U.S. ARMY ENGINEER DIVISION
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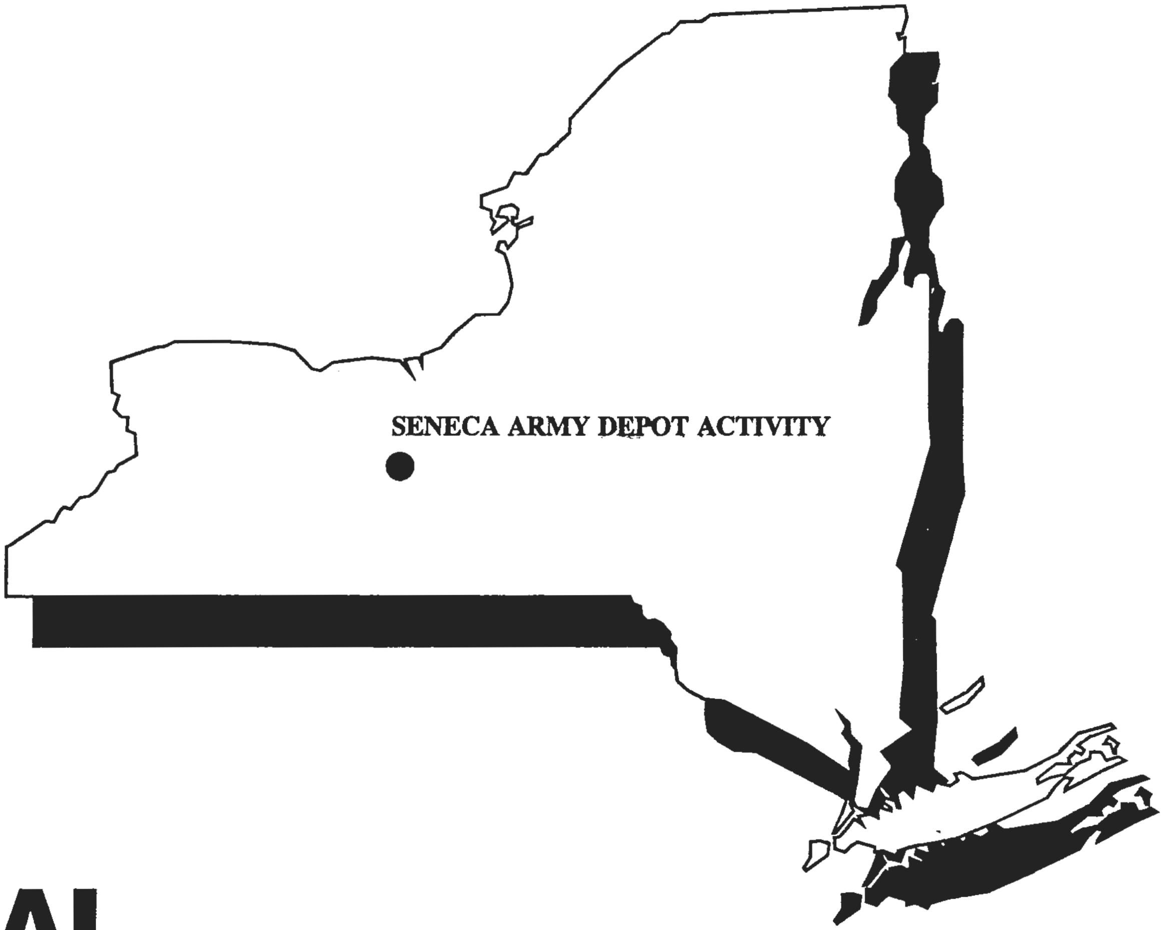

FINAL

SEAD-59 AND SEAD-71
PROJECT SCOPING PLAN FOR PERFORMING A CERCLA REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) AT THE FILL AREA WEST OF BUILDING 135 (SEAD-59), AND THE ALLEGED PAINT DISPOSAL AREA (SEAD-71), SENECA ARMY DEPOT ACTIVITY

APRIL 1997

PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AT SEAD-59 and SEAD-71
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared For:

Seneca Army Depot Activity
Romulus, New York

Prepared By:

Parsons Engineering Science, Inc.
Prudential Center
Boston, Massachusetts

727651 February 1997

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LIST OF ACRONYMS

1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethylene (total)
AA	Atomic absorption
AMC	U.S. Army Material Command
AN	Army-Navy
AOC	Areas of Concern
APCS	Air Pollution Control System
AQCR	Genesee-Finger Air Quality Control Region
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
BOD	Biological Oxygen Demand
BRAC	Base Realigment and Closure
CEC	Cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
cm	Centimeters
cm/sec	Centimeters per second
COD	Chemical Oxygen Demand
Cr	Chromium
$CaCO_3$	Calcium Carbonate
CRT	Cathode ray tube
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DO	Dissolved oxygen
DOT	Department of Transportation
DQO	Data Quality Objective
DRMO	Defense, Revitalization and Marketing Office
EM-31	Electromagnetic - 31 geophysical unit
EPA	Environmental Protection Agency
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	NYS classification for groundwater, which is best used as a source of potable water supply. Class GA waters are fresh groundwaters
GC	Gas chromatograph
gpm	Gallons per minute

LIST OF ACRONYMS
(Cont'd)

GPR	Ground penetrating radar
GRI	Gas Research Institute
GSSI	Geophysical Survey Systems, Inc.
HSWA	Hazardous and Solid Waste Amendments
IAG	Interagency Agreement
Koc	Organic carbon coefficient
lb	pound
L/min	Liters per minute
MCL	Maximum Contaminant Level
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
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
NPL	National Priority List
NTU	Nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
OVM	Organic Vapor Meter
Pb	Lead
PAH	Polynuclear Aromatic Hydrocarbon
Parsons ES	Parsons Engineering Science, Inc.
PCB	Polychlorinated biphenyls
PID	Photoionization detector
ppm	parts per million
ppmv	parts per million per volume
PSCR	Preliminary Site Characterization Report
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RAB	Restoration Advisory Board
RAGS	EPA Risk Assessment Guidance for Superfund

LIST OF ACRONYMS
(Cont'd)

RCRA	Resource Conservation and Recovery Act
RF	Response factor
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
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 Activity
sec	Seconds
SOW	Statement of Work
SS	Soil sample
SVO	Semivolatile Organic Compounds
SW	Surface water sample
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target analyte list
TCL	Target compound list
TDS	Total dissolved solids
TKN	Total Kjeldah Nitrogen
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TRPH	Total Recovered Petroleum Hydrocarbons
TP	Test Pit
UCL	Upper Confidence Level
ug/g	Micrograms per gram
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
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
Vs	Volt Second

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

The purpose of this Project Scoping Plan is to outline the work proposed for a Remedial Investigation/Feasibility Study (RI/FS) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at SEAD-59 and SEAD-71 at the Seneca Army Depot Activity (SEDA) in Romulus, New York. This Plan is based on the results and recommendations for SEAD-59 presented in the Expanded Site Inspection (ESI) Report for Eight Moderately Low Priority SWMUs (Parsons ES, April 1995) and for SEAD-71 presented in the Expanded Site Inspection (ESI) Report for Seven Low Priority SWMUs (Parsons ES, April 1995). The purpose of the RI/FS is to determine the nature and extent of environmental impacts, and to evaluate and select appropriate remedial actions. These actions will comply with applicable or relevant and appropriate requirements (ARARs) and take into account the risks to human health and the environment. The sites are called SWMUs because the Army elected in the Federal Facilities Agreement to combine RCRA and CERCLA obligations and the Army uses RCRA terms to describe the units.

This work will be performed as part of the United States Army Corps of Engineers (USACOE) remedial response activities under CERCLA. It will follow the requirements of the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency, Region II(EPA), and the Interagency Agreement.

This Project Scoping Plan provides site specific information for the RI/FS project at SEAD-59 and SEAD-71. The Generic Installation RI/FS Workplan (Parsons ES, June 1995) is designed to serve as a foundation for this document and provides generic information that is applicable to all site activities at SEDA.

1.2 REPORT ORGANIZATION

The remaining sections of this report are organized to describe the overall site conditions, provide a scoping of the RI/FS, and to provide task plans for the RI and FS. Section 2.0 presents a description of regional geologic and hydrogeologic site conditions. Section 3.0 discusses scoping of the RI/FS including the conceptual site model, the results of previous investigations, identification of potential receptors and exposure scenarios, scoping of potential remedial action technologies, preliminary identification of ARARs, data quality objectives, and data gaps and needs. The task plans for the RI and FS are discussed in Sections 4.0 and 5.0, respectively. Section 6.0 discusses scheduling and staffing. Appendices A through G provide additional supplemental information to topics outlined in this report.

1.3 BACKGROUND

SEAD-59

SEAD-59 is a disposal area at SEDA in Romulus, NY and is referred to as the Fill Area West of Building 135. The site is shown in Figure 1-1. SEAD-59 is located in the eastern portion of SEDA. A detailed site plan is shown in Figure 1-2. The site encompasses an area between Building 128 and Building 311 which is bordered and crossed by railroad tracks and an unnamed dirt road. SEAD-59 north of the unnamed access road contains waste piles while the southern half of the site is covered with vegetation.

In accordance with the decision process outlined in the Interagency Agreement (IAG) between the USACOE, EPA, and NYSDEC, an Expanded Site Inspection (ESI) was performed at SEAD-59 in 1994. This investigation included sampling of subsurface soils and groundwater to identify hazardous constituents or wastes that may have been released to the environment. The sampling data were compared to state and federal guidelines and standards to determine whether this AOC posed a potential threat or risk to human health and the environment. The draft ESI report (Parsons ES, April 1995) indicated that impacts to soils and groundwater exceeding state and federal standards and guidelines had occurred at SEAD-59. As part of the ESI report a CERCLA RI/FS was recommended for SEAD-59. This RI/FS Project Scoping Plan along with the Generic Installation RI/FS Workplan outline the recommended approach and methodologies for completion of an RI/FS at SEAD-59 in accordance with EPA CERCLA guidelines.

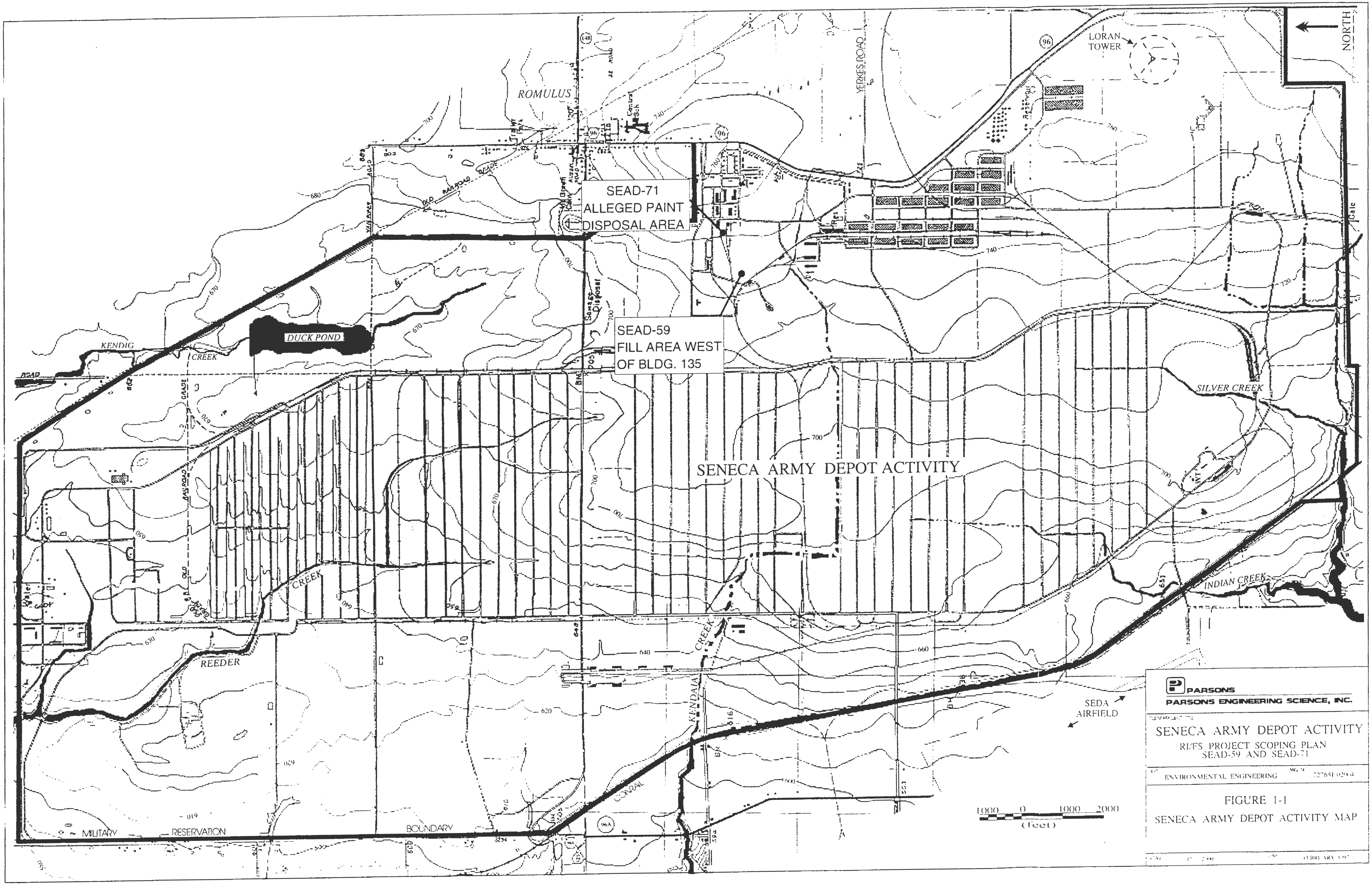
SEAD-71

SEAD-71 is a rumored paint and/or solvent disposal area located in a highly developed portion of SEDA in Romulus, NY. It is designated as the Alleged Paint Disposal Area. The site is shown in Figure 1-1.

SEAD-71 is located in the east-central portion of SEDA approximately 200 feet west of 4th Avenue near Buildings 127 and 114. The site is approximately 350 feet by 100 feet and bounded on the north and south by railroad tracks serving Buildings 114 and 127. A chain-link fence borders the east side and part of the south side of the area. The detailed site plan is shown in Figure 1-3.

Originally, the site was thought to be a small, square storage area adjacent to the northwest corner of Building 127, however, prior to the investigation, the area west of, and adjacent to the site was also reported to have been the location of the suspected burial pits. Therefore, the site investigated for this study was extended west approximately 150 feet to include this area as well.

In accordance with the decision process outlined in the Interagency Agreement between the USACOE, EPA, and NYSDEC, an Expanded Site Inspection (ESI) was performed at SEAD-71 in



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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 AND SEAD-71

ENVIRONMENTAL ENGINEERING 727651-02004

FIGURE 1-1
SENECA ARMY DEPOT ACTIVITY MAP

1" = 2000' FEBRUARY 1997

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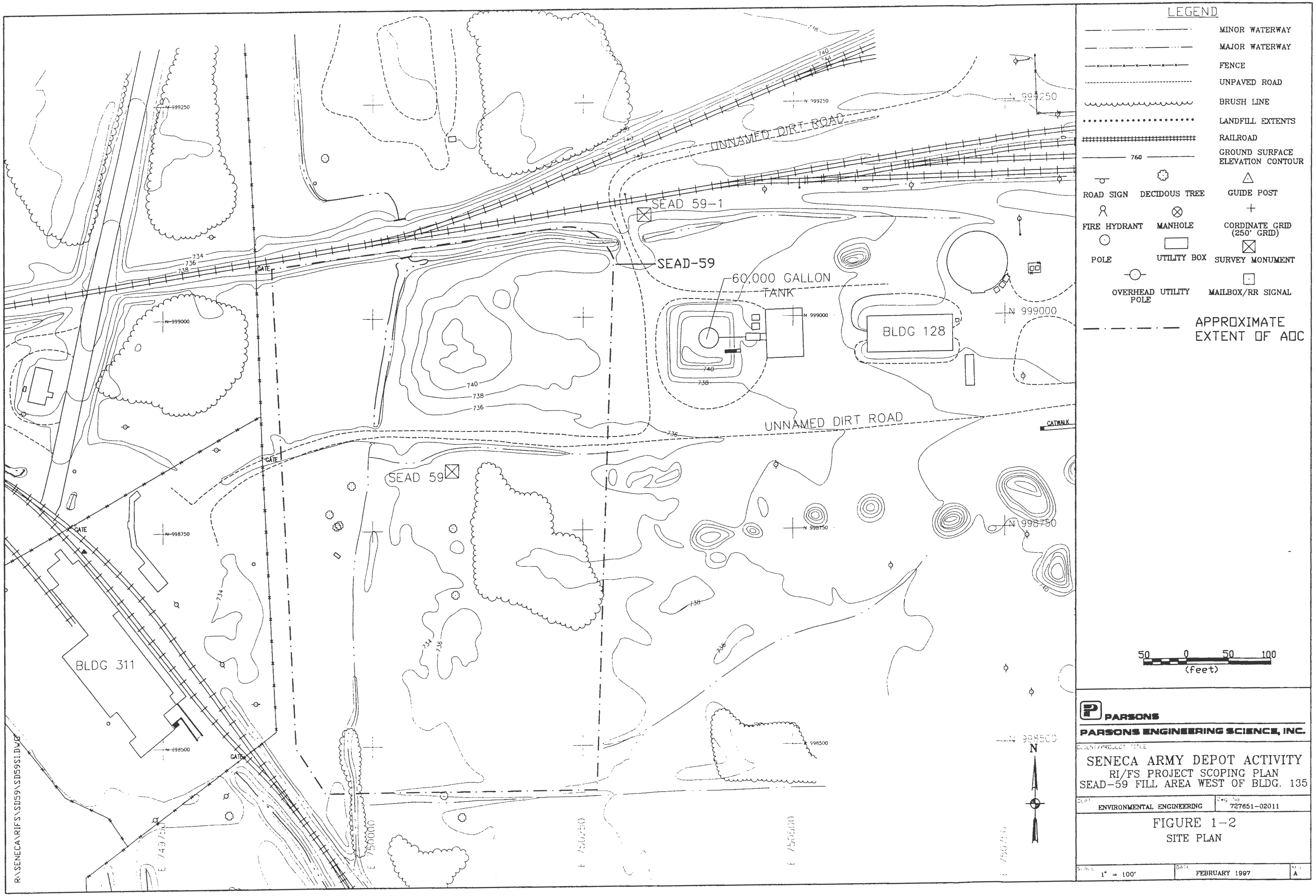

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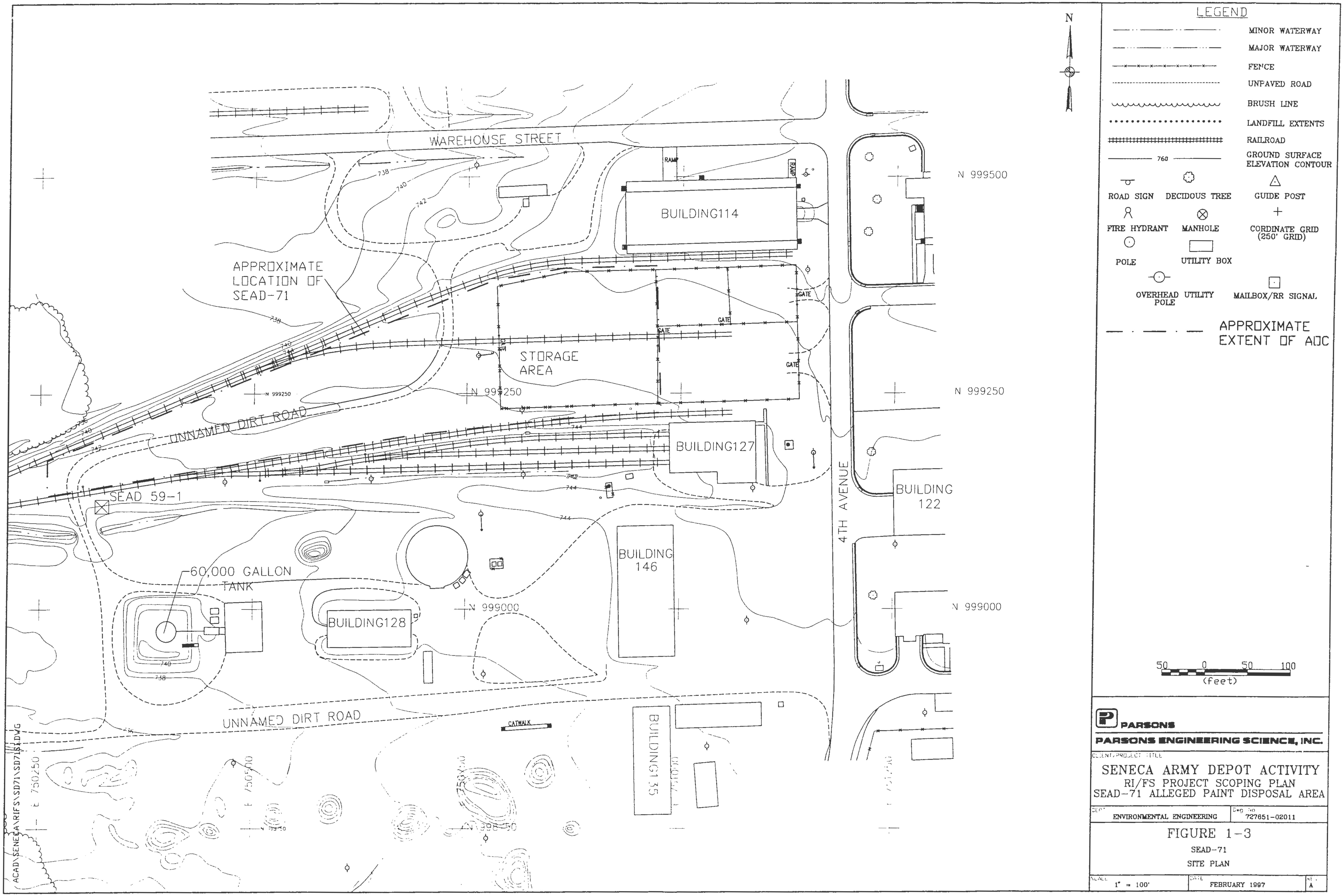
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

DEPT: ENVIRONMENTAL ENGINEERING
Dwg No: 727651-02011

FIGURE 1-2
SITE PLAN

SCALE: 1" = 100'
DATE: FEBRUARY 1997
REV: A



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

DEPT	Dwg No
ENVIRONMENTAL ENGINEERING	727651-02011

FIGURE 1-3
SEAD-71
SITE PLAN

SCALE	DATE	REV.
1" = 100'	FEBRUARY 1997	A

1994. This investigation included sampling of subsurface soils and groundwater to identify hazardous constituents or wastes that may have been released to the environment. The sampling data were compared to state and federal guidelines and standards to determine whether this AOC posed a potential threat or risk to human health and the environment. The draft ESI report (Parsons ES, April 1995) indicated that impacts to soils and groundwater exceeding state and federal standards and guidelines had occurred at SEAD-71. As part of the ESI report, a CERCLA RI/FS was recommended for SEAD-71. This RI/FS Project Scoping Plan along with the Generic Installation RI/FS Workplan outline the recommended approach and methodologies for completion of an RI/FS at SEAD-71 in accordance with EPA CERCLA guidelines.

