results of this mini-risk assessment could then be utilized to support a Completion Report and a Record of Decision (ROD) for SEADs 44A and 44B.

7.7 SEAD-50: TANK FARM

The results of the ESI conducted at SEAD-50 have identified significant releases of semivolatile organic compounds and heavy metals in the surface soils and sediments at SEAD-50. Also, elevated concentrations of pesticides and PCBs were detected in the sediment at SEAD-50. No significant impacts to the groundwater or surface water were detected.

The PAH compounds benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and dibenz(a,h)anthracene were found at concentrations which exceeded their respective soil TAGMs or sediment criteria by up to 1 order of magnitude. Significant concentrations of these PAHs were found in samples collected throughout SEAD-50, however, the highest reported PAH concentrations were located in the northern portion of the site (Figure 4.9-1). Arsenic (in 1 surface soil and 2 sediment samples) and lead (in 3 surface soil samples) were found at concentrations which exceeded their respective criteria by more than a factor of 5. In addition, chromium, lead, and zinc were found at concentrations which exceeded their respective soil TAGMs in at least 66 percent of the surface soil samples. Chrysotile asbestos was also detected in surface soil sample SS50-1, which was collected from the 0 to 1 foot depth interval. The pesticides endosulfan I, 4,4'-DDE, and alpha chlordane, as well as the PCB Aroclor-1260 were detected in sediment sample SD50-1 at concentrations which exceeded their respective sediment criteria for human and/or aquatic life by at least an order of magnitude. These pesticides and PCBs were also detected in several of the surface soil samples, however, all of the reported concentrations were below their respective TAGM values.

The analytical results also indicate that the inorganic elements iron, manganese, and sodium are present at elevated concentrations in the groundwater and surface water at SEAD-50. These inorganic metals were detected at concentrations that exceeded federal or state criteria (in both the upgradient and downgradient monitoring wells) and iron was found in one surface water sample at a concentration which exceeded NYS Class C surface water criteria. Iron, manganese, and sodium were present at low concentrations in the surface soil samples and sediment samples collected at SEAD-50. The organic constituents that were detected in the surface soil samples and sediment samples throughout SEAD-50 were undetected in the groundwater and surface water samples collected at SEAD-50.

These results indicate that releases of PAH compounds, heavy metals, pesticides and one PCB compound (the 2 latter in sediment only) have occurred to the soils and sediment at SEAD-50. The results of the ESI performed at SEAD-50 also demonstrate that the constituents which were found in the surface soils and sediment of the site are not being leached into the groundwater beneath the site. Based upon these results, and the historic utilization of the site (the bulk storage of minerals, ores, and asbestos), it is recommended that a Decision Document be prepared which outlines a limited sampling program and a removal action for the affected media at SEAD-50. Subsequent to this, a Completion Report should be prepared to support a Record of Decision (ROD) for SEAD-50.

7.8 SEAD-58: DEBRIS AREA NEAR BOOSTER STATION 2131

The ESI conducted at SEAD-58 identified sediment that has been impacted by semivolatile organic compounds.

Sediment within SEAD-58 and surrounding SEAD-58 has been impacted by the PAH compounds, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. These PAH compounds were found at concentrations which exceeded NYSDEC sediment criteria for human health in all 6 of the sediment samples collected at SEAD-58. The reported concentrations of these PAHs were typically 5 to 10 times greater than their respective NYSDEC sediment criteria for human health. The highest reported concentrations of all 6 of the PAHs were found in sediment sample SD58-1. The SD58-1 sample location was situated upgradient of the SEAD-58 boundaries. Soils, groundwater, and surface water at the site have not been impacted by any of the constituents analyzed for during this ESI. Heavy metals were the only constituents which were detected at elevated concentrations in these media. Iron was the only constituent

which was found in two groundwater samples at concentrations which exceeded its associated criteria by more than an order of magnitude. However, these elevated iron concentrations are likely associated to the high turbidity of the groundwater in these two samples. The detected concentrations of the remaining inorganic elements were less than 2 times their respective criteria and the concentrations found at downgradient sampling locations were comparable to those reported in the upgradient (background) samples.

The results of the ESI conducted at SEAD-58 demonstrate that the soil, groundwater, and surface water at the debris area and the area of stressed vegetation have not been impacted by any of the constituents analyzed for during this program. The sediment in the drainage swales and streams in the area of SEAD-58 is the only media which has been impacted by moderate releases of PAHs. Also, the spacial distribution of PAHs in these sediments suggests that the debris area and the area of stressed vegetation have not contributed to these impacts. Therefore, it is recommended that a mini-risk assessment and a Completion Report be performed and finalized in a Record of Decision (ROD) for SEAD-58.