2.0 SITE CONDITIONS

2.1 PHYSICAL SETTING

The physical setting of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

2.2 REGIONAL GEOLOGICAL SETTING

The regional geological setting of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

2.3 REGIONAL HYDROGEOLOGICAL SETTING

The regional hydrogeological setting of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.0 SCOPING OF THE RI/FS

This section describes the current understanding of SEAD-59 based upon the results of the ESI Report for Eight Moderately Low Priority SWMUs (Parsons ES, April 1995) and of SEAD-71 based upon results of the ESI Report for Seven Low Priority SWMUs (Parsons ES, April 1995). This includes the development of a conceptual model describing all known contaminant sources and receptor pathways based upon actual sampling data. This conceptual model will be used to develop and implement additional studies which may be required to fully assess risks to human health and the environment. Other considerations which are discussed in this section are data quality objectives (DQOs) and potential remedial actions for SEAD-59 and SEAD-71. These considerations will also be integrated into the scoping process to ensure that adequate data is collected to complete the RI/FS process for this AOC.

3.1 CONCEPTUAL SITE MODEL

The conceptual site models, which were developed for the three sites and presented in the draft ESI Reports (Parsons ES, April 1995), identifies potential source areas, release mechanisms, potential exposure pathways, and receptors. The model takes into account site conditions and accepted pollutant behavior to formulate an understanding of the site. These factors will serve as the basis for determining necessary additional studies for the RI. The model was developed by evaluating the three following aspects:

- Historical usage and waste disposal practices.
- Physical site characteristics: This considers the physical aspects of environmental conditions and the effect these conditions may have on potential pollutant migration. These include soil characteristics, topography, subsurface geology, groundwater characteristics and local terrain.
- Environmental fate of constituents: This considers the fate and transport of residual materials in the environment based upon known chemical and physical properties.

3.1.1 SEAD-59

3.1.1.1 Site History

SEAD-59, the Fill Area West of Building 135, was used for the disposal of construction debris and oily sludges. SEDA personnel have indicated that there may be a large quantity of miscellaneous "Roads and Grounds" waste buried at the site. It is not known when the disposal took place.

3.1.1.2 Physical Site Characterization

3.1.1.2.1 Physical Site Setting

SEAD-59 is located in the east-central portion of SEDA. The site encompasses an area along both sides of an unnamed dirt road which is the access road to Building 311 and runs perpendicular to the south side of Administration Avenue terminating at Building 311. The site plan is shown in Figure 1-2. The entire western border of the site is defined by a north-south trending drainage ditch. The area of SEAD-59 to the south of the access road is approximately 250 feet by 100 feet and is covered with vegetation. The topography is relatively flat and slopes gently towards the west. SEAD-5 is adjacent to the eastern boundary of this area, and SEADs 16 & 17 are located directly to the west.

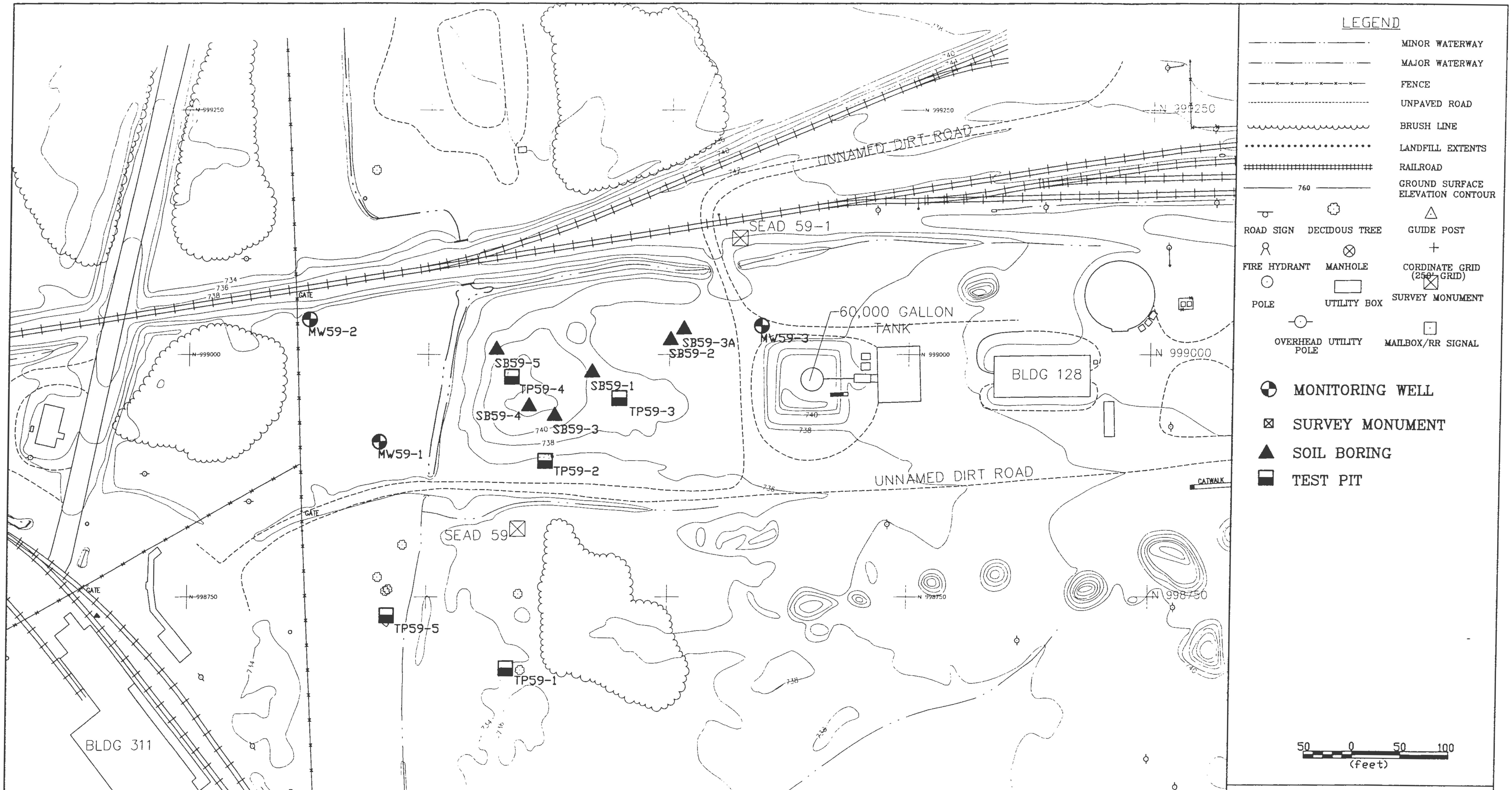
The area of SEAD-59 on the northern side of the access road is approximately 250 feet by 200 feet and is bounded on the north by railroad tracks. This area has approximately 10 feet of relief and appears to be one large filled area of waste piles. The area has stressed vegetation and the terrain is irregular in nature.

A drainage swale which flows east to west, parallels the railroad tracks which form the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale turns to the north and flows under the railroad tracks. A north-south trending drainage ditch is located in the western portion of the site. Drainage ditches are also located on each side of the access road to Building 311 and flow from east to west into the drainage ditch in the western portion of the site.

3.1.1.2.2 Site Geology

Determination of the site geology was based on the drilling program conducted for the ESI at SEAD-59. This program included 5 soil borings and 3 monitoring wells which were drilled to a maximum depth of 20 feet below ground surface. In addition, boring SB59-3A was drilled in the northeastern portion of the site in an attempt to install the upgradient monitoring well. Because fill material was encountered down to 8.0 feet, 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 locations of the borings, test pits,and monitoring wells are shown in Figure 3-1. Soil boring logs, including the log for SB59-3A, are included in Appendix G.

Based on the results of the drilling program, fill material, till, weathered dark gray shale, and competent gray-black shale are the four major geologic units present on-site. At most of the boring locations very little topsoil was present. Several of the borings were drilled on a gravel surface, and no topsoil was encountered at these locations. The depths to the bottom of the till, bedrock, and fill material, and the thicknesses of the weathered shale at SEAD-59 are presented in Table 3-1.



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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

ENVIRONMENTAL ENGINEERING
727851-02011

FIGURE 3-1
LOCATION OF
ESI SAMPLING POINTS

1" = 100'
FEBRUARY 1997
A

Table 3-1

SEAD-59 Stratigraphic Information

SEAD-59 and SEAD-71 RI/FS Scoping Plan
Seneca Army Depot Activity

Boring Location	Depth to Bottom of Fill (feet)	Depth to Bottom of Till (feet)	Thickness of Weathered Shale (feet)	Depth to Bedrock (feet)
MW59-1	NA	8.9	1.2	10.1
MW59-2	NA	11.4	0.0	11.4
MW59-3	3.5	6.6	1.4	8.0
SB59-3A	8.0	ND	ND	ND
SB59-1	10.5	NA	NA	NA
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

Notes:
NA = Not Applicable
ND = Not Detected

Fill material was encountered in the seven borings located within the fill area north of the access road. The borings in which 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 as silt with minor components of sand and shale fragments, but was different from the till in color, which tended to be gray brown or tan, and by 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. The till was characterized as light brown in color and composed of 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 top of the weathered shale. The thickness of the till ranged from 3.1 to 8.6 feet.

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 weathered shale interval was comprised of weathered shale interbedded with till. 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 SB59-3A and SB59-5, bedrock was inferred from the point of auger or spoon refusal at depths ranging from 9.5 to 20.5 feet below grade. Depth to bedrock at soil boring SB59-4 was measured at 20.5 feet below grade; however, the soil boring was located at the highest point in the fill area. Therefore, the measured depth to bedrock (20.5 ft) is reflective of the high elevation of the ground surface rather than any unusual bedrock configuration.

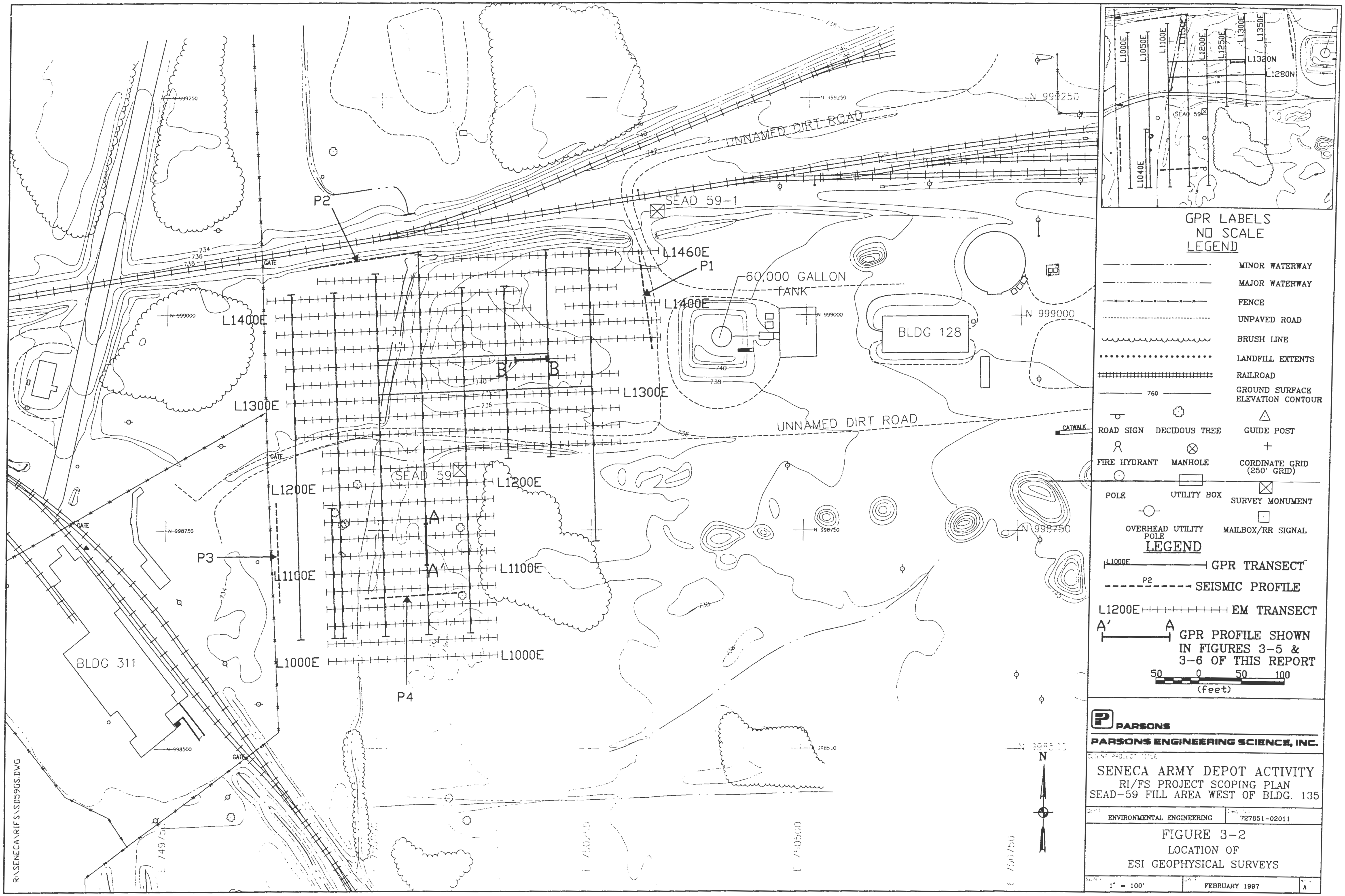
3.1.1.2.3 Geophysics

Seismic refraction surveys, electromagnetic (EM-31) surveys, and GPR surveys were performed at SEAD-59 as part of the geophysical investigations for the ESI.

Seismic Survey

Four seismic refraction profiles were performed on 4 lines (P1 through P4) positioned along each boundary line of SEAD-59. The profile locations are shown on Figure 3-2. The results of the seismic refraction survey are presented in Table 3-2. 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 limited thickness of the saturated overburden.

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 volume. Compaction of the soils in this



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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

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FIGURE 3-2
LOCATION OF
ESI GEOPHYSICAL SURVEYS

1" = 100' | FEBRUARY 1997 | A

TABLE 3-2
SEAD-59
RESULTS OF SEISMIC REFRACTION SURVEY FROM THE ESI

Profile	Distance[1]	Ground Elevation[2]	Bedrock	
			Depth	Elevation[2]
P1	2.5	737.5	10.0	727.5
	57.5	737.5	9.7	728.0
	112.5	738.5	11.2	727.5
P2	2.5	733.5	7.1	726.0
	57.5	733.5	7.1	726.0
	112.5	733.5	6.1	727.5
P3	2.5	733.0	2.9	730.0
	57.5	733.5	4.8	729.0
	112.5	733.5	6.4	727.0
P4	2.5	733.5	6.2	727.5
	57.5	733.0	5.3	728.0
	112.5	734.0	6.2	728.0

[1] All distances are measured in feet along the axis of each seismic profile from geophone #1 of each profile. For profiles P1 and P3, geophone #1 is located at the southern end point of the axis, and for profiles P2 and P4, geophone #1 is located at the western end point. See Figure 3-2 for locations of seismic profiles.

[2] All elevations are accurate to within ±1 foot and are rounded to the nearest half foot.

area should be considered as the probable cause of the elevated overburden velocities observed at SEAD 59.

The elevations of the bedrock surface indicated that the bedrock sloped to the west, generally following the surface topography. Based upon the results of the seismic survey, the groundwater flow direction was also expected to be to the west, following the slope of the bedrock surface.

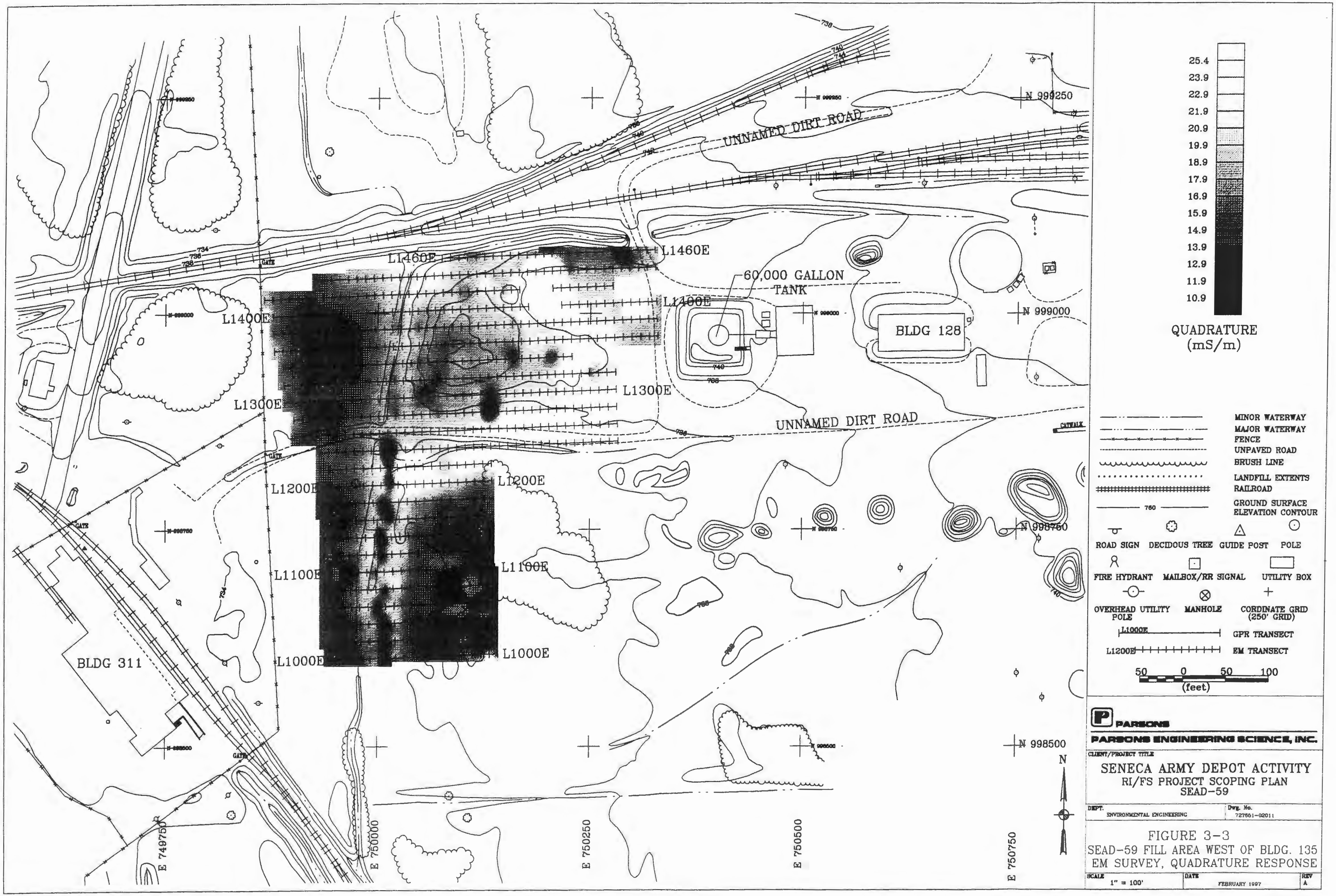
Electromagnetic Survey

An electromagnetic (EM-31) survey was performed for the ESI at SEAD-59 to delineate the limits of the landfill and to identify locations where metallic objects were buried. The location of the EM-31 grid is shown on Figure 3-2.

Figure 3-3 shows the EM-31 quadrature response, which is proportional to the apparent ground conductivity. Several apparent ground conductivity anomalies 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, also located in the northeastern portion of the EM grid, could be attributed to an increase in the clay content of the fill material, 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.

Ten localized anomalies were identified as a result of the EM-31 survey completed at SEAD-59. Two of the 10 localized anomalies were correlated to surface features: one was attributed to a drainage culvert located under the railroad track 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, which reflect the presence of buried ferrous objects, are shown in Figure 3-4. Eight of the localized in-phase response anomalies are associated with the eight apparent ground conductivity anomalies of unknown origin previously mentioned. Several larger anomalies were identified in the northeastern quadrant of the EM grid and were associated to cultural features. The in-phase response measured throughout the remainder of the EM grid showed a relatively featureless response, including the northeastern 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 based upon the geophysical results.



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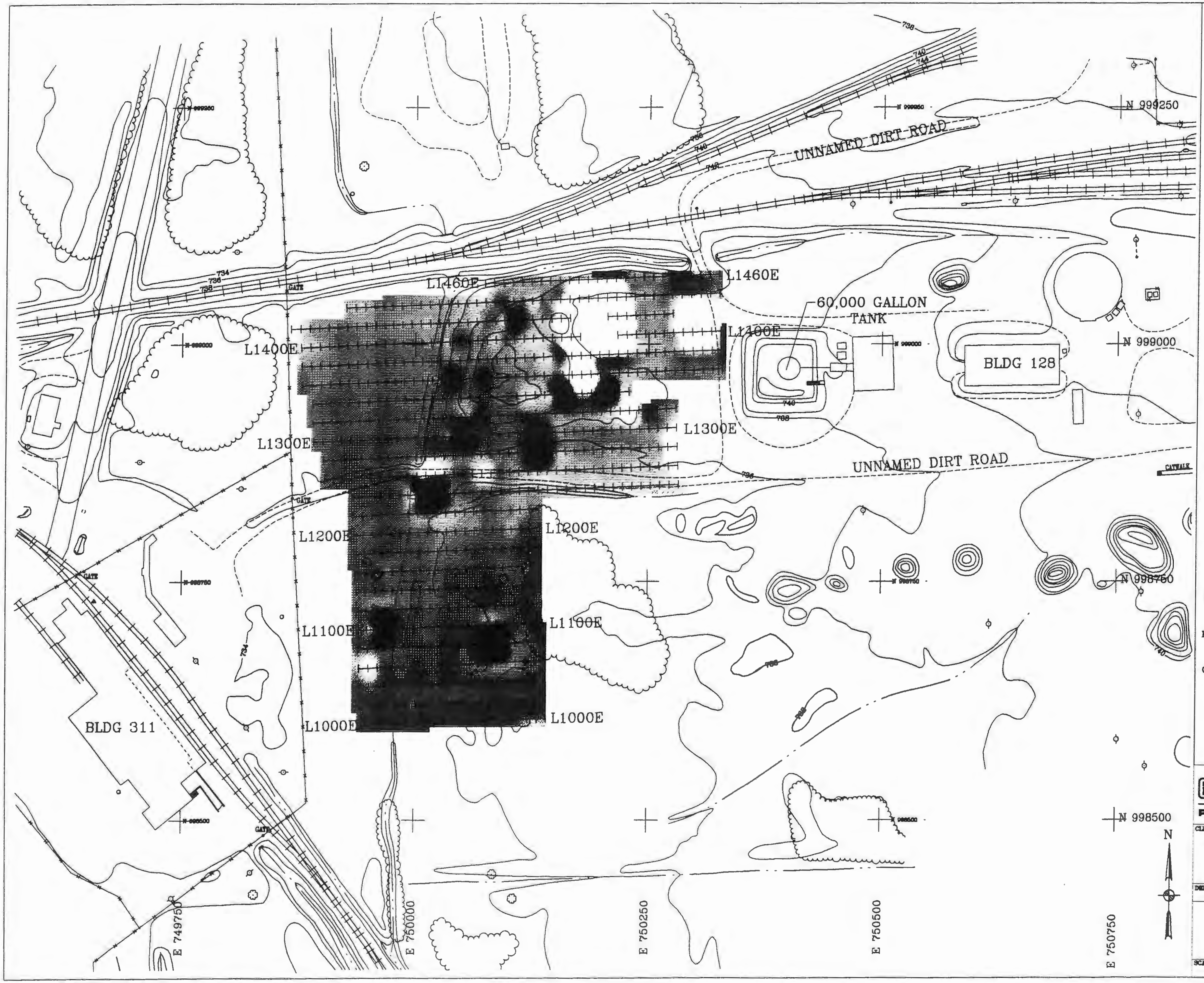
CLIENT/PROJECT TITLE

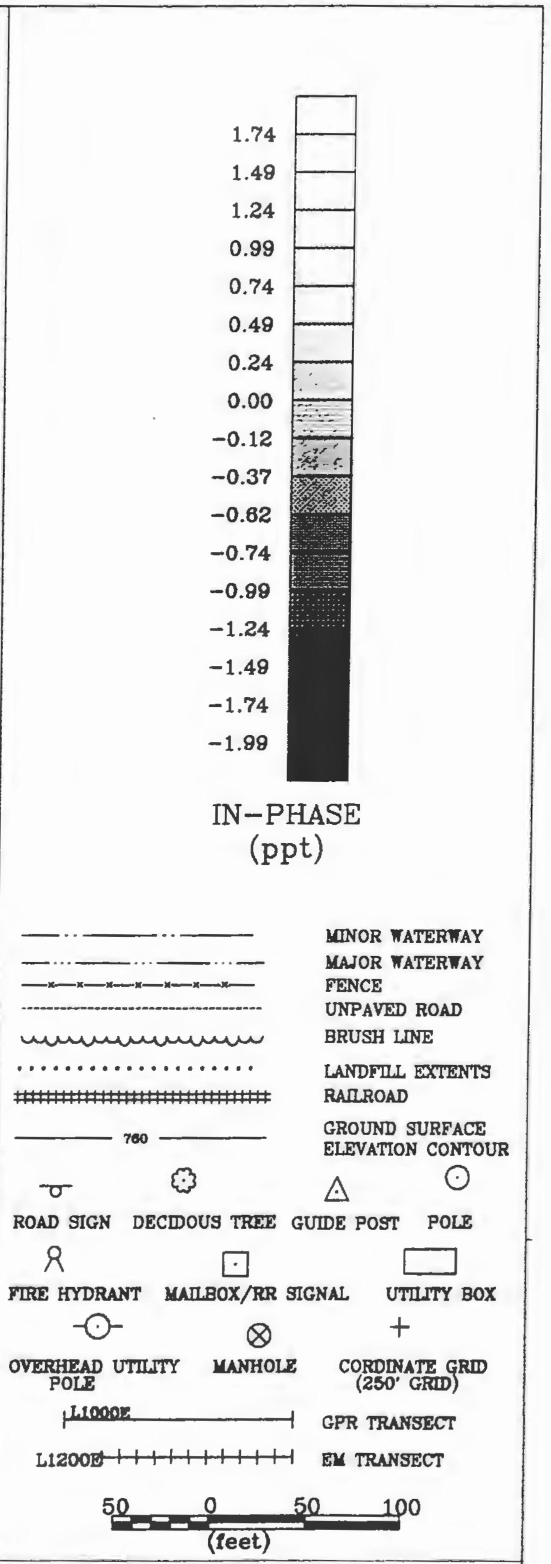
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	727551-02011

FIGURE 3-3
SEAD-59 FILL AREA WEST OF BLDG. 135
EM SURVEY, QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	FEBRUARY 1997	A





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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	727661-02011

FIGURE 3-4
SEAD-59 FILL AREA WEST OF BLDG. 135
EM SURVEY, IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	FEBRUARY 1997	A

GPR Survey

Ground penetrating radar (GPR) data were acquired for the ESI at SEAD-59 along profiles spaced at 50-foot intervals. In addition, GPR data from two profiles, Profiles A-A' and B-B', were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The locations of the GPR profiles are shown in Figure 3-2.

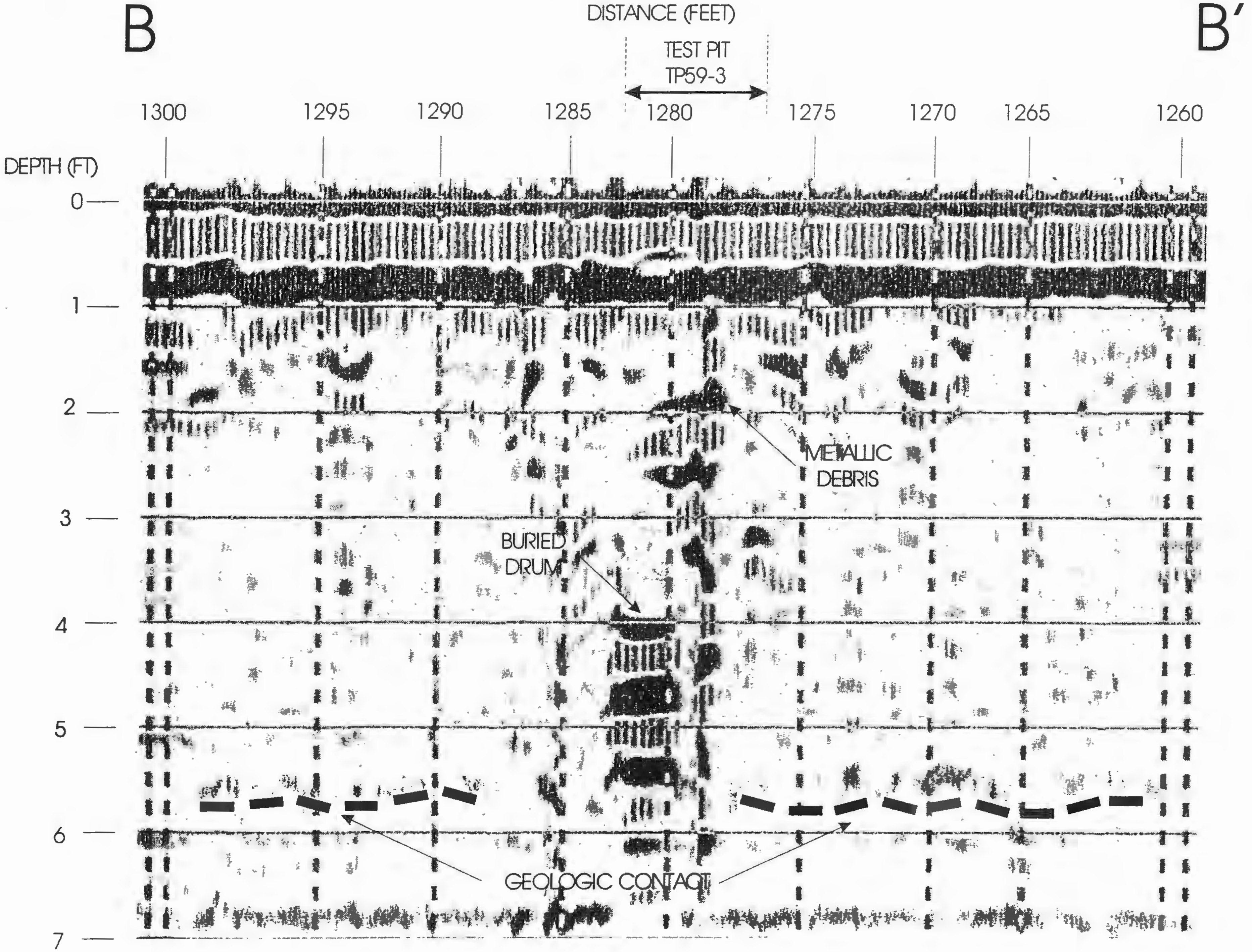
The GPR profiles revealed 17 locations where buried metallic objects were suspected. A small disposal pit was also detected in the southeastern portion of the area investigated. Twelve of the buried metallic object locations were situated within the suspected disposal area in the northeastern quadrant of SEAD-59. Ten of the GPR anomaly locations were either situated over a localized EM anomaly or within 15 feet of a localized EM anomaly. Figure 3-5 shows one of the GPR profiles (Profile B-B') acquired over the EM/GPR anomaly which was later investigated as test pit TP59-3. A small disposal pit located in the southeastern portion of SEAD-59 was associated with both in-phase and apparent conductivity anomalies. Figure 3-6 shows one of the GPR profiles (Profile A-A') 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. This anomaly was further investigated with test pit TP59-1.

Test Pitting Program

Five test pits were excavated for the ESI at SEAD-59 and their locations are shown on Figure 3-1. Test pit logs are included in Appendix G. Test pit TP59-1 was centered over the small disposal pit as identified with the GPR data, located in the southeastern portion of SEAD-59. Test pit TP59-5 was also located in the southern portion of SEAD-59 in the surface debris pile associated with the western-most negative in-phase EM-31 anomaly. Test pits TP59-3 and TP59-4 were centered over areas of EM and GPR anomalies located in the fill area north of the access road. TP59-2 was also located in the fill area.

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 andscreened 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.



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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59

DEPT ENVIRONMENTAL ENGINEERING
DWG NO 727651-02011

FIGURE 3-5
SEAD 59 FILL AREA WEST OF BLDG. 135
GPR PROFILE B-B'

SCALE
DATE FEBRUARY 1997

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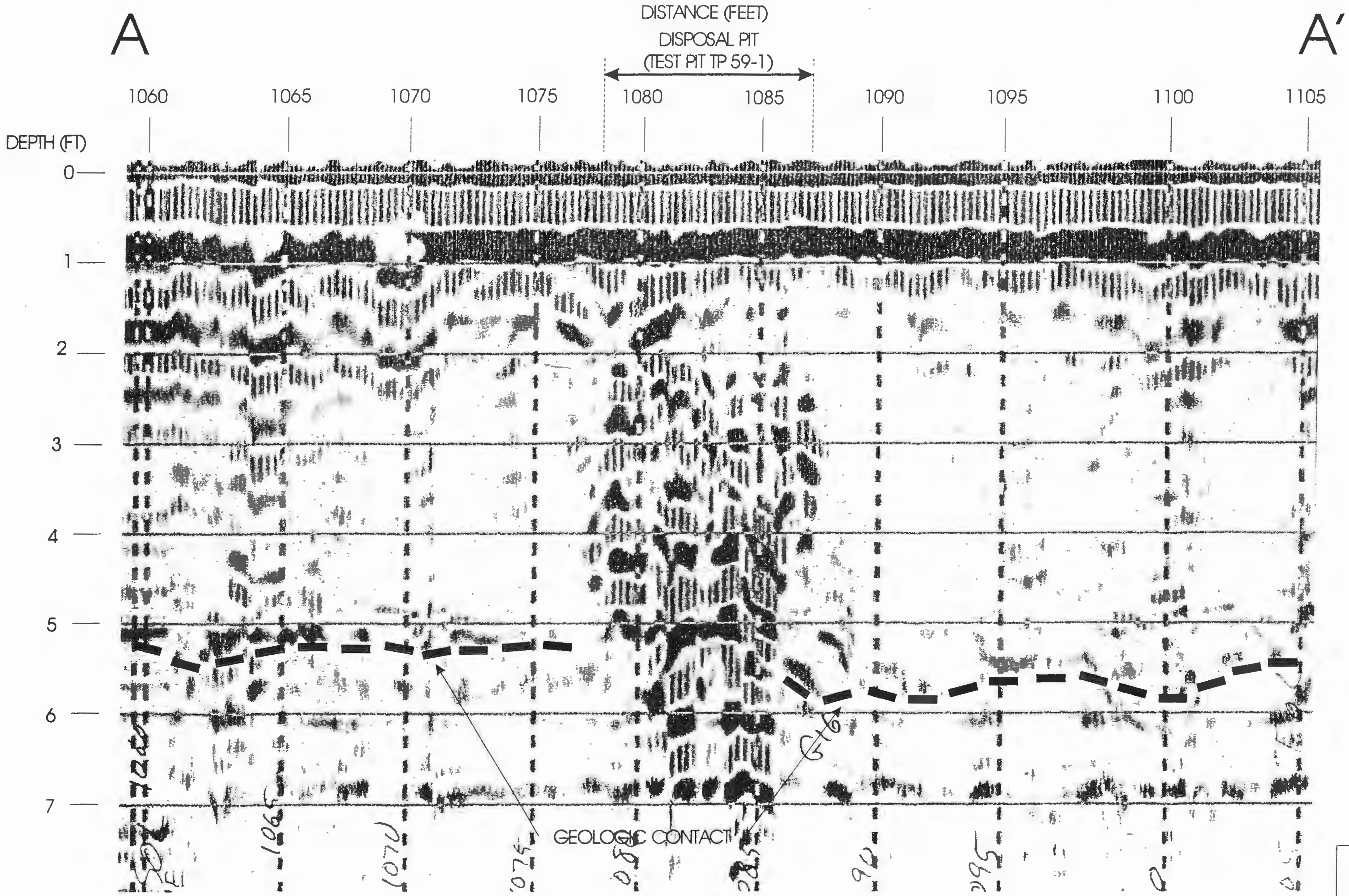

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59

DEPT ENVIRONMENTAL ENGINEERING | DWG NO. 727651-02011

FIGURE 3-6
SEAD 59 FILL AREA WEST OF BLDG. 135
GPR PROFILE A-A'

SCALE | DATE FEBRUARY 1997

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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 is 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 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 from all the test pits was continuously screened for organic vapors and radioactivity with a Thermo Environmental OVM 580 PID and a Victoreen Model 190 radiation monitor, 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.

3.1.1.2.4 Site Hydrology and Hydrogeology

SEAD-59 is comprised of two areas, one area located north of the access road to Building 311 and one area located to the south of the road. Each area is characterized by different topography with the area to south of the road being relatively flat and sloping gently to the west and the area to the north of the road containing a fill area with approximately 10 feet of relief.

Surface water flow from precipitation events is controlled by local topography. The area to the south of the access road slopes gently to the west. Surface water flow in this area is to the west and it is likely to be captured by the north-south trending drainage swale located in the western portion of the site and by the drainage ditch which parallels the south side of the access road. This ditch also drains SEAD-5, which is located just to the east of SEAD-59.

In the area north of the access road, a hill composed of fill material has approximately 10 feet of vertical relief. To the west, the hill slopes steeply to the north-south trending drainage swale which flows north and eventually flows under the railroad tracks north of the site. To the north, the hill slopes to a sustained drainage ditch approximately two feet deep. This ditch originates east of the site near Building 128 and flows west paralleling the railroad tracks and the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale flows north under the railroad tracks. To the east, the hill slopes downward to a graded gravel surface used for storing large equipment. Surface water from this area also drains into the northern drainage swale, flowing along the northern boundary of the site, as described above. To the south, the hill slopes to the access road which runs through the site. Surface water from this southern portion of the hill drains into the drainage ditch which parallels the access road on the north side. This drainage ditch flows west and intersects the north flowing drainage ditch in the western portion of SEAD-59.

As part of the ESI program, three monitoring wells were installed at SEAD-59 and three wells were installed at SEAD-5. SEAD-5 is located adjacent to SEAD-59 just east of the area south of the access road. Groundwater elevations were measured in the six wells and the results are presented in Table 3-3. Figure 3-7 shows the groundwater elevations. Based on these data, the groundwater flow direction is primarily southwest across SEAD-59.

3.1.1.2.5 Chemical Analysis Results

Soil and groundwater were sampled as part of the ESI conducted at SEAD-59 in 1994. Sampling and analyses were based upon historical usage of the area for the disposal of construction debris and oily sludges. The results of this investigation were detailed in the draft ESI report (Parsons ES, April 1995).

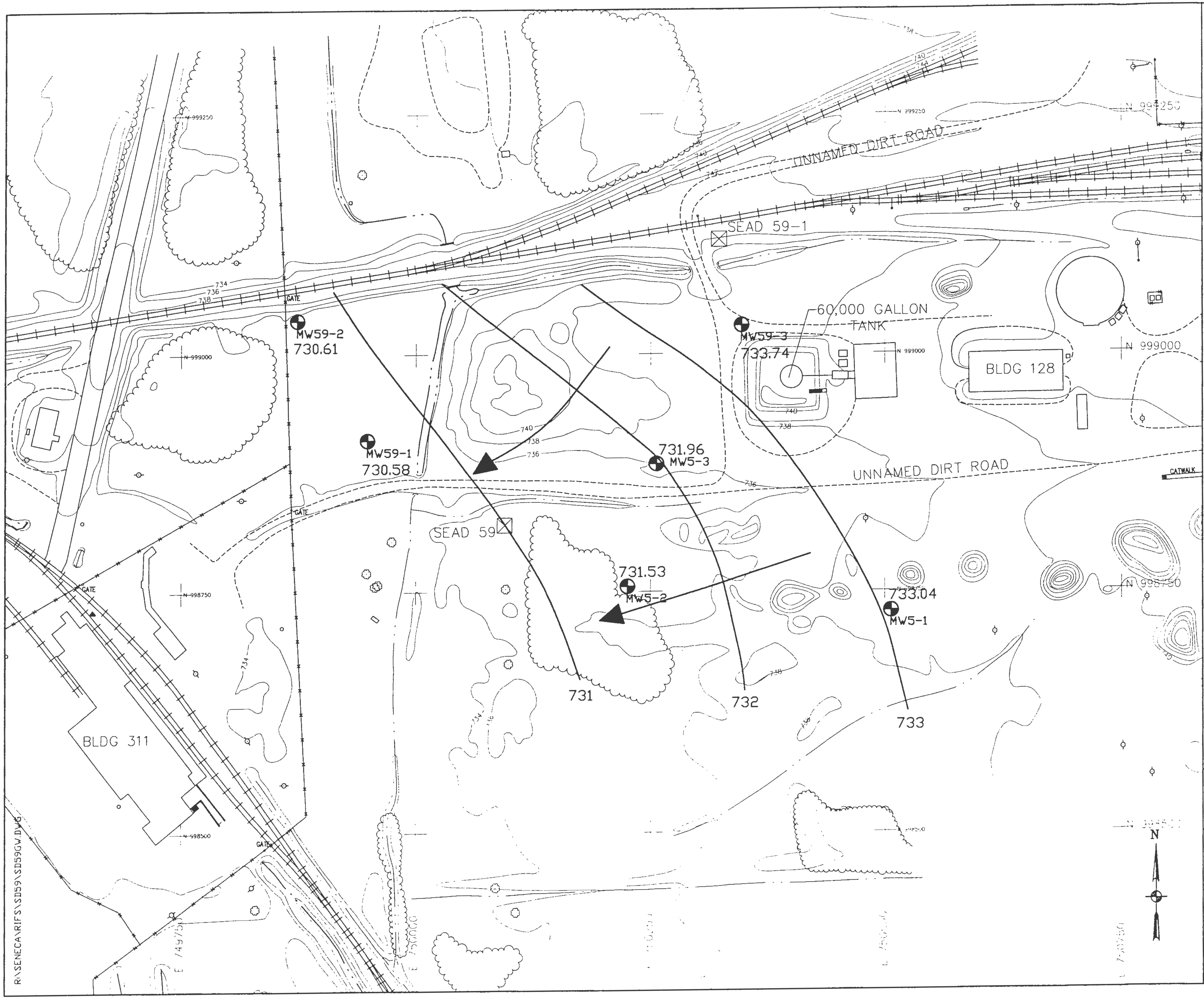
To evaluate whether each media (soil and groundwater) is being impacted, the chemical analysis data were compared to available New York State and Federal standards, guidelines, and criteria. Only those state standards which are more stringent than federal requirements were used as criteria.

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, and the 25 AOCs investigated for ESIs. The 95th UCL of the mean for the metals analyzed in this investigation are presented in the ESI reports. 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:

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.



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
SURVEY MONUMENT
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL

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 FOR THE ESI

50 0 50 100
(feet)

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RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

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727651-02011

FIGURE 3-7
GROUNDWATER ELEVATION MAP

1" = 100'
FEBRUARY 1997
A

TABLE 3-3

SEAD-59
RI/FS PROJECT SCOPING PLAN
MONITORING WELL WATER LEVEL SUMMARY

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	4.28	730.58
								7/26/94	4.44	330.42
MW59-2	736.20	3/8/94	3.40	732.80	7/21/94	6.55	729.65	7/6/94	5.59	730.61
								7/26/94	5.58	730.62
MW59-3	737.61	3/20/94	1.44	736.17	7/21/94	5.20	732.41	7/6/94	3.87	733.74
								7/26/94	3.91	733.70
MW5-1	739.76	3/18/94	3.36	736.40	7/11/94	7.22	732.54	7/6/94	6.72	733.04
								7/26/94	6.94	732.02
MW5-2	737.18	3/8/94	2.71	734.47	3/30/94	1.84	735.34	7/6/94	5.65	731.53
								7/26/94	6.58	730.60
MW5-3	730.82	3/19/94	3.33	727.49	7/11/94	5.42	725.40	7/6/94	4.86	731.93
								7/26/94	5.60	731.92

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

SOIL SAMPLING SUMMARY

A total of 20 soil samples were collected from soil borings and test pits as part of the ESI for SEAD-59. One additional solids sample (sample TP59-3X), which was collected from material found inside a buried drum in test pit TP59-3, was submitted for VOC analysis only. The following sections describe the nature and extent of contamination identified in the soils at SEAD-59.

Soil borings were located throughout the landfill area to determine the thickness of the fill and to provide subsurface samples for chemical analyses. Test pits were located in zones of disturbed soil determined by the GPR survey, areas of large EM-31 anomalies, and areas with visible surface debris. Locations of the soil borings and test pits are shown on Figure 3-1. Table 3-4 presents a summary of all soil sampling data collected during the ESI.

Sampling conducted in SEAD-59 indicated impacts to soils from volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, metals. In the fill area, polyaromatic hydrocarbon (PAH) compounds were found in surface soil and subsurface soil samples at concentrations exceeding the criteria specified in the Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, 1992). Several 55-gallon drums were unearthed at test pit location, TP59-3, and an area of stained soil was identified at the pit location TP59-4. Both of the test pits were located within the fill area north of the access road. Total petroleum hydrocarbons were detected in all but 2 of the soil samples collected from the fill area. At TP59-1, located approximately 100 feet south of the access road, a disposal pit containing filled 2-gallon paint cans was found. BTEX constituents were detected in the sample from this location at concentrations exceeding the associated TAGM criteria.