7.9 SEAD-59: FILL AREA WEST OF BUILDING 135

The ESI conducted at SEAD-59 identified several areas which have been impacted by releases of volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, heavy metals.

In the area of the landfill (located in the northeastern portion of SEAD-59), PAH compounds were found in 5 surface soil and 7 subsurface soil samples at concentrations which exceeded their respective TAGMs by at least an order of magnitude. Individual occurrences of 4 inorganic elements were found in 1 surface soil sample and 3 subsurface soil samples at concentrations which exceeded their respective TAGMs by an order of magnitude. In addition, several 55 gallon drums (the contents of which were unknown) were unearthed at the TP59-3 test pit location, and an area of stained soil (presumably diesel fuel) was identified at the TP59-4 test pit location. The source of the stained soil at the TP59-4 test pit location was not identified during this ESI. Total petroleum hydrocarbons (TPHs) were also detected, at concentrations ranging from 40 to 7,870 mg/kg, in all but 2 of the soil samples collected from the landfill area. At a location approximately 100 feet south of the landfill area, a disposal pit containing filled 2 gallon paint cans was found. BTEX constituents were detected at concentrations which exceeded their TAGMs by at least an order of magnitude in the sample collected at this location. These concentrations were presumably associated to the paint staining of the soil.

The analytical results also indicate that the inorganic elements iron, manganese, and sodium are present at elevated concentrations in the groundwater and surface water at SEAD-50. These inorganic metals were detected at concentrations that exceeded federal or state criteria (in both the upgradient and downgradient monitoring wells) and iron was found in one surface water sample at a concentration which exceeded NYS Class C surface water criteria. Iron, manganese, and sodium were present at low concentrations in the surface soil samples and sediment samples collected at SEAD-50. The organic constituents that were detected in the surface soil samples and sediment samples throughout SEAD-50 were undetected in the groundwater and surface water samples collected at SEAD-50.

These results indicate that releases of PAH compounds, heavy metals, pesticides and one PCB compound (the 2 latter in sediment only) have occurred to the soils and sediment at SEAD-50. The results of the ESI performed at SEAD-50 also demonstrate that the constituents which were found in the surface soils and sediment of the site are not being leached into the groundwater beneath the site. Based upon these results, and the historic utilization of the site (the bulk storage of minerals, ores, and asbestos), it is recommended that a Decision Document be prepared which outlines a limited sampling program and a removal action for the affected media at SEAD-50. Subsequent to this, a Completion Report should be prepared to support a Record of Decision (ROD) for SEAD-50.

7.8 SEAD-58: DEBRIS AREA NEAR BOOSTER STATION 2131

The ESI conducted at SEAD-58 identified sediment that has been impacted by semivolatile organic compounds.

Sediment within SEAD-58 and surrounding SEAD-58 has been impacted by the PAH compounds, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. These PAH compounds were found at concentrations which exceeded NYSDEC sediment criteria for human health in all 6 of the sediment samples collected at SEAD-58. The reported concentrations of these PAHs were typically 5 to 10 times greater than their respective NYSDEC sediment criteria for human health. The highest reported concentrations of all 6 of the PAHs were found in sediment sample SD58-1. The SD58-1 sample location was situated upgradient of the SEAD-58 boundaries. Soils, groundwater, and surface water at the site have not been impacted by any of the constituents analyzed for during this ESI. Heavy metals were the only constituents which were detected at elevated concentrations in these media. Iron was the only constituent

The analytical results of the groundwater analyses indicated that the groundwater at SEAD-59 has been moderately impacted by TPHs. TPHs were detected at low concentrations in each of the down gradient groundwater samples. The PAH compounds detected in the soils have a high affinity for organic matter and low water solubility. When present is soil or sediment, these compounds tend to remain bound to the soil particles and dissolve slowly into the groundwater. Therefore, the PAHS are less likely to migrate to the groundwater than other constituents detected in the soils. Total petroleum hydrocarbons were undetected in the upgradient groundwater sample. Iron and sodium were detected at elevated concentrations in both the upgradient and the downgradient groundwater samples. The highest concentrations of each of these inorganic elements were found in the upgradient groundwater sample. Manganese was found in one of the downgradient groundwater samples at a concentration which exceeded its associated state or federal criteria by less than a factor of 3.

The results of this ESI have identified significant releases of BTEX and PAH compounds in the materials comprising the landfill and disposal pits at SEAD-59. In addition, trace quantities of total petroleum hydrocarbons which were found in the fill materials are presumably being leached into the groundwater beneath the site. These results suggest that the affected media at SEAD-59 have the potential to impact the receptors identified in Section 5 of this report. Therefore, it is recommended that a remedial investigation and a feasibility study program be initiated to fully delineate the extent of contamination in the media at SEAD-59.