Volatile Organic Compounds

A total of 10 volatile organic compounds were detected in the soil samples collected at SEAD-59. BTEX compounds were detected in 4 of the samples. Benzene (5,900 µg/kg), toluene (830,000 µg/kg), ethylbenzene (260,000 µg/kg), and xylene-total (1,000,000 µg/kg) were found at concentrations which exceeded the associated criteria in the soil sample collected from test pit TP59-1. These elevated concentrations were attributed to the paint staining of the soils at this location. A reported concentration of 2,000 µg/kg of benzene in the solids sample TP59-3X was

TABLE 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

COMPOUND		MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM				
	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-59	SEAD-59	SEAD-59	SEAD-59
	DEPTH (FEET)					0-0.2	6-8	10-12	0-0.2
	SAMPLE DATE					02/20/94	02/20/94	02/20/94	05/26/94
	ES ID					SB59-1.01	SB59-1.04	SB59-1.06	SB59-2-00
	LAB ID					212224	212225	212226	222479
	SDG NUMBER					42494	42494	42494	44410
	UNITS								
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%	NA	NA	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-59	SEAD-59	SEAD-59	SEAD-59
	DEPTH (FEET)					0-0.2	6-8	10-12	0-0.2
	SAMPLE DATE					02/20/94	02/20/94	02/20/94	05/26/94
	ES ID					SB59-1.01	SB59-1.04	SB59-1.06	SB59-2-00
	LAB ID					212224	212225	212226	222479
	SDG NUMBER	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	42494	42494	42494	44410
COMPOUND	UNITS								
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%	1	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%	30	9	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59
	DEPTH (FEET)					2-4	6-7	0-0.2	2-4	6-8	0-0.2
	SAMPLE DATE					05/26/94	05/26/94	05/25/94	05/25/94	05/25/94	05/25/94
	ES ID		FREQUENCY		NUMBER	SB59-2-02	SB59-2-04	SB59-3-00	SB59-3-02	SB59-3-04	SB59-4-00
	LAB ID		OF		ABOVE	222481	222482	222428	222429	222430	222431
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44410	44410	44345	44345	44345	44345
COMPOUND	UNITS										
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%	NA	NA	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

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%	1	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%	30	9	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

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%	NA	NA	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59
	DEPTH (FEET)					8-10	10-20	0-0.2	4-6	10-12	2
	SAMPLE DATE					05/25/94	05/25/94	05/25/94	05/25/94	05/25/94	06/08/94
	ES ID					SB59-4-05	SB59-4-10	SB59-5-00	SB59-5-03	SB59-5-06	TP59-1
	LAB ID					222432	222433	222434	222435	222436	223514
	SDG NUMBER	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	44345	44345	44345	44345	44345	44694
COMPOUND	UNITS										
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%	1	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%	30	9	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

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%	NA	NA	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 3-4

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59	SEAD-59
	DEPTH (FEET)					7	3	1.5	1.5	2	2.5
	SAMPLE DATE					02/20/94	06/08/94	06/28/94	06/28/94	06/08/94	06/08/94
	ES ID					TP59-2	TP59-3	TP59-3	TP59-3X	TP59-4	TP59-5
	LAB ID					212043	223515	225801	225802	223516	223517
	SDG NUMBER	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	42494	44694	45062	45062	44694	44694
COMPOUND	UNITS										
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%	1	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%	30	9	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.

also above its associated criteria of 60 µg/kg. Toluene was detected in soil samples TP59-4 (220 µg/kg) and TP59-5 (2 µg/kg) and in the solids sample TP59-3X (440 µg/kg) at concentrations which were below the associated criteria of 1,500 µg/kg. Xylene (total) was also detected in soil sample TP59-4 (410 µg/kg) and solids sample TP59-3X (1200 µg/kg) at concentrations that were at or below the associated criteria of 1,200 µg/kg. Figure 3-8 shows the total reported BTEX concentrations found in the soil samples collected at SEAD-59.

The six VOCs, chloromethane, methylene chloride, acetone, carbon disulfide, 2-butanone, and trichloroethane, were detected in 4 soil samples at concentrations which were below the associated criteria.

Semivolatile Organic Compounds

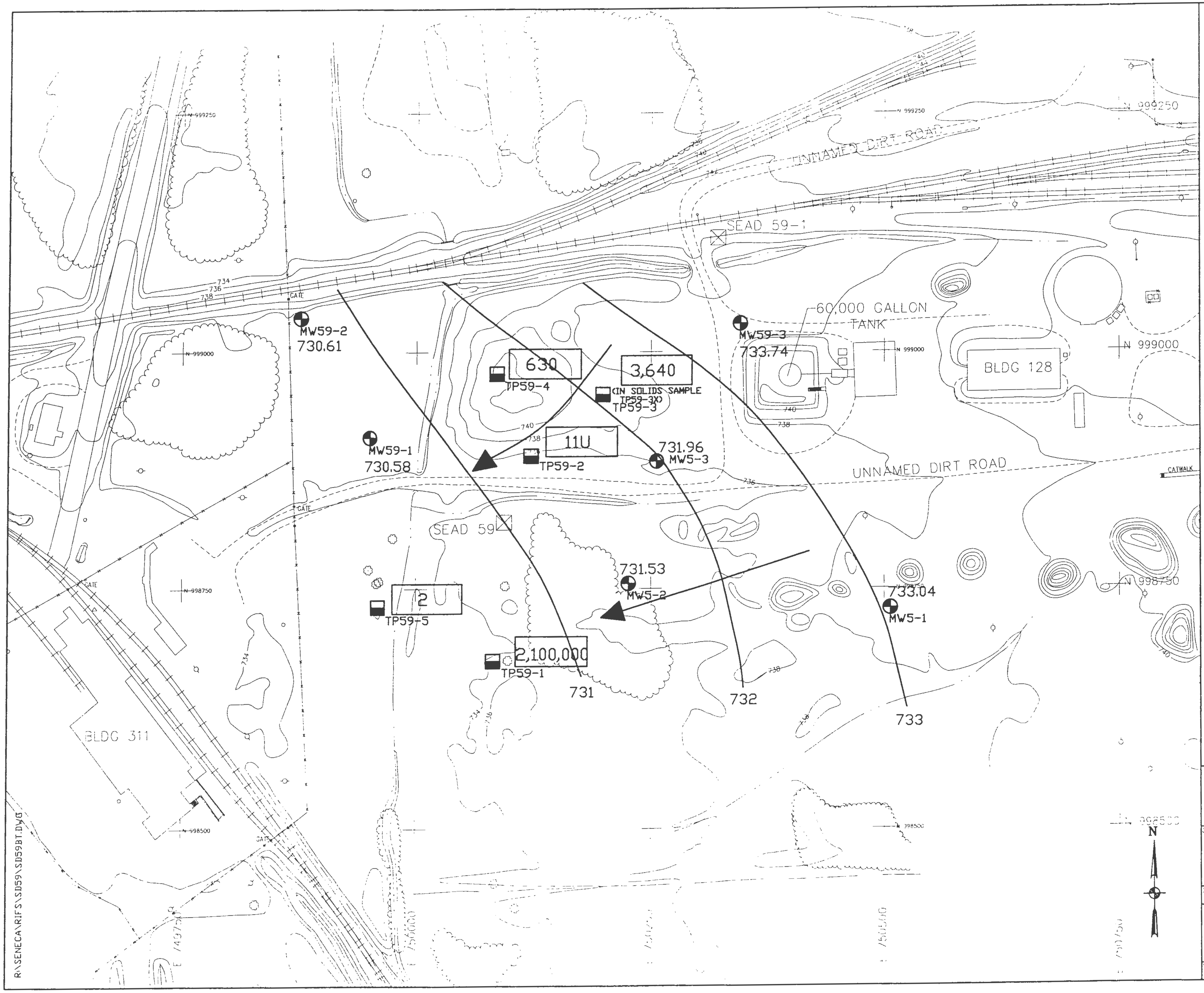
A total of 23 semivolatile organic compounds (SVOCs) were detected at varying concentrations in 14 of the 20 soil samples collected at SEAD-59. Eight PAH compounds were found in concentrations exceeding the associated criteria and at least one PAH exceedance was noted in all 14 samples which had detectable concentrations of SVOCs. 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 from 0 to 0.2 feet below the ground surface at soil boring location SB59-5. 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 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 3-9 shows the total PAH concentrations found in the soil samples collected at SEAD-59. It should be noted that the detection limits for SVOCs were greatly increased in samples TP59-1, TP59-3, and TP59-4 due to interference effects in the chemical analyses. The presence of paint in sample TP59-1 and a petroleum product (probably diesel fuel) in sample TP59-4 are considered to be the cause of the elevated detection limits in these two samples.

Pesticides/PCBs

A total of 14 pesticides and 1 PCB compound (Aroclor-1254) were detected at varying concentrations in 15 of the 20 soil samples collected at SEAD-59. Aroclor-1254 and all of the pesticides, except endrin aldehyde, were found at concentrations which were less than associated criteria. Currently, no criteria value exists for endrin aldehyde in soil.

Metals

A total of 22 metals were detected in the 20 soil samples collected at SEAD-59. Sixteen metals were detected in one or more samples at concentrations which exceeded the associated TAGM



LEGEND

—·—·—	MINOR WATERWAY
—··—··—	MAJOR WATERWAY
—x—x—x—	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
SURVEY MONUMENT
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL

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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SEAD-59 FILL AREA WEST OF BLDG. 135

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FIGURE 3-8
BTEX IN SOILS

1" = 100' FEBRUARY 1997 A

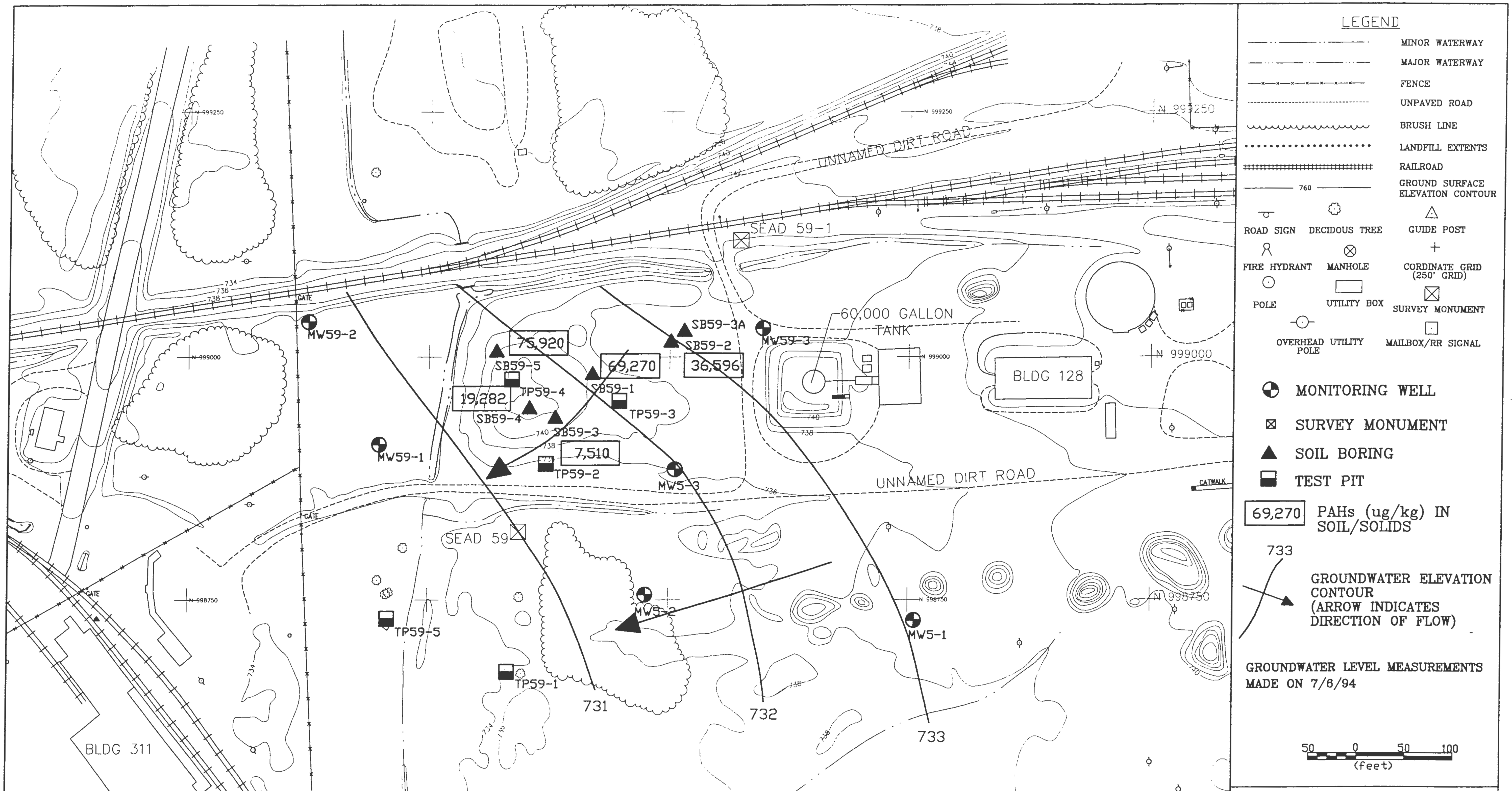

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FIGURE 3-9
TOTAL PAHs IN SURFACE SOILS
LOCATION OF ESI SAMPLING POINTS

1" = 100' | FEBRUARY 1997 | A

criteria. Exceedances were reported in all 20 of the soil samples collected. A variety of the metals were found at concentrations just slightly above the criteria, and approximately half of these exceedances appear to reflect natural variations in site soils. The exceptions to this are the metals antimony, cadmium, lead, mercury, and zinc which were reported at concentrations at least 2 times the criteria in the soil samples.

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 (depth of 8 to 10 feet) to 7,870 mg/kg in soil sample TP59-4 (depth of 2 feet). Currently, no TAGM criteria exists for detected concentrations of TPH in soils.

GROUNDWATER SAMPLING SUMMARY

Three monitoring wells were installed and sampled as part of the ESI conducted at SEAD-59. The locations of the wells are shown in Figure 3-1. Monitoring well installation diagrams are included in Appendix G. Table 3-5 presents a summary of all groundwater sampling data collected during the ESI. The following sections describe the nature and extent of contamination identified in the groundwater at SEAD-59. Concentrations of constituents were compared to the NY AWQS Class GA groundwater criteria and the Federal Primary and Secondary Drinking Water Maximum Contaminant Levels (MCLs).

Volatile Organic Compounds

No volatile organic compounds were found in the groundwater samples collected at SEAD-59.

Semivolatile Organic Compounds

Phenol was reported at estimated concentrations in the groundwater samples collected at monitoring wells MW59-2 and MW59-3. The estimated concentrations were 2 μg/L in MW59-2 and 1 μg/L in MW59-3. The state groundwater criterium for phenol is 1 μg/L.

Pesticides and PCBs

No Pesticides or PCBs were found in the groundwater samples collected at SEAD-59.

Metals

A total of 18 metals were detected in the groundwater samples collected at SEAD-59. Five metals, aluminum, iron, manganese, sodium, and thallium, were detected at concentrations which were above the lowest associated federal or state criteria. Sodium was found at concentrations which

TABLE 3-5

SENECA ARMY DEPOT
SEAD-59 PROJECT SCOPING PLAN
GROUNDWATER ANALYSIS RESULTS FROM ESI

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	FEDERAL DRINKING WATER MCL (f)	NY AWQS CLASS GA (a)	NUMBER ABOVE LOWEST 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%	NA	1	1	10 U	2 J	1 J
METALS									
Aluminum	ug/L	2680	100%	50-200 *	NA	3	1940	299	2680
Arsenic	ug/L	2	33%	NA	25	0	2 J	2 U	2 U
Barium	ug/L	103	100%	2000	1000	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%	100	50	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%	1000 ***	200	0	4.3 J	0.5 U	3.6 J
Iron	ug/L	3940	100%	300	300	3	3120	731 J	3940 J
Lead	ug/L	2.4	67%	15 **	25	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%	50 *	300	3	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%	100	NA	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%	NA	20000	3	66000	32100	239000
Thallium	ug/L	4	67%	2	NA	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%	5000 *	300	0	21.8	4 J	26.2
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/L	2.6					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 and Secondary (*) Drinking Water Maximum Contaminant Levels (40 CFR 141.61-62 and 40 CFR 143.3)
g) * Secondary Maximum Contaminant Levels
h) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, MAy 1994
i) *** the value is a Secondary Maximum Contaminant Level. The action level for copper is 1300 ug/L.

were above the associated state groundwater criteria value of 20,000 µg/L in all three groundwater samples collected at SEAD-59. Iron was found above the associated state and federal criteria value of 300 µg/L in all three groundwater samples. Manganese was found above the associated federal MCL value of 50 µg/L in groundwater samples from all three wells. Aluminum was found at concentrations which were above the federal secondary MCL range of 50 to 200 µg/L in all three groundwater samples. Thallium was found at concentrations which were above the federal MCL of 2 µg/L in groundwater samples from wells MW59-2 and MW59-3. The maximum reported concentrations of iron (3,940 µg/L) and sodium (239,000 µg/L) were found in the groundwater sample collected from MW59-3 which is located upgradient of the site. The highest concentration of manganese (780 µg/L) was found in groundwater sample from MW59-1.

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 TPH in groundwater.

3.1.1.3 Data Summary and Conclusions

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 fill area 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 the associated criteria by at least one 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 the associated criteria by one 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. Both test pits were located within the fill area north of the access road. The source of the stained soil at the TP59-4 test pit location was not identified during the ESI. Total petroleum hydrocarbons were also detected, at concentrations ranging from 40 to 7,870 mg/kg, in all but 2 of the soil samples collected from the fill area. At a location approximately 200 feet south of the access road, a disposal pit containing filled 2 gallon paint cans was found. BTEX constituents were detected at concentrations which exceeded the associated criteria by at least one order of magnitude in the sample collected at this location. These concentrations were presumably associated with the paint staining of the soil.

The analytical results of the groundwater analyses indicated that the groundwater at SEAD-59 has been moderately impacted by total petroleum hydrocarbons and, to a lesser extent, by metals and one semivolatile organic compound. Total petroleum hydrocarbons were detected at low concentrations in each of the downgradient groundwater samples. Total petroleum hydrocarbons were undetected in the upgradient groundwater sample. Iron, aluminum, manganese, and sodium were detected at elevated concentrations in both the upgradient and the downgradient groundwater samples. Concentrations of each of these elements were found in all groundwater samples above their associated groundwater criteria. Thallium was found in the upgradient and one downgradient groundwater sample at concentrations above the federal MCL.

The results of this ESI have identified significant releases of BTEX and PAH compounds in the materials comprising the fill area 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 potential receptors.

3.1.2 SEAD-71

3.1.2.1 Site History

It is rumored that paints and/or solvents were disposed of in burial pits at SEAD-71. It is not known what other activities occurred here. No dates of disposal are available nor is there any information on the number of suspected disposal pits.

3.1.2.2 Physical Site Characterization

3.1.2.2.1 Physical Site Setting

SEAD-71 is located in the east-central portion of SEDA. The site is located approximately 200 feet west of 4th Avenue near Buildings 127 and 114. The site plan is shown in Figure 1-3. Originally, the site was thought to be a small, square storage area adjacent to the northwest corner of Building 127, however, prior to the investigation, the area west of, and adjacent to the site was also reported to have been the location of the suspected burial pits. Therefore, the site investigated for this study was extended west approximately 150 feet to include this area as well.

The entire site is approximately 350 feet by 100 feet and bounded on the north and south by railroad tracks serving Buildings 114 and 127. A chain-link fence borders the east side of the site. The topography is relatively flat, gently sloping to the southwest. There is no evidence of surface water bodies or drainage ditches on-site.

The western half of SEAD-71 is a grassy rectangular area, which is transected by an unnamed gravel road and an east-west trending SEDA railroad track.

The eastern half of the site is a paved rectangular area approximately 150 feet by 70 feet bounded on three sides by chain link fences and a railroad spur on the north side. This area is one of several areas defined by chain-link fences that serve as storage for equipment and miscellaneous supplies.

The storage areas north and east of the site contain numerous white transformers, large spools of cable, and other assorted equipment.

3.1.2.2.2 Site Geology

Determination of the site geology was based on the results of the subsurface exploration program conducted for the ESI at SEAD-71. This program included three soil borings, which were completed as monitoring wells, and two test pits. The three soil borings and test pit, TP71-2, were located in the eastern half of the site either within or near the fenced storage area. Test pit 71-1 was located in the south central portion of the western half of the site. The soil borings were drilled to a maximum depth of 9.4 feet below ground surface and the test pits were excavated to a maximum depth of 5.7 feet. The locations of the soil borings and test pits are shown on Figure 3-10. Soil boring logs and test pit logs are included in Appendix G.

Based on the results of the subsurface exploration program, till, calcareous weathered shale, and competent shale are the three major types of geologic materials present on-site.

The till in the storage area was characterized as olive grey clay with little silt, very fine sand, and shale fragments (up to 1 inch in diameter) and ranged in thickness between 4.7 and 7.8 feet. In the southern section of the storage area, the till consisted of light brown silt with little clay and trace amounts of shale fragments (up to 1 inch in diameter). Large shale fragments (rip-up clasts) were observed at or near the till/weathered shale contact at all soil boring locations. In the western half of the site, the till consisted of olive gray silt and was found to be approximately 4 feet thick, according to the test pit log for TP71-1.

The weathered shale that forms the transition between the till and competent shale was encountered at all soil boring and test pit locations. The depth of the weathered shale ranged from 4.7 to 8.3 feet below ground surface.

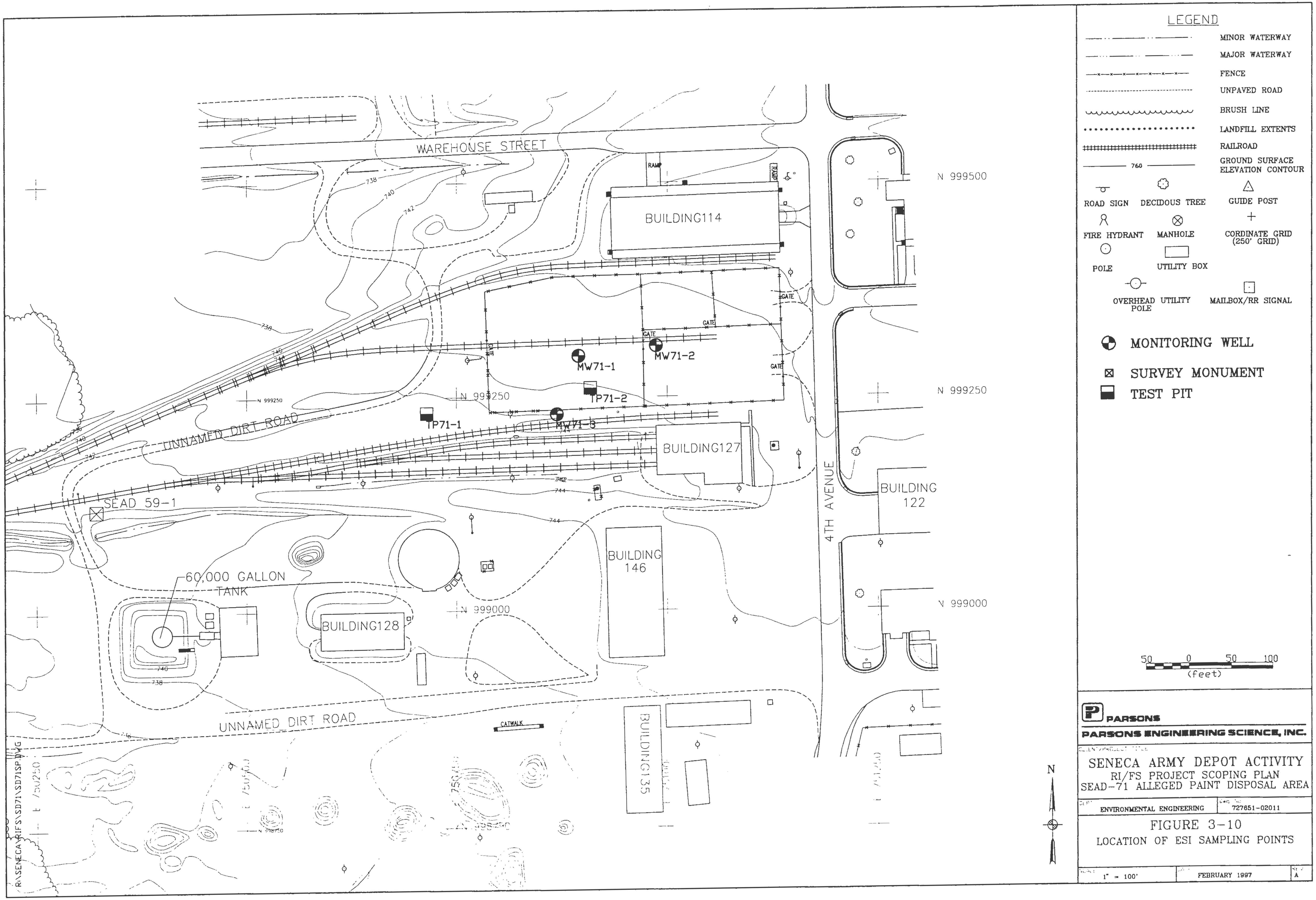
Competent, calcareous grey shale was encountered at depths between 5.2 and 9.4 feet below ground surface.

3.1.2.2.3 Geophysics

Seismic refraction surveys, electromagnetic (EM-31) surveys, and Ground Penetrating Radar (GPR) surveys were performed at SEAD-71 as part of the geophysical investigations for the ESI.

Seismic Survey

Four seismic refraction profiles were performed on four lines (P1 through P4) positioned along each boundary line of the storage area in the eastern half of SEAD-71. The profile locations are shown on Figure 3-11. The results of the seismic refraction survey at SEAD-71 are presented in



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RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

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FIGURE 3-10
LOCATION OF ESI SAMPLING POINTS

1" = 100' FEBRUARY 1997 A

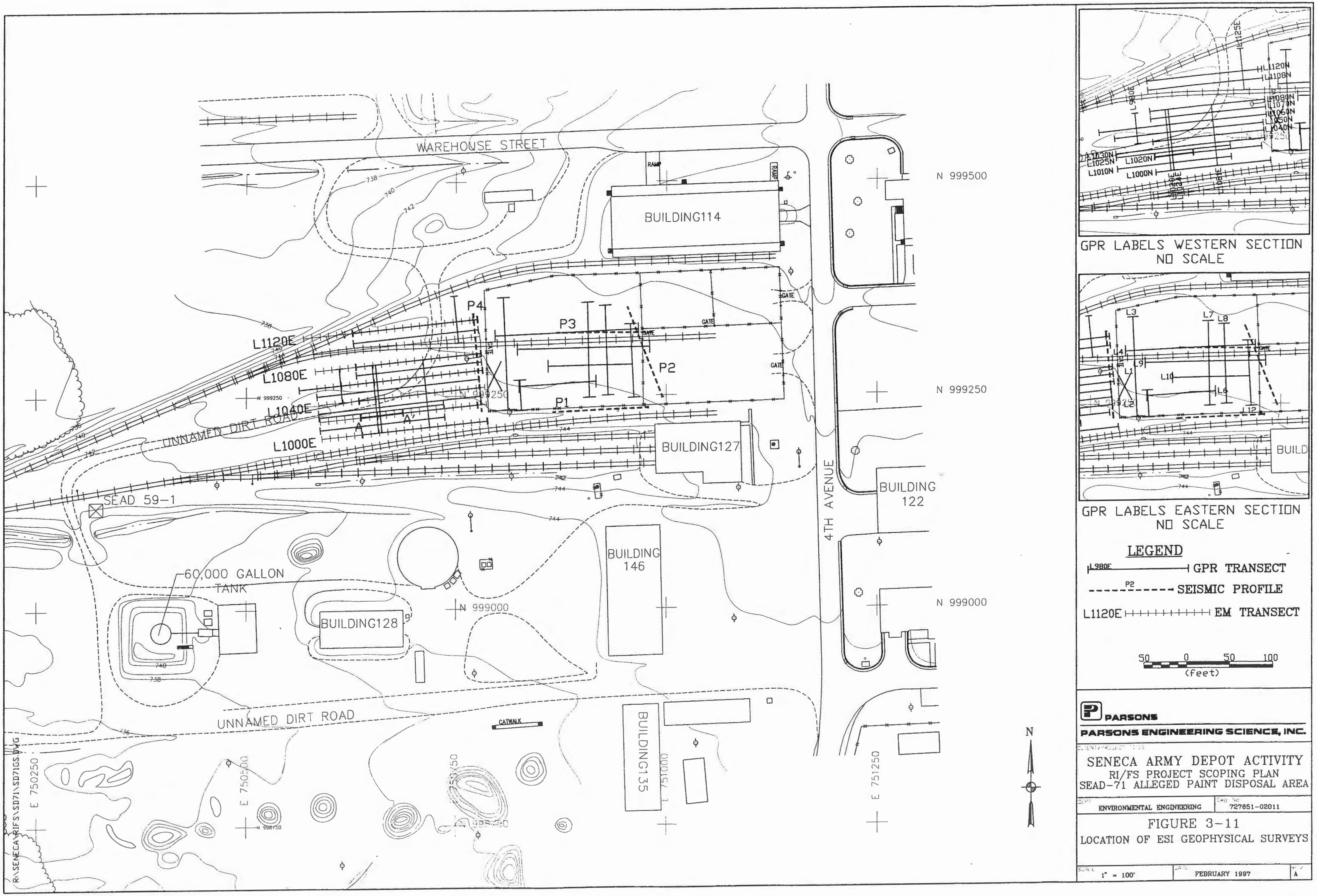

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FIGURE 3-11
LOCATION OF ESI GEOPHYSICAL SURVEYS

1" = 100'
FEBRUARY 1997
A

Table 3-6. The seismic refraction profiles detected 6 to 9 feet of unconsolidated overburden (1,125 to 1,500 ft./sec.) overlying bedrock (12,800 to 16,200 ft./sec.). Saturated overburden was not detected by the seismic survey due to limited thickness of the saturated overburden.

The elevations of the bedrock surface indicated that the bedrock slopes to the west, generally following the surface topography. Based on the results of the seismic survey, the groundwater flow direction is also expected to be to the west, following the slope of the bedrock surface.

EM-31 Survey

The EM-31 survey was performed for the ESI at SEAD-71 in the western half of the site to help locate the burial pits. The location of the EM-31 grid are shown on Figure 3-11. Figure 3-12 shows the EM-31 quadrature response, which is proportional to the apparent ground conductivity survey. Figure 3-13 shows the results of the in-phase response, which reflects the presence of buried ferrous objects.

Interferences from many cultural effects along the perimeter of the surveyed area complicated the interpretation of the data. A review of the EM-31 data from SEAD 71 revealed one area, in the south central portion of the grid, where both the apparent conductivity and the in-phase response decreased noticeably. One other area of increased apparent ground conductivity measurements was detected along the west-central portion of the grid, however, an associated in-phase response was not observed.

GPR Survey

GPR data was acquired for the ESI at SEAD-71 in both areas of concern. The locations of the GPR survey are shown in Figure 3-11. Within the storage area located in the eastern half of the site, the GPR records were acquired along the spaces in between stored equipment and supplies. The data from these surveys revealed an underground utility line or conduit running northwest - southeast across the northeastern corner of the storage compound. One area of anomalous subsurface reflections, typical of reflections from metallic objects, was detected in the south-central portion of the storage compound.

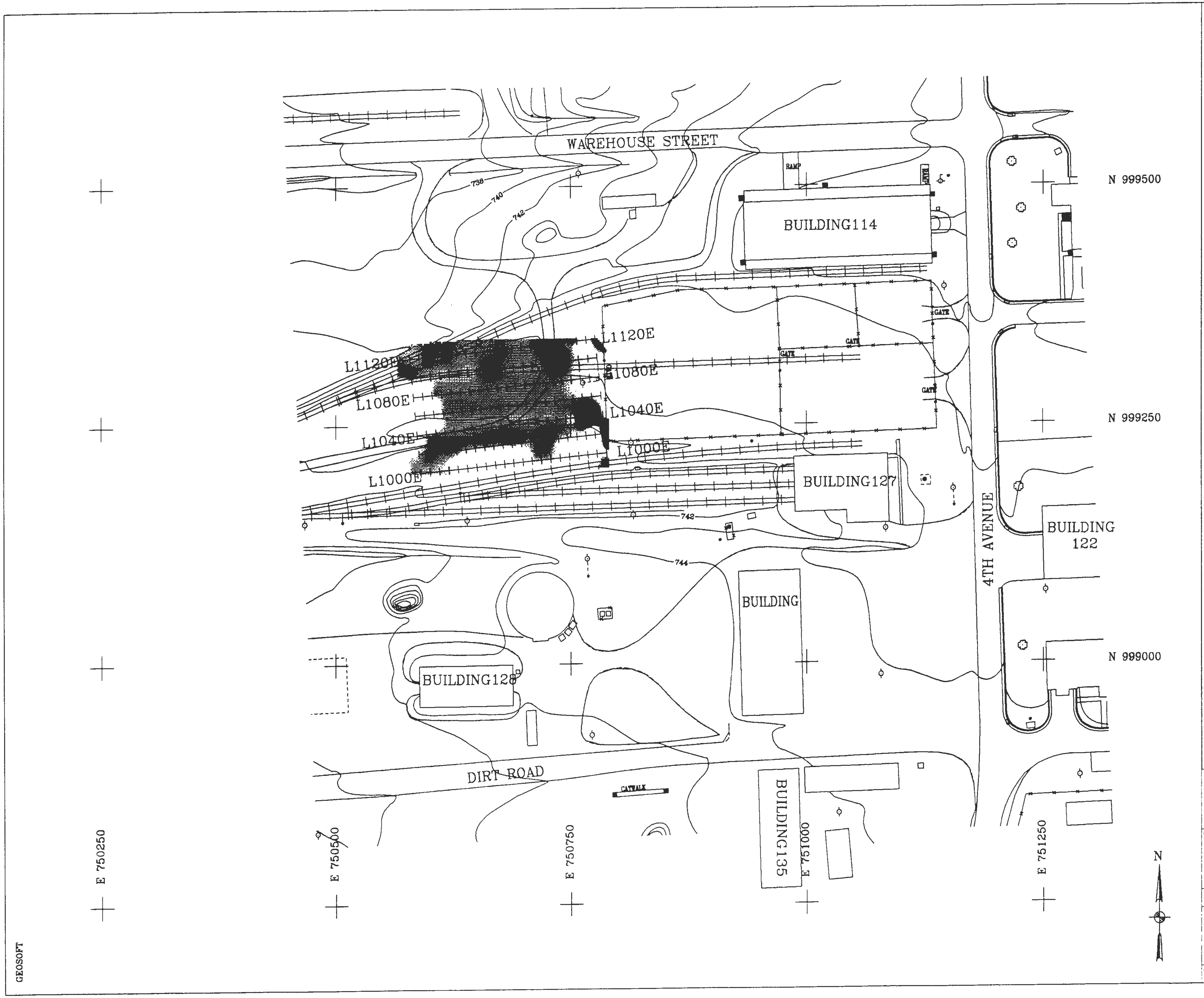
The GPR survey conducted in the area west of the storage compound revealed five localized anomalies and three zones with multiple anomalies. All were characterized by strong reflections originating from depths of 1 to 2 feet below grade and all were located in the central region of the area investigated. One zone of multiple anomalies coincided with the conductivity and in-phase anomalies located in the south central portion of the EM-31 grid. GPR profile A-A' was collected over this zone and is shown on Figure 3-14.

TABLE 3-6
SEAD-71
RESULTS OF SEISMIC REFRACTION SURVEY FROM THE ESI

Profile	Distance[1]	Ground Elevation[2]	Bedrock	
			Depth	Elevation[2]
P1	2.5	106.1	6.9	99.2
	57.5	106.7	6.7	100.0
	112.5	107.9	7.1	100.8
P2	2.5	105.2	7.7	97.5
	57.5	107.2	8.1	99.1
	112.5	109.2	9.4	99.8
P3	2.5	109.2	9.0	100.2
	57.5	109.1	8.3	100.8
	112.5	109.0	7.5	101.5
P4	2.5	108.3	8.3	100.0
	57.5	108.8	7.0	101.8
	112.5	109.2	6.0	103.2

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

[2] All elevations are accurate to within ±1 foot and are rounded to the nearest half foot.



LEGEND

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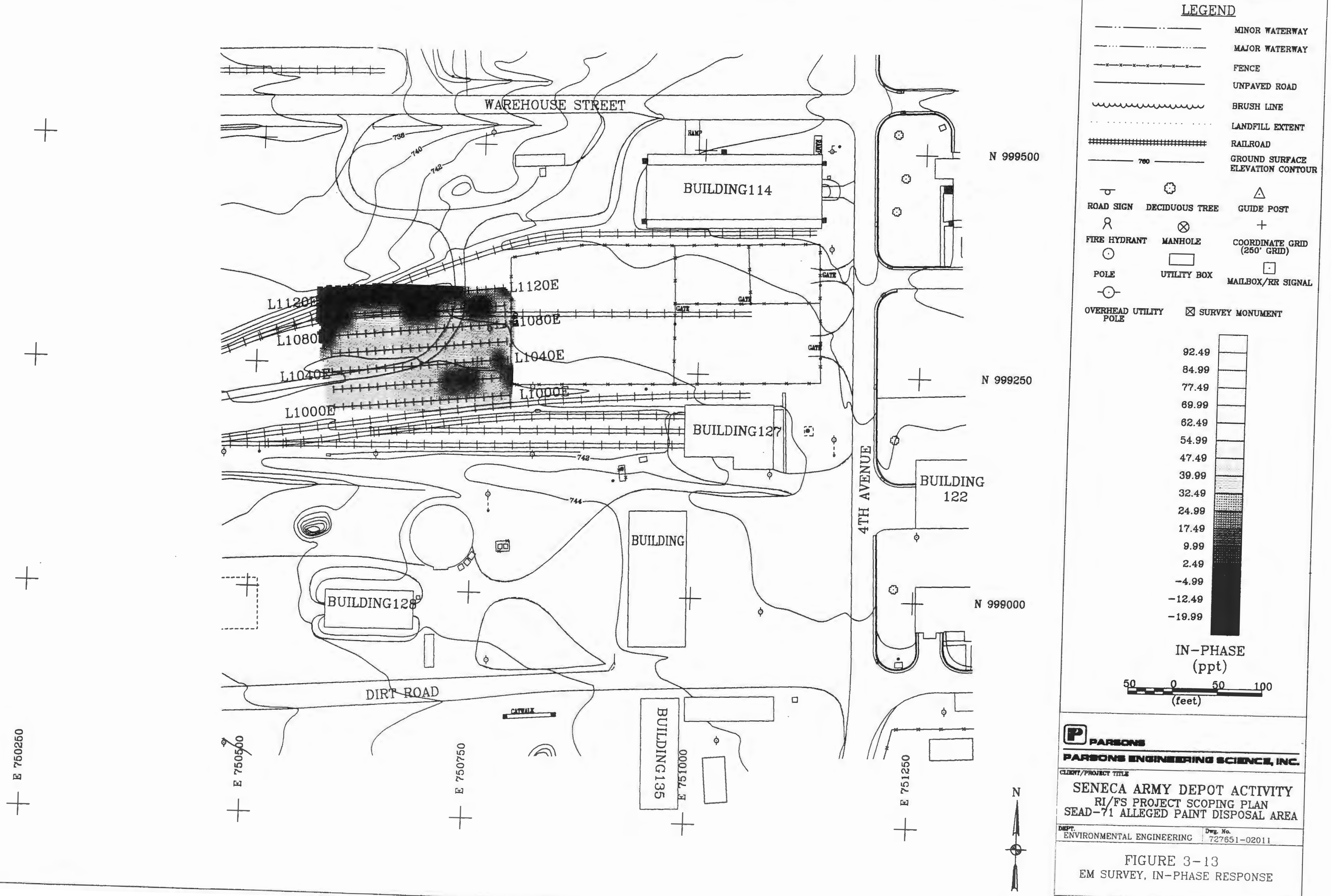
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02011

FIGURE 3-12
EM SURVEY, QUADRATURE RESPONSE

SCALE 1" = 100'
DATE FEBRUARY 1997
REV A



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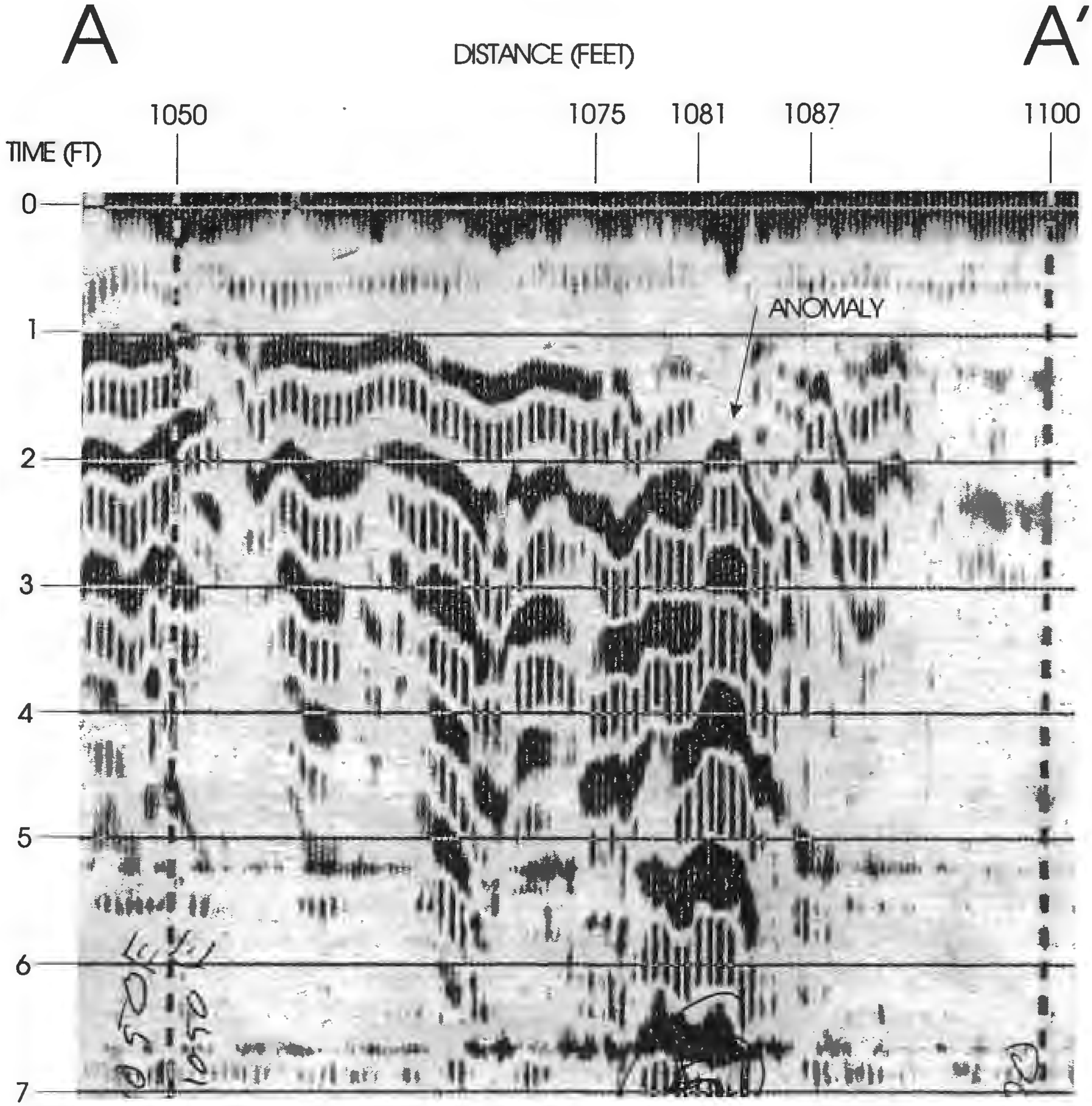
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	727651-02011

FIGURE 3-13
EM SURVEY, IN-PHASE RESPONSE

SCALE DATE



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RI/FS PROJECT SCOPING PLAN

SEAD-71 ALLEGED PAINT DISPOSAL AREA

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	727651-02011

FIGURE 3-14

SEAD-71, GPR PROFILE A-A'

SCALE	DATE
	FEBRUARY 1997

R:\GRAPHICS\SENECA\RADAR\FIG3-10-3.CDR

Test Pitting Program

Two test pits were excavated for the ESI at SEAD-71 to characterize the source of the geophysical anomalies. The locations of the test pits are shown on Figure 3-10. Test pit TP71-2 was located within the fenced storage area and was centered over an area with several GPR anomalies. Test pit TP71-1 was located in the area west of the fenced storage area where both the electromagnetic and GPR data indicated the presence of buried metallic objects. This test pit was also located near some empty heating oil storage tanks and oil-stained roadstone. The test pit logs are presented in Appendix G.

The source of the EM-31 and the GPR anomalies at the TP71-1 location was identified as construction debris composed of chain link fencing, sheet metal, asphalt, and a crushed, yellow, twenty gallon drum. This debris was situated 0.75 to 1.3 feet below the ground surface. A 0.75 foot thick layer of fine angular black debris (resembling creosote or soot) was observed immediately below the construction debris layer. A weathered shale layer, encountered at a depth of 5.5 feet, limited any further advancement of the excavation.

Test pit TP71-2 was centered over a GPR anomaly located in the storage area. This location was situated along the southern boundary of compacted roadstone. A dark gray to black, possibly stained, fine shale gravel layer was encountered from 0.25 to 1.0 foot below ground surface. The source of the GPR anomaly was not identified at this test pit location. Changes in the electrical properties of the soils within a layer may give rise to spurious radar wave reflections resembling GPR signatures observed over metallic objects.

The excavated material from the test pits was continuously screened for organic vapors and radioactivity with Thermo OVM 580 PID and a Victoreen Model 190 Radiation Monitor, 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.

3.1.2.2.4 Site Hydrology and Hydrogeology

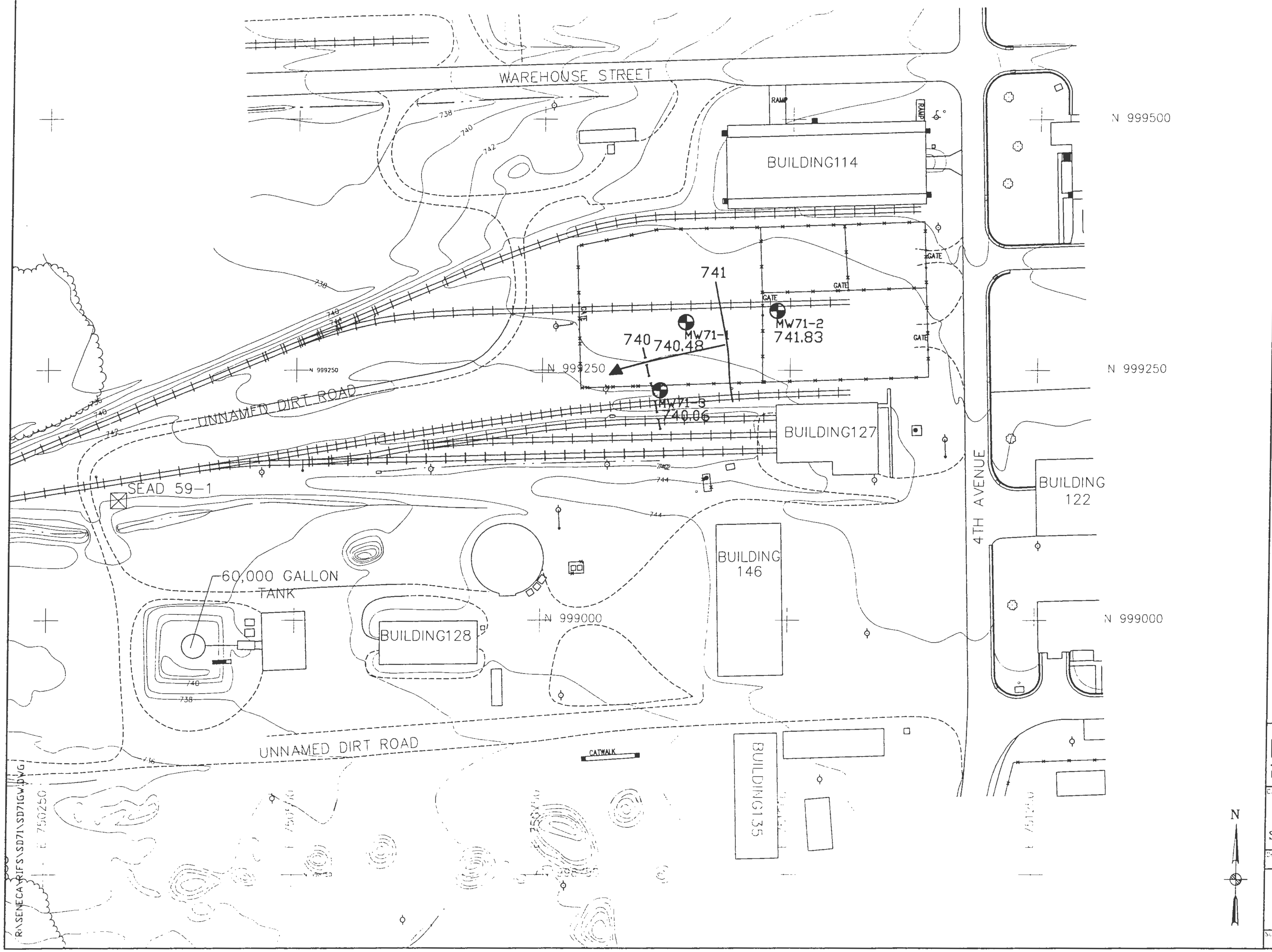
Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the fenced storage area located in the eastern half of the site, the area is covered with asphalt, which provides an impermeable surface resulting in an increased amount of surface water runoff from the site. Based on topographic relief, surface water flow is to the southwest toward the SEDA railroad tracks (to the south), which are topographically lower than the site.

As part of the ESI program, three monitoring wells were installed at SEAD-71. Groundwater elevations were measured in the three wells and the results are shown on Table 3-7. Figure 3-15 shows the groundwater elevations. Based on these data, the groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest.

TABLE 3-7
SEAD-71, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-71

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)
MW71-1	747.06	3/16/94	4.48	742.58	3/29/94	5.15	741.91	7/6/94	6.58	740.48
								7/26/94	5.73	741.33
MW71-2	747.29	4/5/94	4.85	631.97	7/10/94	5.46	741.83	7/6/94	5.46	741.83
								7/26/94	4.94	742.35
MW71-3	745.94	4/5/94	6.43	631.97	7/7/94	5.95	739.99	7/6/94	5.88	740.06
								7/26/94	6.09	739.85



GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

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SEAD-71 ALLEGED PAINT DISPOSAL AREA

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727651-02011

FIGURE 3-15
GROUNDWATER ELEVATION MAP

1" = 100'
FEBRUARY 1997
A

3.1.2.2.5 Chemical Analysis Results

Soil and groundwater were sampled as part of the ESI conducted at SEAD-71 in 1994. Sampling and analyses were based upon historical usage of the area for the disposal of paint and solvents. The results of this investigation were detailed in the draft ESI report (Parsons ES, April 1995).

To evaluate whether each media (soil and groundwater) 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, and the 25 AOCs investigated for ESIs. The 95th UCL of the mean for the metals analyzed in this investigation are presented in the ESI reports. 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.

SOIL SAMPLING SUMMARY

A total of eight subsurface soil samples were obtained from two test pits as part of the ESI for SEAD-71. The following sections describe the nature and extent of contamination identified at SEAD-71.

The two test pits were located over areas with GPR and EM-31 anomalies. Locations of the test pits are shown on Figure 3-10. Table 3-8 presents a summary of all soil sampling data collected during the ESI.

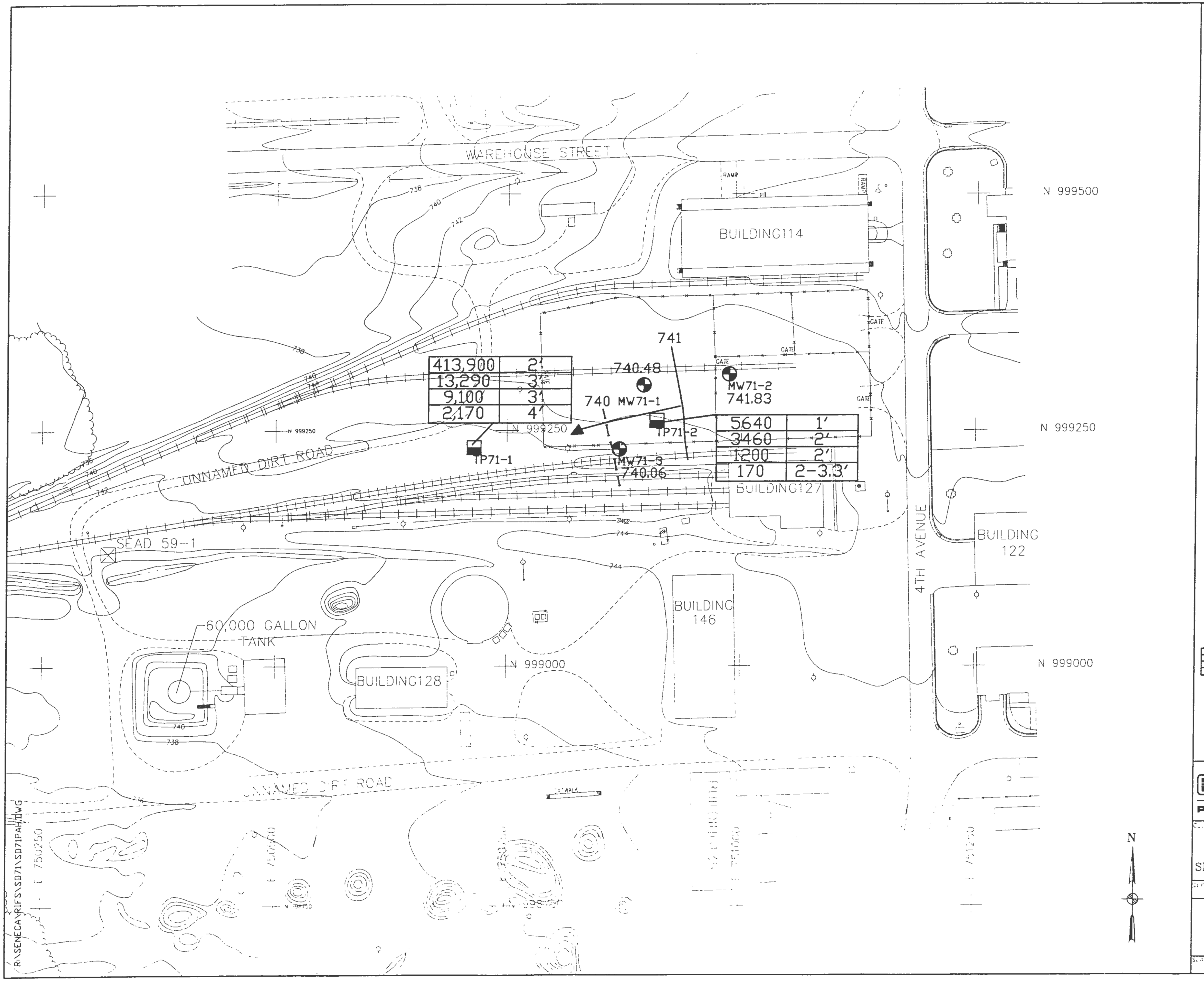
The ESI conducted at SEAD-71 did not uncover a burial pit for paint and solvents, although it did indicate the soils at SEAD-71 have been impacted by the waste materials which have been disposed of in at least one disposal pit on site. At one location, polynuclear aromatic hydrocarbons (PAHs) were present at concentrations exceeding the criteria specified in the Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC 1992). At the other test pit, PAHs, possibly associated with a nearby oil spill on the ground surface, were present in the soil above the associated criteria (up to 610 μg/kg for individual PAHs). Heavy metals concentrations above the associated criteria values were also present in all of the samples, though no consistent pattern in their occurrences was evident.

Volatile Organic Compounds

Methylene chloride, 1,1,1-trichloroethane, and tetrachloroethane were detected in the eight soil samples collected from test pits TP71-1 and TP71-2. All compounds were found at concentrations well below the associated TAGM criteria. Methylene chloride is a common laboratory contaminant. This compound can be potentially attributed to the laboratory and not site conditions.

Semivolatile Organic Compounds

A total of 18 semivolatile organic compounds, all PAHs, were found at varying concentrations in the eight test pit soil samples collected at SEAD-71. Ten PAH compounds were found at concentrations exceeding the associated TAGM criteria and at least one PAH exceedance was noted in 7 of the 8 soil samples. Figure 3-16 shows the total PAHs found in the soils at SEAD-71. Maximum values of these compounds were found in the soil sample TP71-1-1, which was collected 2 feet below ground surface. All four soil samples from test pit TP71-1 contained PAH compounds at concentrations exceeding the associated criteria. Test pit TP71-1 was located in the western half of the site near empty heating oil storage tanks and oil stained road stone. In test pit TP71-2, maximum concentrations of PAHs were detected in the soil sample collected at a depth of 1 foot below ground surface. The samples below the 1 foot depth had PAHs at lower concentrations.



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
⊠ SURVEY MONUMENT
TEST PIT

MW71-1 740.48 MONITORING WELL WITH WATER TABLE ELEVATION

740 GROUNDWATER ELEVATION CONTOUR – DASHED WHERE INFERRED (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

TOTAL PAHs (μg/Kg) in left column
DEPTH OF SAMPLE in right column

50 0 50 100
(feet)

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RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

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FIGURE 3-16

TOTAL PAHs IN SUBSURFACE SOILS

1" = 100' | FEBRUARY 1997 | A

TABLE 3-8

SENECA ARMY DEPOT
SEAD-71 RI/FS PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-71	SEAD-71	SEAD-71	SEAD-71
	DEPTH (FEET)					2	3	3	4
	SAMPLE DATE					06/07/94	06/07/94	06/07/94	06/07/94
	ES ID		FREQUENCY		NUMBER	TP71-1-1	TP71-1-2	TP71-1-3	TP71-1-4
	LAB ID		OF		ABOVE	223344	223345	223346	223347
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44665	44665	44665	44665
COMPOUND	UNITS								
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	11	100%	100	0	2 J	2 J	2 J	2 J
1,1,1-Trichloroethane	ug/Kg	23	63%	800	0	4 J	7 J	10 J	23
Tetrachloroethene	ug/Kg	3	38%	1400	0	1 J	1 J	3 J	12 U
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	77	25%	13000	0	19000 U	77 J	370 U	29 J
2-Methylnaphthalene	ug/Kg	29	13%	36400	0	19000 U	29 J	370 U	390 U
Acenaphthene	ug/Kg	5800	50%	50000*	0	5800 J	280 J	76 J	38 J
Dibenzofuran	ug/Kg	120	13%	6200	0	19000 U	120 J	370 U	390 U
Fluorene	ug/Kg	2800	38%	50000*	0	2800 J	230 J	56 J	390 U
Phenanthrene	ug/Kg	66000	100%	50000*	1	66000	1900	770	260 J
Anthracene	ug/Kg	11000	50%	50000*	0	11000 J	560	120 J	59 J
Carbazole	ug/Kg	9500	50%	50000*	0	9500 J	360 J	100 J	30 J
Fluoranthene	ug/Kg	88000	100%	50000*	1	88000	2600	1400	330 J
Pyrene	ug/Kg	63000	100%	50000*	1	63000	1600	2000	390
Benzo(a)anthracene	ug/Kg	37000	88%	220	5	37000	1200	660	180 J
Chrysene	ug/Kg	36000	88%	400	4	36000	1000	750	220 J
Benzo(b)fluoranthene	ug/Kg	26000	88%	1100	1	26000	930	710	130 J
Benzo(k)fluoranthene	ug/Kg	15000	88%	1100	1	15000 J	570	490	140 J
Benzo(a)pyrene	ug/Kg	22000	88%	61	7	22000	750	630	160 J
Indeno(1,2,3-cd)pyrene	ug/Kg	12000	88%	3200	1	12000 J	390 J	520	88 J
Dibenz(a,h)anthracene	ug/Kg	9800	75%	14	6	9800 J	190 J	320 J	38 J
Benzo(g,h,i)perylene	ug/Kg	10000	88%	50000*	0	10000 J	500	500	82 J
PESTICIDES/PCB									
Heptachlor	ug/Kg	1.2	13%	100	0	19 U	1.2 J	1.9 U	2 U
Endosulfan I	ug/Kg	200	88%	900	0	200 J	3.5	6.6 J	2.8 J
Dieldrin	ug/Kg	3.5	13%	440	0	37 U	3.5 J	3.7 U	3.9 U
4,4'-DDE	ug/Kg	4.2	25%	2100	0	37 U	3.7 U	3.1 J	4.2 J
Endrin	ug/Kg	29	13%	100	0	29 J	3.7 U	3.7 U	3.9 U
Endosulfan II	ug/Kg	26	38%	900	0	26 J	2.5 J	3.7 U	3.9 U
4,4'-DDD	ug/Kg	3.4	13%	2900	0	37 U	3.7 U	3.7 U	3.9 U
Endosulfan sulfate	ug/Kg	2.2	13%	1000	0	37 U	3.7 U	3.7 U	3.9 U
4,4'-DDT	ug/Kg	13	38%	2100	0	37 U	3.7 U	8.4	13
alpha-Chlordane	ug/Kg	74	25%	540	0	74 J	1.9 U	1.9 U	2 U

TABLE 3-8

SENECA ARMY DEPOT
SEAD-71 RI/FS PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-71	SEAD-71	SEAD-71	SEAD-71
	DEPTH (FEET)					2	3	3	4
	SAMPLE DATE					06/07/94	06/07/94	06/07/94	06/07/94
	ES ID					TP71-1-1	TP71-1-2	TP71-1-3	TP71-1-4
	LAB ID					223344	223345	223346	223347
	SDG NUMBER	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	44665	44665	44665	44665
COMPOUND	UNITS								
METALS									
Aluminum	mg/Kg	18000	100%	14593	2	12900	13100	10900	9960
Antimony	mg/Kg	0.47	38%	3.59	0	0.19 J	0.27 UJ	0.23 UJ	0.47 J
Arsenic	mg/Kg	7.8	100%	7.5	2	5.4	5.1	5.2	4.8
Barium	mg/Kg	108	100%	300	0	86.2	69.2	69.8	63.5
Beryllium	mg/Kg	0.88	100%	1	0	0.58 J	0.56 J	0.53 J	0.47 J
Cadmium	mg/Kg	0.53	100%	1	0	0.53 J	0.39 J	0.45 J	0.45 J
Calcium	mg/Kg	52800	100%	101904	0	38000 J	52800 J	32200 J	36500 J
Chromium	mg/Kg	25.8	100%	22	1	18.4	17.9	16.3	15.5
Cobalt	mg/Kg	14.6	100%	30	0	9.4	9.3 J	9.7	8.7 J
Copper	mg/Kg	37.5	100%	25	4	25.4	19	23	26.7
Iron	mg/Kg	32700	100%	26627	2	23600	22700	21600	20000
Lead	mg/Kg	96.9	100%	30	3	96.9	10.3	43.8	67.8
Magnesium	mg/Kg	13100	100%	12222	1	8690	7910	8840	9180
Manganese	mg/Kg	749	100%	669	1	497	390	474	458
Mercury	mg/Kg	0.15	100%	0.1	1	0.03 J	0.03 J	0.03 J	0.03 J
Nickel	mg/Kg	42.5	100%	34	3	26.8	25.2	24.9	24.6
Potassium	mg/Kg	1830	100%	1762	1	1340 J	1540 J	1230 J	1520 J
Selenium	mg/Kg	0.91	50%	2	0	0.43 J	0.57 U	0.47 U	0.56 U
Sodium	mg/Kg	140	88%	104	2	54.9 J	108 J	140 J	90.7 J
Vanadium	mg/Kg	29.2	100%	150	0	19.7	20.1	17.9	18.2
Zinc	mg/Kg	128	100%	83	2	96.2	63.9	86.1	79.7
OTHER ANALYSES									
Total Solids	%W/W					88.9	87.7	88.8	84.7

TABLE 3-8

SENECA ARMY DEPOT
SEAD-71 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-71	SEAD-71	SEAD-71	SEAD-71
	DEPTH (FEET)					1	2	2-3.3	2
	SAMPLE DATE					06/07/94	06/07/94	06/07/94	06/07/94
	ES ID		FREQUENCY		NUMBER	TP71-2-1	TP71-2-2	TP71-2-3	TP71-2-4
	LAB ID		OF		ABOVE	223348	223349	223350	223351
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44665	44665	44665	44665
COMPOUND	UNITS								
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	11	100%	100	0	2 J	2 J	3 J	11 J
1,1,1-Trichloroethane	ug/Kg	23	63%	800	0	11 U	11 U	3 J	12 U
Tetrachloroethene	ug/Kg	3	38%	1400	0	11 U	11 U	12 U	12 U
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	77	25%	13000	0	1500 U	380 U	420 U	380 U
2-Methylnaphthalene	ug/Kg	29	13%	36400	0	1500 U	380 U	420 U	380 U
Acenaphthene	ug/Kg	5800	50%	50000*	0	1500 U	380 U	420 U	380 U
Dibenzofuran	ug/Kg	120	13%	6200	0	1500 U	380 U	420 U	380 U
Fluorene	ug/Kg	2800	38%	50000*	0	1500 U	380 U	420 U	380 U
Phenanthrene	ug/Kg	66000	100%	50000*	1	270 J	180 J	30 J	80 J
Anthracene	ug/Kg	11000	50%	50000*	0	1500 U	380 U	420 U	380 U
Carbazole	ug/Kg	9500	50%	50000*	0	1500 U	380 U	420 U	380 U
Fluoranthene	ug/Kg	88000	100%	50000*	1	690 J	580	63 J	240 J
Pyrene	ug/Kg	63000	100%	50000*	1	1000 J	660	73 J	260 J
Benzo(a)anthracene	ug/Kg	37000	88%	220	5	370 J	250 J	420 U	120 J
Chrysene	ug/Kg	36000	88%	400	4	610 J	360 J	420 U	130 J
Benzo(b)fluoranthene	ug/Kg	26000	88%	1100	1	750 J	400	420 U	110 J
Benzo(k)fluoranthene	ug/Kg	15000	88%	1100	1	490 J	240 J	420 U	77 J
Benzo(a)pyrene	ug/Kg	22000	88%	61	7	490 J	290 J	420 U	94 J
Indeno(1,2,3-cd)pyrene	ug/Kg	12000	88%	3200	1	430 J	220 J	420 U	52 J
Dibenz(a,h)anthracene	ug/Kg	9800	75%	14	6	170 J	130 J	420 U	380 U
Benzo(g,h,i)perylene	ug/Kg	10000	88%	50000*	0	370 J	150 J	420 U	36 J
PESTICIDES/PCB									
Heptachlor	ug/Kg	1.2	13%	100	0	1.9 U	2 U	2.2 U	2 U
Endosulfan I	ug/Kg	200	88%	900	0	5.1 J	6.9 J	2.2 U	3.4 J
Dieldrin	ug/Kg	3.5	13%	440	0	3.7 U	3.8 U	4.2 U	3.8 U
4,4'-DDE	ug/Kg	4.2	25%	2100	0	3.7 U	3.8 U	4.2 U	3.8 U
Endrin	ug/Kg	29	13%	100	0	3.7 U	3.8 U	4.2 U	3.8 U
Endosulfan II	ug/Kg	26	38%	900	0	2 J	3.8 U	4.2 U	3.8 U
4,4'-DDD	ug/Kg	3.4	13%	2900	0	3.4 J	3.8 U	4.2 U	3.8 U
Endosulfan sulfate	ug/Kg	2.2	13%	1000	0	2.2 J	3.8 U	4.2 U	3.8 U
4,4'-DDT	ug/Kg	13	38%	2100	0	2.7 J	3.8 U	4.2 U	3.8 U
alpha-Chlordane	ug/Kg	74	25%	540	0	2 J	2 U	2.2 U	2 U

TABLE 3-8

SENECA ARMY DEPOT
SEAD-71 PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-71	SEAD-71	SEAD-71	SEAD-71
	DEPTH (FEET)					1	2	2-3.3	2
	SAMPLE DATE					06/07/94	06/07/94	06/07/94	06/07/94
	ES ID		FREQUENCY		NUMBER	TP71-2-1	TP71-2-2	TP71-2-3	TP71-2-4
	LAB ID		OF		ABOVE	223348	223349	223350	223351
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44665	44665	44665	44665
COMPOUND	UNITS								
METALS									
Aluminum	mg/Kg	18000	100%	14593	2	9630	12500	18000	15200
Antimony	mg/Kg	0.47	38%	3.59	0	0.21 J	0.18 UJ	0.23 UJ	0.25 UJ
Arsenic	mg/Kg	7.8	100%	7.5	2	4.2	4.8	7.6	7.8
Barium	mg/Kg	108	100%	300	0	37.5	57.6	108	76.1
Beryllium	mg/Kg	0.88	100%	1	0	0.44 J	0.48 J	0.88 J	0.7 J
Cadmium	mg/Kg	0.53	100%	1	0	0.44 J	0.43 J	0.45 J	0.48 J
Calcium	mg/Kg	52800	100%	101904	0	10500 J	37200 J	4260 J	27300 J
Chromium	mg/Kg	25.8	100%	22	1	18.1	16.7	25.8	22
Cobalt	mg/Kg	14.6	100%	30	0	11.4	9	14.6	13.4
Copper	mg/Kg	37.5	100%	25	4	37.5	17.5	36.2	23.5
Iron	mg/Kg	32700	100%	26627	2	22400	22100	32700	32100
Lead	mg/Kg	96.9	100%	30	3	25.3	11.2	15.3	15.1
Magnesium	mg/Kg	13100	100%	12222	1	4830	13100	6680	6320
Manganese	mg/Kg	749	100%	669	1	255	434	749	503
Mercury	mg/Kg	0.15	100%	0.1	1	0.04 J	0.15	0.04 J	0.02 J
Nickel	mg/Kg	42.5	100%	34	3	42.5	23.2	38.8	36.1
Potassium	mg/Kg	1830	100%	1762	1	992 J	1010 J	1830 J	1300 J
Selenium	mg/Kg	0.91	50%	2	0	0.91	0.37 U	0.61 J	0.74 J
Sodium	mg/Kg	140	88%	104	2	50 J	45.6 J	17.6 U	37.2 J
Vanadium	mg/Kg	29.2	100%	150	0	15.4	19.2	29.2	23.1
Zinc	mg/Kg	128	100%	83	2	128	58.9	71.8	79.3
OTHER ANALYSES									
Total Solids	%W/W					87.6	86.4	78.5	85.7

NOTES:
- a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVO's <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.

Pesticides/PCBs

Ten pesticides were detected in the soil samples collected from SEAD-71. None of the compounds were detected at concentrations above the associated criteria.

Metals

A total of 21 metals were detected in the eight soil samples collected at SEAD-71. Thirteen metals were detected in one or more samples at concentrations above the associated TAGM criteria.

All metals, except lead, were found at concentrations just slightly above the criteria, which may reflect natural variations in site soils. The exception to this was lead in soil samples from TP71-1, which was reported at concentrations at least 2 times the associated criteria.

GROUNDWATER SAMPLING SUMMARY

Three monitoring wells were installed and two of the three wells were sampled as part of the ESI at SEAD-71. The upgradient well, MW71-2, was dry at the time of sampling. Table 3-9 contains a summary of all groundwater sampling data collected during the ESI. Concentrations of constituents were compared to the NY AWQS Class GA groundwater criteria and the Federal Primary and Secondary Drinking Water Maximum Contaminant Levels (MCLs). The locations of the wells are shown on Figure 3-10. The following sectionsdescribe the nature and extent of contamination identified in the groundwater at SEAD-71.

Volatile Organic Compounds

No volatile organic compounds were detected in the groundwater samples collected at SEAD-71.

Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the groundwater samples collected at SEAD-71.

Pesticides and PCBs

No pesticides or PCBs were detected in the groundwater samples collected at SEAD-71.

Metals

A total of 20 metals were detected in the groundwater samples collected at SEAD-71. Five metals, aluminum, iron, lead, manganese, and thallium were detected at concentrations which were above the lowest associated federal or state criteria. Iron was found at concentrations above the state and federal criteria value of 300 µg/L in groundwater samples from MW71-1 and MW71-3. Manganese was found above the associated federal MCL of 50 µg/L in groundwater samples from

TABLE 3-9

SENECA ARMY DEPOT
SEAD-71 PROJECT SCOPING PLAN
GROUNDWATER ANALYSIS RESULTS FROM ESI

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 (h)	NUMBER ABOVE LOWEST CRITERIA	WATER SEAD-71 03/29/94 MW71-1 215839 43179	WATER SEAD-71 07/07/94 MW71-3 226311 45257
METALS								
Aluminum	ug/L	19700	100%	NA	50-200 *	2	19700	334
Arsenic	ug/L	2.7	50%	25	NA	0	2.7 J	2 U
Barium	ug/L	164	100%	1000	2000	0	164 J	37.7 J
Beryllium	ug/L	0.88	50%	NA	4	0	0.88 J	0.1 U
Cadmium	ug/L	0.33	50%	10	5	0	0.33 J	0.2 U
Calcium	ug/L	212000	100%	NA	NA	NA	212000	146000
Chromium	ug/L	33.1	100%	50	100	0	33.1	0.59 J
Cobalt	ug/L	22.1	100%	NA	NA	NA	22.1 J	1.1 J
Copper	ug/L	16.1	100%	200	1000 ***	0	16.1 J	0.75 J
Iron	ug/L	35100	100%	300	300 *	2	35100	613
Lead	ug/L	17.2	50%	25	15 **	1	17.2	0.89 U
Magnesium	ug/L	32400	100%	NA	NA	NA	32400	18000
Manganese	ug/L	1680	100%	300	50 *	2	1680	557
Mercury	ug/L	0.06	100%	2	2	0	0.06 J	0.05 J
Nickel	ug/L	49.4	100%	NA	100	0	49.4	2.6 J
Potassium	ug/L	4910	100%	NA	NA	NA	3260 J	4910 J
Sodium	ug/L	9180	100%	20000	NA	0	9180	4130 J
Thallium	ug/L	2.5	50%	NA	2	1	1.6 U	2.5 J
Vanadium	ug/L	25.7	100%	NA	NA	NA	25.7 J	0.9 J
Zinc	ug/L	97.3	100%	300	5000 *	0	97.3	6.5 J
OTHER ANALYSES								
pH	Standard Units						6.8	7.1
Conductivity	umhos/cm						620	660
Temperature	°C						6.1	17.5
Turbidity	NTU						1860	64

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) Federal Primary and Secondary(*) Drinking Water Maximum Contaminant Levels (40 CFR 141.61-62 and 40 CFR 143.3)
i) * Secondary Maximum Contaminant Levels
j) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994
k) *** the value is a Secondary Maximum Contaminant Level. The action level for copper is 1300 ug/L.

both monitoring wells. Aluminum exceeded the federal MCL of 50 μg/L at MW71-1 (19,700 μg/L) and at MW71-3 (334 μg/L).

Lead was detected in one sample, MW71-1, at a concentration of 17.2 μg/L, which is above the federal MCL of 15 μg/L. Thallium was estimated at 2.5 μg/L in MW71-3, which is above the federal MCL of 2 μg/L.

The high concentrations of metals in monitoring well MW71-1 may be due to silt in the groundwater sample as evidenced by the turbidity reading of 1860 NTUs.

3.1.2.3 Data Summary and Conclusions

The ESI conducted at SEAD-71 did not uncover a burial pit for paint and solvents, though it did indicate the soils at SEAD-71 have been impacted by former activities on site. At one location in the western half of the site, PAHs were present above the criteria along with construction debris. At another test pit located in the storage area, PAHs, possibly associated with a nearby oil spill on the ground surface, were present in the soil above the associated criteria. Metals concentrations above the criteria were also present in all of the soil samples, however, only lead was detected at concentrations at least 2 times the associated criterium.

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents detected. Aluminum, iron, lead, manganese, and thallium were the metals found at concentrations above the state or federal criteria.

These results suggest that the presence of PAHs in the near surface soil has the potential to impact potential receptors.

3.1.3 Environmental Fate of Constituents

The potential contaminants of concern at SEAD-59 are volatile organic compounds, SVOCs, metals, and TPHs and their environmental fate are discussed below. The following discussion is meant to present general information on the fate of the potential contaminants of concern, and where possible, site-specific characteristics are presented. Further discussion of these potential contaminants of concern and all contaminants of concern site-wide at SEDA are provided in the Generic Installation RI/FS Workplan. A summary of fate and transport characteristics for the constituents of concern is presented in Table 3-10.

3.1.3.1 Volatile Organic Compounds

Volatile organic compounds tend to have a low residence time in surface soil and surface water environments. These chemicals can be persistent in groundwater. However, there is evidence that non-chlorinated volatile organic compounds may degrade rapidly in the vadose zone aboveground water plumes. (Gas Research Institute, Management of Manufactured Gas Plant Sites, Volume III, Risk Assessment, May 1988, GRI-87/0260.3).

TABLE 3-10

SENECA ARMY DEPOT ACTIVITY

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m³/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
Volatile Organic Compounds							
Methylene Chloride	20000	438	2.03E-03	8.80E+00	2.00E+01	1-3	0.8
Acetone	infinite	288	2.06E-05	2.80E-01	5.75E-01		0.03
1,2-Dichloroethene (total)	6300	5.3	6.60E-03	5.90E+01	1.23E+02		4.5
Carbon Disulfide	2940	366	1.32E-02	5.40E+01	1.00E+02		7.9
Chloroform	8200	208	2.87E-03	4.70E+01	9.33E+01		4.5-6
2-Butanone	353000	70.6	4.35E-05	9.40E-01	1.95E+00		0.09-1.86
1,2-Dichloroethane	8520	80	9.78E-04	1.40E+01	3.02E+01	2-18	1.4-2
Trichloroethene	1100	75	9.10E-03	1.26E+02	2.40E+02	3-300	13-39
Vinyl chloride	2670	2300	8.19E-02	5.70E+01	2.40E+01		
1,1-Dichlroethene	2250	500	3.40E-02	6.50E+01	5.30E+01		
Tetrachloroethene	150	19	2.59E-02	3.64E+02	3.98E+02	1-13	49-66
Toluene	535	30	6.37E-03	3.00E+02	5.37E+02	3-39	2.6-27.1
Chlorobenzene	490	8.8	3.46E-03	3.33E+02	6.92E+02		10-33
Xylene (total)	0.3	9	6.91E-03	6.91E+02	1.45E+03		70
Semivolatile Organic Compounds							
Phenol	93000	0.341	4.54E-07	1.42E+01	2.88E+01	3-5	1.4-2
2-Methylphenol	25000	0.24	1.50E-06	2.74E+02	8.91E+01	1-3	
4-Methylphenol		0.11	4.43E-07	2.67E+02	8.51E+01	1-3	
2,4-Dimethylphenol	4200	0.0573	2.38E-06	2.22E+02	2.63E+02	1-3	9.5-150
Benzoic Acid	2700			2.48E+02	7.41E+01		
Naphthalene	31.7	0.23	1.15E-03	1.30E+03	2.76E+03	1-110	44-95
2-Methylnaphthalene	25.4	0.0083	5.80E-05	8.50E+03	1.30E+04	1-3	
2-Chloronaphthalene	6.74	0.017	4.27E-04	4.16E+03	1.32E+04		
2,6-Dinitrotoluene	1320	0.018	3.27E-06	9.20E+01	1.00E+02	4	4.6
Acenaphthene	3.42	0.00155	9.20E-05	4.60E+03	1.00E+04		
Dibenzofuran				4.16E+03	1.32E+04		
2,4-Dinitrotoluene	240	0.0051	5.09E-06	4.50E+01	1.00E+02	5	
Diethylphthalate	896	0.0035	1.14E-06	1.42E+02	3.16E+02	1-3	14-117
Fluorene	1.69	0.00071	6.42E-05	7.30E+03	1.58E+04		
N-Nitrosodiphenylamine	113		1.40E-06	6.50E+02	1.35E+03	4	65-217
Hexachlorobenzene	0.006	0.000019	6.81E-04	3.90E+03	1.70E+05		
Phenanthrene	1	0.00021	1.59E-04	1.40E+04	2.88E+04	1-200	
Anthracene	0.045	0.000195	1.02E-03	1.40E+04	2.82E+04		
Di-n-butylphthalate	13	0.00001	2.82E-07	1.70E+05	3.98E+05	1-3	89-1800
Fluoranthene	0.206	0.0177	6.46E-06	3.80E+04	7.94E+04	140-440	
Pyrene	0.132	2.50E-06	5.04E-06	3.80E+04	7.59E+04	9-1900	
Butylbenzylphthalate	2.9	8.60E-06	1.20E-06	2.84E+04	5.89E+04		663
Benzo(a)anthracene	0.0057	1.50E-07	1.16E-06	1.38E+06	3.98E+05	240-680	

TABLE 3-10

SENECA ARMY DEPOT ACTIVITY

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m³/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
Chrysene	0.0018	6.30E-09	1.05E-06	2.00E+05	4.07E+05	160-1900	
Bis(2-Ethylhexyl)phthalate	0.285	2.00E-07	3.61E-07	5.90E+03	9.50E+03	Neg. Deg.	
Di-ni-octylphthalate	3			2.40E+06	1.58E+09		
Benzo(b)fluoranthene	0.014	5.00E-07	1.19E-05	5.50E+05	1.15E+06	360-610	
Benzo(k)fluoranthene	0.0043	5.10E-07	3.94E-05	5.50E+05	1.15E+06	910-1400	
Benzo(a)pyrene	0.0012	0.000568	1.55E-06	5.50E+06	1.15E+06	220-530	
Indeno(1,2,3-cd)pyrene	0.00053	1.00E-10	6.86E-08	1.60E+06	3.16E+06	600-730	
Dibenz(a,h)anthracene	0.0005	5.20E-11	7.33E-08	3.30E+06	6.31E+06	750-940	
Benzo(g,h,i)perylene	0.0007	1.03E-10	5.34E-08	1.60E+06	3.24E+06	590-650	
Pesticides/PCBs							
beta-BHC	0.24	2.80E-07	4.47E-07	3.80E+03	7.94E+03		
gamma-BHC (Lindane)	7.8	0.00016	7.85E-06	1.08E+03	7.94E+03	Neg. Deg.	250
Heptachlor	0.18	0.0003	8.19E-04	1.20E-04	2.51E+04	Neg. Deg.	3600-37000
Aldrin	0.18	6.00E-06	1.60E-05	9.60E+04	2.00E+05	Neg. Deg.	3890-12260
Endosulfan I	0.16	0.00001	3.35E-05	2.03E+03	3.55E+03		
Heptachlor epoxide	0.35	0.0003	4.39E-04	2.20E+02	5.01E+02	Neg. Deg.	851-66000
Dieldrin	0.195	1.78E-07	4.58E-07	1.70E+03	3.16E+03	Neg. Deg.	3-10000
4,4'-DDE	0.04	6.50E-06	6.80E-05	4.40E+06	1.00E+07	Neg. Deg.	110000
Endrin	0.024	2.00E-07	4.17E-06	1.91E+04	2.18E+05	Neg. Deg.	1335-49000
Endosulfan II	0.07	0.00001	7.65E-05	2.22E+03	4.17E+03		
4,4'-DDD	0.16	2.00E-09	3.10E-05	2.40E+05	3.60E+05		
Endosulfan sulfate	0.16			2.33E+03	4.57E+03		
4,4'-DDT	0.005	5.50E-06	5.13E-04	2.43E+05	1.55E+06	Neg. Deg.	38642-110000
Endrin aldehyde							
alpha-Chlordane	0.56	0.00001	9.63E-06	1.40E+05	2.09E+03	Neg. Deg.	400-38000
Aroclor-1254	0.012	0.00008	2.70E-03	4.25E+04	1.07E+06	42	10E4-10E6
Aroclor-1260	0.0027	0.000041	7.10E-03	1.30E+06	1.38E+07	Neg. Deg.	10E4-10E6

Notes:

Koc = organic carbon partition coefficient
Kow = octanol-water partition coefficient
BCF = bioconcentration factor
Neg. Deg. = Negligible Biodegradation

References:

1. IRP Toxicology Guide
2. Basics of Pump-and-Treat Ground-Water Remediation Technology (EPA, 1990).
3. Handbook of Environmental Fate and Exposure Data (Howard, 1989).
4. Soil Chemistry of Hazardous Materials (Dragun, 1988)
5. Hazardous Waste Treatment, Storage, and Disposal Facilities, Air Emissions Models (EPA, 1989).
6. USATHAMA, 1985
7. Values for Koc not found were estimated by: logKoc = 0.544logKow + 1.377 (Dragun, 1988).

Major exposure routes of interest include the ingestion of groundwater and the inhalation of the gases. The latter can be important in situations involving the excavation of pits or the entrainment of soil gas into buildings. There is little potential for these chemicals to accumulate in aquatic or terrestrial biota.

Because it is not the intent of this section to discuss the persistence of all volatile organic compounds, only selected volatile organics that are commonly found or are suspected to have been released to the environment at SEAD-59 are discussed below.

This section addresses the contaminant persistence (fate and transport) and focuses on volatile organic compounds of concern at SEAD-59. Volatile organic chlorinated (aliphatic) compounds associated with SEAD-59 are primarily benzene, toluene, ethylbenzene and xylenes (BTEX) which are associated with petroleum hydrocarbons, including gasoline.

The chemical/physical properties of these chemical constituents and the media (soil, sediment, surface water, and groundwater) which have been impacted are necessary to fully evaluate the fate and transport. Meaningful chemical-specific properties are solubility, volatility, degradability, and adsorptivity. These properties are discussed below. Table 3-13 summarizes the chemical specific properties of BTEX compounds. Media specific properties include organic carbon content, porosity, moisture content, bulk density, groundwater velocity, and dispersivity.

Aromatic Volatile Organics

The following information was obtained from the document, "Installation Restoration Program Toxicology Guide", Volume 1, October 1985, AD-A171095.

Benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds may move through the soil/groundwater system when present at low concentrations (dissolved in water and sorbed on soil) or as a separate organic phase (resulting from a spill of significant quantities of the chemical). In general, transport pathways of low soil concentrations can be assessed by equilibrium partitioning. These calculations predict the partitioning of BTEX compounds among soil particles, soil water and soil air. The portions of BTEX compounds associated with the water and air phases of the soil are more mobile than the adsorbed portions.

Partitioning in the Environment

Benzene

The estimate from the unsaturated topsoil model indicate that most of the benzene (88%) is expected to be sorbed to the soil. A much smaller (yet significant) amount (7%) will be present in the soil water phase and can thus migrate by bulk transport (e.g., the downward movement of infiltrating water), dispersion and diffusion. For the portion of benzene in the gaseous phase of the soil (5%), diffusion through the soil-air pores up to the ground surface, and subsequent removal by wind, will be a significant loss pathway. There is no significant difference in the partitioning calculated for 25°C and 10°C.

In saturated, deep soils (containing no soil air and negligible soil organic carbon), a much higher fraction of the benzene (79%) is likely to be present in the soil water phase and transported with flowing groundwater.

Toluene

The estimates from the unsaturated topsoil model indicate that nearly all of the toluene (97%) is sorbed to the soil. A much smaller amount (2%) will be present in the soil water phase and can thus migrate by bulk transport (e.g., the downward movement of infiltrating water). For the portion of toluene in the gaseous phase of the soil (1.6%), diffusion through the soil pore spaces up to the ground surface, and subsequent removal by wind, will be a significant loss pathway. There is no significant difference in the partitioning calculated for 25°C and 10°C.

In saturated, deep soils (containing no soil air and negligible soil organic carbon), a much higher fraction of the toluene (48%) is likely to be present in the soil water phase and transported with flowing groundwater.

Investigators have studied the transport and fate of toluene in solutions applied to any soils. In a soil column receiving solutions with less than 1 mg/L toluene, approximately 40-70% was volatilized and 2-13% percolated through the soil column with minimal retardation. Between 20-60% was either degraded or not accounted for.

Ethyl benzene

The estimates from the unsaturated topsoil model indicate that nearly all of the ethyl benzene (98%) is sorbed to the soil. A much smaller amount (0.75%) is expected to be present in the soil water. For the portion of ethyl benzene in the gaseous phase of the soil (0.7%), diffusion through the soil air pores up to the ground surface, and subsequent removal by wind, will be a significant loss pathway. There is no significant difference in the partitioning calculated for 25°C and 10°C.

In saturated, deep soils (containing no soil air and negligible soil organic carbon), a much higher fraction of the ethyl benzene (26%) is likely to be present in the soil water phase and transported with flowing groundwater.

Xylene

The estimates from the unsaturated topsoil model indicate that nearly all of the xylene (98.8%) is expected to be sorbed to the soil. A much smaller amount (0.7%) is expected to be present in the soil water phase and thus available to migrate by bulk transport (e.g., the downward movement of infiltrating water), dispersion and diffusion. For the portion of xylene in the gaseous phase of the soil (0.5%), diffusion through the soil-air pores up to the ground surface, and subsequent removal by wind, will be a significant loss pathway.

In saturated, deep soils (containing no soil air and negligible soil organic carbon), a much higher fraction of the xylene (26%) is likely to be present in the soil water phase and transported with flowing groundwater.

Sorption on Soils

The mobility of BTEX compounds in the soil/groundwater system (and their eventual migration into aquifers) is strongly affected by the extent of their sorption on soil particles. In general, sorption on soils is expected to:

- increase with increasing soil organic matter content;
- increase slightly with decreasing temperature;
- increase moderately with increasing salinity of the soil water; and
- decrease moderately with increasing dissolved organic matter content of the soil water.

Based upon octanol-water partition coefficients, for the BTEX compounds (135, 537, 1410, and 1450, respectively) the soil sorption coefficients (K_{OC})s are estimated to be 65, 259, 681, and 691, respectively.

Volatilization from Soils

Transport of BTEX vapors through the air-filled pores of unsaturated soils is an important transport mechanism for near-surface soils. In general, important soil and environmental properties influencing the rate of volatilization include soil porosity, temperature, convection currents and barometric pressure changes; important physio-chemical properties include the Henry's law constant, the vapor-soil diffusion coefficient, and, to a lesser extent, the vapor phase diffusion coefficient.

There are no data from laboratory or field test, showing actual soil volatilization rates. Sorption of the benzene vapors on the soil may slow the vapor phase transport.

The Henry's law constant (H), which provides an indication of a chemical's tendency to volatilize from solution increases significantly with increasing temperature. Moderate increases in H are also observed with increasing salinity due to a decrease in solubility of benzene, toluene and ethyl benzene.

Transformation Processes in Soil/Groundwater Systems

The persistence of BTEX compounds in soil/groundwater systems is not well documented. In most cases, it should be assumed that the chemical will persist for months to years (or more). Benzene, toluene and ethyl benzene that have been released into the air will eventually undergo photochemical oxidation; tropospheric lifetime on the order of a few hours to a few days have been estimated for benzene and 15 hours for toluene and ethyl benzene.

BTEX compounds under normal environmental conditions are not expected to undergo hydrolysis. Further, benzene and toluene are not expected to be susceptible to oxidation or reduction reactions in the soil/groundwater environment.

Available data on the biodegradability of benzene are somewhat contradictory. Certain pure and mixed cultures can apparently degrade benzene under environmental conditions, but the chemical must be considered fairly resistant to biodegradation. Available data indicate that toluene and ethyl benzene are biodegradable in the soil/groundwater environment. No information on the biodegradability of xylene in the soil/groundwater environment is available. However, based upon data for other structurally similar chemicals (e.g., toluene, ethyl benzene), it is expected that xylene would be biodegradable. In most soil/groundwater systems aerobic degradation would be of minimal importance because of the low concentration of microorganisms (at depth) and the low dissolved oxygen (anaerobic) conditions. No data are available on the possibility of anaerobic biodegradation.

Primary Routes of Exposure From Soil/Groundwater Systems

The above discussion of fate pathways suggests that benzene is highly volatile, weakly adsorbed by soil, and has a limited potential for bioaccumulation. Toluene is highly volatile from aqueous solutions, moderately sorbed to soil, and has a low potential for bioaccumulation. Ethyl benzene and xylene are highly volatile from aqueous solutions, may be moderately adsorbed by soil, and have a moderate potential for bioaccumulation. BTEX compounds may volatilize from soil surfaces, but that portion not subject to volatilization is likely to be mobile in groundwater. These fate characteristics suggest several potential exposure pathways.

Volatilization of BTEX compounds from a disposal site, particularly during drilling or restoration activities, could result in inhalation exposures. The potential for groundwater contamination is high, particularly in sandy soils.

The results of a USEPA Groundwater Supply Survey indicate that BTEX compounds have the potential for movement in soil/groundwater systems. The compounds may eventually reach surface waters by this mechanism, suggesting several other exposure pathways:

- Groundwater and surface water may be used as drinking water supplies, resulting in exposures from direct ingestion and inhalation during showers;
- Aquatic organisms residing in these waters may be consumed, also resulting in ingestion exposure through bioaccumulation;
- Recreational use of these waters may result in dermal exposure;
- Domestic animals may consume or be dermally exposed to contaminated ground or surface waters; the consumption of meats and poultry could then result in ingestion exposures.

In general, exposures associated with surface water contamination can be expected to be lower than exposures from drinking contaminated groundwater for two reasons. First, the Henry's law constants for BTEX compounds indicate that they will volatilize upon reaching surface waters. Secondly, the bioconcentration factors for benzene and toluene are expected to below, suggesting limited bioaccumulation in aquatic organisms or domestic animals. For ethylbenzene, the bioconcentration factor suggests moderate bioaccumulation in aquatic organisms and domestic animals. The bioaccumulation factor for xylene is not high enough to suggest consumption of aquatic organisms or domestic animals as a significant source of exposure compared to drinking water.

Although BTEX compounds are readily photo-oxidized in the atmosphere, its volatility suggests that it may be found in air as well.

3.1.3.2 Semi-Volatile Organic Compounds

PAH Compounds

The following information was obtained from the document, "Management and Manufactured Gas Plant Sites, Volume III, Risk Assessment," GRI, May 1988, GRI-87/0260.3.

PAH compounds have a high affinity for organic matter and low water solubility. Water solubility tends to decrease and affinity for organic matter tends to increase with increasing molecular weight. Therefore, naphthalene is much more soluble in water than is benzo(a)pyrene. When present in soil or sediments, PAHs tend to remain bound to the soil particles and dissolve only slowly into groundwater or the overlying water column. Because of the high affinity for organic matter, the physical fate of the chemicals is usually controlled by the transport of particulates. Thus, soil, sediment and suspended particulate matter (in air) represent important media for the transport of the chemicals.

Because of their high affinity for organic matter, PAH compounds are readily taken up (bioaccumulated) by living organisms. However, organisms have the potential to metabolize the chemicals and to excrete the polar metabolites. The ability to do this varies among organisms. Fish appear to have well-developed systems for metabolizing the chemicals. The metabolites are excreted. Shellfish (bi-valves) appear to be less able to metabolize the compounds. As a result, while PAH compounds are seldom high in fish tissues, they can be high in shellfish tissues.

Several factors can degrade PAH compounds in the environment. Biodegradation on soil microorganisms is an important process affecting the concentrations of the chemicals in soils, sediment and water. Volatilization may also occur. This mechanism is effective for the lighter molecular weight compounds. However, the volatilization of higher molecular weight PAH compounds occurs slowly.

Phenolic Compounds

These compounds are highly water soluble and, therefore, easily leach from soil environments into the underlying groundwater. They are not persistent in surface water environments. Phenolics are not as volatile as benzene, xylene or toluene, but can volatilize at a moderate rate. Therefore there may be some potential for exposure to gases. Non-chlorinated phenolic compounds are not readily bioaccumulated by terrestrial or aquatic biota.

3.1.3.3 Pesticides and PCBs

This section discusses only selected pesticides and PCBs that are suspected to be applicable to SEAD-5. It is not meant to present a complete summary of all possible pesticides and PCBs that could be found at SEAD-5.

Chlordane

The following information was obtained from "Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Vol. III, Pesticides (ed. Philip H. Howard, Lewis Publishers, 1991).

Chlordane has been released in the past into the environment primarily from its application as an insecticide. Technical grade chlordane is a mixture of at least 50 compounds. If released to soil, chlordane may persist for long periods of time. Under field conditions, the mean degradation rate has been observed to range from 4.05-28.33%/yr with a mean half-life of 3.3 years. Chlordane is expected to be generally immobile or only slightly mobile in soil based on field tests, soil column leaching tests and estimated K_{OC} estimation; however, its detection in various ground waters in NJ and elsewhere indicates that movement to ground water can occur. Adsorption to sediment is expected to be a major fate process based on soil adsorption data, estimated Koc values (24,600-15,500), and extensive sediment monitoring data. The presence of chlordane in sediment core samples suggests that chlordane may be very persistent in the adsorbed state in the aquatic environment. If released to water, chlordane is not expected to undergo significant hydrolysis, oxidation or direct photolysis. Sensitized photolysis in the water column may be possible, however. The observation that 85% of the chlordane originally present in a sealed glass jar under sunlight and artificial light in a river die-away test remained at the end of two weeks and persisted at that level through week 8 of the experiment; this indicates that chlordane will be very persistent in aquatic environments.

Although sufficient biodegradation data are not available, it has been suggested that chlordane is very slowly biotransformed in the environment which is consistent with the long persistence periods observed under field conditions. Bioconcentration is expected to be important based on experimental BCF values which are generally above 3,200.

If released to the atmosphere, it will be expected to be predominantly in the vapor phase. Chlordane will react in the vapor-phase with photochemically produced hydroxyl radicals at an estimated half-life rate of 6.2 hr suggesting that this reaction is the dominant chemical removal process. Soil volatility tests have found that chlordane can volatilize significantly from soil surfaces on which it has been sprayed, particularly moist soil surfaces; however, shallow incorporation into soil will greatly restrict volatile losses.

The detection of chlordane in remote atmospheres (Pacific and Atlantic Oceans; the Arctic) indicates that long range transport occurs. It has been estimated that 96% of the airborne reservoir of chlordane exists in the sorbed state which may explain why its long range transport is possible without chemical transformation. The detection of chlordane in rainwater and its observed dry deposition at various rural locations indicates that physical removal via wet and dry deposition occurs in the environment.

Endosulfan

The following information was obtained from "Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Vol. III, Pesticides (ed. Philip H. Howard, Lewis Publishers, 1991).

Endosulfan is used as an insecticide against a variety of insects on a variety of crops. Technical endosulfan is composed of -endosulfan and -endosulfan. Release of endosulfan isomers to soil will most likely result in biodegradation and in hydrolysis, especially under alkaline conditions. Endosulfan isomers on the soil surface may photolyze. Volatilization and leaching are not expected to be significant due to the high estimated soil-sorption coefficients of the isomers. When release to water, endosulfan isomers are expected to hydrolyze readily under alkaline conditions, and more slowly at neutral and acidic pH values (half-lives=35.4 and 150.6 days for pH 7 and 5.5, respectively; half-lives=37.5 and 187.3 days for pH 7 and 5.5, respectively). Volatilization and biodegradation are also expected to be significant. Endosulfan released to the atmosphere will react with photochemically generated hydroxyl radicals with an estimated half-life of 1.23 hr. Bioconcentration of endosulfan is expected to be significant. Isomers of endosulfan are contaminants in air, water, sediment, soil, fish and other aquatic organisms, and food. Human exposure results primarily from food, and by occupational exposure.

DDT

The following information was obtained from "The Installation Restoration Program Toxicology Guide," Vol. III, Arthur D. Little, Inc. June 1987.

From 1946 to 1972, DDT was one of the most widely used agricultural insecticides in the world. During this time, DDT played an important role in many phases of agriculture and in the eradication of malaria, typhus and plague. As of January 1, 1973, all uses of DDT in the United States were cancelled with the exception of emergency public health however, it is still used extensively in some tropical countries.

DDT is expected to be highly immobile in the soil/groundwater environment when present at low dissolved concentrations. Bulk quantities of DDT dissolved in an organic solvent could be transported through the unsaturated zone as the result of a spill or improper disposal of excess formulations. However, the extremely low solubility of DDT and its strong tendency to sorb to soils results in a very slow transport rate in soils.

In general transport pathways can be assessed by using an equilibrium-partitioning models. These calculations predict the partitioning of low soil concentrations of DDT among soil particles, soil water, and soil air. Due to its strong tendency to sorb to soil, virtually all of the DDT partitions to the soil particles of unsaturated top soil, with negligible amounts associated with the soil water or air. Even in saturated deep soil, which is assumed to contain no soil air and a smaller organic carbon fraction, almost all of the DDT is retained on the soil.

DDT is characterized by a strong tendency to sorb to organic carbon. Kadeg et. al. report an arithmetic mean K_{oc} of 670,200 for 17 reported values; the corresponding geometric mean was log $K_{oc} = 5.48$. As with all neutral organic chemicals, the extent of sorption is proportional to the soil organic carbon content. In soils with little organic carbon (e.g., clays) the extent of sorption may also depend upon soil properties such as surface area, cation exchange capacity and degree of hydration.

The apparent sorption of DDT to soils and sediments is lessened, and thus its mobility is enhanced by the presence of dissolved organic matter in solution. Caron et. al. found the sorption of DDT to a natural freshwater sediment to be reduced by 75% in the presence of 6.95 mg/L of dissolved organic carbon (in the form of humic acid extracted from another sediment). Using p,p'-DDT, Chiou et al. observed the apparent water solubility to be significantly enhanced (roughly 2-5 times) in the presence of 100 mg/L of humic and fulvic acids. (Sorption will decrease with increasing water solubility). The partitioning of p,p'-DDT between soil-derived humic acid and water was approximately 4 times greater than with soil fulvic acids and 5-7 times greater than with aquatic (freshwater) humic and fulvic acids. These findings indicated that the mobility of DDT in natural waters may be several times greater than predicted (though probably still small) when the effect of dissolved organic matter is present. In waters containing large concentrations of dissolved organic material, such as swamps and bogs, this may be especially important.

The vapor pressure of DDT at 25°C has been given as 2.6×10^{-10} atm with estimates of its Henry's law constant at 25°C ranging from 2.8×10^{-5} to 2.0×10^{-6} atm m^3/mol. Volatilization is expected to be an important loss process in aquatic environments with the half-life for DDT on the order of several hours to several days. The presence of sediment particles, which would adsorb DDT from solution, would significantly reduce volatilization losses.

In soils, volatilization is much slower. Jury et al. using soil of 1.25% organic carbon to which DDT was applied uniformly to a depth of 1 cm at the rate of 1 kg/hectare, calculated volatilization half-lives of 497 and 432 days when water evaporation rates were 0.0 and 5.0 mm/day, respectively. The corresponding figures when the same quantity of DDT was mixed to a depth of 10 cm were 2300 and 2069 days.

Similar results were obtained by Lichtenstein et al. who studied the persistence of technical DDT (84% p,p', 15% o,p') in agricultural loam soil with crops over a 15 year period. Calculated half-lives for both isomers fell between 4.0 and 4.7 years for DDT applied at 10 pounds/acre; somewhat longer half-lives were measured for applications of 100 pounds/acre. These half-lives should be taken as upper limits of the volatilization rate since other processes such as leaching and degradation contribute to the DDT loss.

In tropical soils, the loss of DDT has been found to be much more rapid. El Zorgani found a half-life of less than three weeks for DDT applied at an initial concentration of 6.65 ppm to the soil surface beneath a cotton crop in the Sudan. The loss of the o,p' isomer was several times greater than for the p,p' isomer; and insignificant fraction of the loss could be accounted for by conversion to p,p'-DDE. A half-life 110 days has been reported for DDT in Kenya where it was found to sublime directly into the atmosphere without conversion to DDE.

The rate at which DDT degrades in the soil/groundwater environment is dependent on the conditions under which it is present. The pH strongly affects the rate of aqueous hydrolysis. Over the pH range typical of natural waters (pH 5-9), Wolfe et al. found the pseudo-first-order rate constant (k_{obs}) at 27°C could be expressed as:

$$k_{obs} = 1.9 \times 10^{-9} + 9.9 \times 10^{-3}\ [OH^-]$$

where k_{obs} is in s^{-1} and [OH-], the concentration of the hydroxide ion, is in moles/liter. Hydrolysis half-lives of roughly 81 days, 8 years and 12 years at pH 9, 7, and 5, respectively, result from the rate constant obtained from this equation. The hydrolysis product of p,p'-DDT is p,p'-DDE.

A photolysis half-life of 5 days was measured for DDT when it was present in natural water exposed to summer sunlight, although no photolysis was observed when the chemical was present in pure water. Again, p,p'-DDE is a degradation product. Chen et al. observed a similar half-life of 8 days for p,p'-DDT applied as a thin film (0.67 $\mu g/cm^2$) to glass plates and exposed to light of environmentally important wavelengths (maximum intensity at 300 nm). The degradation of DDT by ultraviolet light was found to be more effective when the DDT was present in humus-free soil than in soil containing humus.

DDT has been found to undergo abiotic, reductive dehalogenation to DDD in the presence of Fe(II) porphyrin. It has been suggested that the Fe(III) porphyrin, which results from the oxidation of the Fe(II) porphyrin in this process, is reconverted to the Fe(II) porphyrin in the presence of reduced organic material. Dehydrochlorination of DDT to DDE (removal of a hydrogen and chlorine atom to form a double bond) has also been observed in model systems containing reduced porphyrins and in the natural environment.

Gambrell et al. found the degradation of DDT to be little affected by pH but greatly affected by redox conditions. Under strongly reducing conditions (Eh = 150 mV), over 90% of the DDT was degraded within a few days. The authors note that this is an unusually rapid rate.

The half-life for the decomposition of DDT in aerobic soils has been reported to be in the range of 10-14 years compared to half-lives of 28-33 days in moist soils incubated under anaerobic conditions. DDE is the major degradation product in aerobic soil, and it is believed to be produced predominantly by chemical processes. Under anaerobic conditions DDD is the major metabolite.

The bacterial and fungal cometabolism of DDT has been observed in the laboratory and has been suggested to be potentially important in the field as well. In these reactions, bacteria which are not able to use DDT as their sole carbon source grow on non-chlorinated analogues of DDT, but degrade DDT in the process.

Information on the fate and transport parameters of DDT (i.e., solubility, vapor pressure, Henry's Law Constant, K_{oc}, K_{ow}, half-life and BCF) are provided in Table 3-13.

DDD

The following information was obtained from "The Installation Restoration Program Toxicology Guide," Vol. III, Arthur D. Little, Inc. June 1987.

DDD, no longer manufactured commercially, is still found as an impurity in the pesticide DDT and the miticide dicofol. It is also the major breakdown product of DDT under anaerobic conditions. The p,p' isomer of DDD is the third largest component of the technical DDT product after the two DDT isomers accounting for >4% of the mixture. It is present in somewhat lower concentrations in dicofol. In one study of several dicofol products, DDD was present in amounts ranging from 0.1 to 2.5% of the amount of dicofol.

Like DDT, DDD is expected to be highly immobile in the soil/groundwater environment when present at low dissolved concentrations. Bulk quantities of DDD dissolved in an organic solvent could be transported through the unsaturated zone as a result of a spill or the improper disposal of excess formulations. However, the extremely low solubility of DDD and its strong tendency to sorb to soil organic carbon results in a very slow transport rate in soils.

In general, transport pathways can be assessed by using an equilibrium partitioning models. These calculations predict the partitioning of low soil concentrations of DDD among soil particles, soil water, and soil air. Due to its strong sorption to soil, virtually all of the DDD partitions to the soil particles of unsaturated top soil and negligible amounts to the soil air or water. Even in saturated deep soil, which is assumed to contain no soil air, and a smaller organic carbon fraction, almost all of the DDD is retained on the soil.

DDD, like DDT, is characterized by a strong tendency to sorb to soil organic carbon. While only one measured K_{oc} value for DDD was found (log K_{oc} = 5.38) it is consistent with the value obtained for DDT, as would be expected based on the similarity of their structures and their octanol water partition coefficients (DDD log K_{ow} = 5.56). As with all neutral organic chemicals, the extent of DDD sorption is proportional to the soil organic carbon content. In soils with little organic carbon (e.g., clays) the extent of sorption may also depend upon such soil properties as surface area, cation exchange capacity, and degree of hydration.

The sorption of DDD to soils is lessened and thus its mobility is enhanced by the presence of dissolved organic matter in solution. The apparent solubility of DDT was increased several times in solutions containing humic and fulvic acids. Because the sorption behavior of DDD is expected to be much like that of DDT, its mobility in natural waters may be several times greater than predicted (though probably still small) if dissolved organic matter is present. In waters containing large concentrations of dissolved organic matter, such as swamps and bogs, this may be especially important.

The vapor pressures of the p,p' and o,p' - isomers of DDD at 30°C have been measured as 1.3×10^{-9} and 2.5×10^{-9} atm, respectively. The Henry's law constant estimated by use of the average vapor pressure of the two isomers and an aqueous solubility of 20 ppb is 3.1×10^{-5} atm

m^3/mol. This value is almost identical to that for DDT and roughly an order of magnitude less than that for DDE.

Experimental evidence indicates that DDT volatilization from water occurs at about one-third the rate for DDT, which may seem at odds with the similar estimates for the Henry's law constants for these two compounds. Given the uncertainties involved in measuring both the aqueous solubilities and the vapor pressures of these compounds, from which H is estimated, the findings cannot be considered inconsistent. Using a factor of one-third for the difference in the rate of volatilization of DDD and DDT, a volatilization half-life for DDD ranging from a day to less than a month has been estimated.

Volatilization of DDD from soils can be expected to be much slower than from water because of the strong tendency of DDD to sorb to soil. Using wet river bed quartz sand in 15 mm deep petri dishes, Ware et at. measured volatilization losses of p,p'-DDD (present initially at 10 ppm) that corresponded to a volatilization half-life of roughly 170 days, slightly more than twice that for p,p'-DDT under the same conditions. Because these experiments were conducted with a relatively thin layer of soil with a small organic carbon fraction, the actual volatilization rate of DDD in the field would be expected to be lower. If the relative volatilization rates of DDD and DDT in the field were the same as those observed by Ware et al., the volatilization half-life of DDD from soil could be assumed to be double the value of one to several years for DDT.

Hydrolysis of DDD can be expected to be extremely slow under environmental conditions. Over the pH range typical of natural waters (pH 5-9), Wolfe et al. found the pseudo-first-order rate constant (k_{obs}) at 27°C could be expressed as:

$$k_{obs} = 1.1 \times 10^{-10} + 1.4 \times 10^{-3} [OH-]$$

where k_{obs} is in s^{-1} and [OH-], the concentration of the hydroxide ion, in moles/liter. Hydrolysis half-lives of roughly 1.6, 88, and 190 years at pH 9, 7, and 5, respectively, correspond to the rate constant estimated from this equation. These estimates are consistent with the observations of Eichelberger and Lichtenberg that no DDD, initially present in river water at 20 ppb, degraded over an eight week period (within 2.5%).

No information was found on the photolysis of DDD in natural waters. Direct photolysis of DDD (i.e., in pure water) is believed to be slower than that for DDT which is estimated to have a half-life of over 150 years. However, DDT in natural water has been estimated to have a photolysis half-life of 5 days when exposed to sunlight in mid-June; DDD might be expected to have a similar half-life based on the similar structure of the two chemicals.

Data on the biodegradation of DDD are limited. In aquatic systems, biotransformation is believed to be slow, although a model ecosystem study has shown DDD to be more biodegradable than either DDT or DDE. The ketone analogue of DDD (i.e., p,p'-dichlorobenzophenone) has been suggested as the end product of the biodegradation of DDD in the environment. DDD undergoes dehydrochlorination to 2,2-bis-(p-chlorophenyl)-1-chloroethylene, reduction to 2,2-bis-(p-chlorophenyl)-1-chlorethane, dehydrochlorination to 2,2-bis-(p-chlorophenyl)-ethylene, reduction to

1,1-bis-(p-chlorophenyl)-ethane and eventual oxidation to bis-(p-chlorophenyl)-acetic acid (DDA), the ultimate excretory product of higher animals. DDD has also been observed to degrade in anaerobic sewage sludge.

The above discussion of fate pathways suggests that DDD is moderately volatile, very strongly sorbed to soil, and has a high potential for bioaccumulation. Information on the fate and transport parameters (i.e., solubility, vapor pressure, Henry's Law Constant, K_{OC}, K_{OW}, half-life and BCF) are provided in Table 3-10.

DDE

The following information was obtained from "The Installation Restoration Program Toxicology Guide," Vol. III, Arthur D. Little, Inc. June 1987.

The presence of DDE in the environment is primarily the result of the use of the insecticide DDT and the miticide dicofol. DDE is the principal degradation product of DDT under aerobic conditions, and it has been found to equal roughly 1-3% of the weight of dicofol in the technical mixture. Like DDT, DDE exists as both an o,p' and a p,p' isomer, with the o,p' and the p,p' isomers of DDT degrading to the respective DDE isomer. Because technical DDT consists of 65-80% p,p' - DDT and 15-21% o,p' - DDT, the p,p' - DDE isomer might be expected to predominate in the environment. In dicofol, however, the o,p' isomer typically makes up 80-90% of the DDE present. The two isomers of DDE are considered individually below where data are available.

Like DDT, DDE is expected to be highly immobile in the soil/groundwater environment when present at low dissolved concentrations. Bulk quantities of DDE dissolved in an organic solvent (e.g., as a contaminant in dicofol) could be transported through the unsaturated zone as a result of a spill or improper disposal of excess formulations. However, the extremely low solubility of DDE and its strong tendency to sorb to soils would result in a very slow transport rate in soils.

In general, transport pathways can be assessed by using an equilibrium partitioning model. These calculations predict the partitioning of low soil concentrations of DDE among soil particles, soil water and soil air. Due to its strong tendency to sorb to soil, virtually all of the DDE partitions to the soil particles of unsaturated topsoil, with negligible amounts associated with the soil water or air. Even in saturated deep soil, which is assumed to contain no soil air and a smaller organic carbon fraction, almost all of the DDE is retained on the soil.

DDE is characterized by a strong tendency to sorb to organic matter in soils and in sediments. Only one value, log K_{OC} = 5.17 was found in the literature for the soil organic carbon partition coefficient. A log K_{OC} value of roughly 5 has been suggested based on log K_{OW} measurements of 5.69 for the p,p' isomer and 5.78 for the o,p' isomer. Using the geometric mean of these K_{OW} values and a regression equation, a log K_{OC} value of 5.41 is estimated. As with all neutral organic chemicals, the extent of sorption is proportional to the soil organic carbon content. In soils with little organic carbon (e.g., clays), the extent of sorption may also depend upon soil properties such as surface area, cation exchange capacity, and degree of hydration.

The apparent sorption of DDE to soils and sediments (like that of DDT), is lessened, and thus its mobility is enhanced by the presence of dissolved organic matter. DDT concentrations were found to be higher in aqueous solutions containing humic and fulvic acids. Because the sorption behavior of DDE is expected to be much like that of DDT, its mobility in natural waters may be several times greater than predicted (though probably still small) if dissolved organic matter is present. In waters containing large concentrations of dissolved organic matter such as swamps and bogs, this may be especially important.

The vapor pressure of p,p'- isomer of DDE at 20°C has been given as 8.7×10^{-9} atm and that of the o,p' isomer as 8.2×10^{-9} atm. A somewhat lower value of roughly eight times the vapor pressure of DDT has been suggested. Using the average vapor pressures for the two isomers to estimate the Henry's law constant, a value of 1.9×10^{-4} atm m^3/mol is obtained.

This estimate is roughly an order of magnitude larger than the Henry's law constant for DDT. Because volatilization losses for DDT are expected to be important, the same is also true for DDE. DDE has been found to volatilize from distilled and natural waters five times faster than DDT. Since the volatilization half-life for DDT has been reported to range from several hours to several days proportionately shorter half-lives would be expected for DDE.

In soils, volatilization of DDE is much slower. Using wet river bed, quartz sand in 15 mm deep petri dishes, Ware et al. measured volatilization losses of p,p'-DDE (present initially at 10 ppm) that corresponded to a half-life of roughly 40 days. This value may be more indicative of an upper limit of the volatilization rate because soils of higher organic matter content would tend to sorb more of the DDE, and the rate of volatilization would be expected to be lower from thicker layers of soil. In the same study and under the same conditions, the o,p' isomer of DDT took 50% longer to reach half its initial concentration; p,p'-DDT took twice as long. This suggests that the volatilization of DDE in the field may occur at a rate somewhat greater than that for DDT, which has been found to have a volatilization half-life of one to several years. The observation that the volatilization rate of DDE from soil is not several times the rate for DDT, given that it has an order of magnitude larger Henry's law constant, may be explained by its strong sorption to soil, which tends to impede volatilization.

DDE is the hydrolysis product of DDT and is quite resistant to further hydrolysis. A hydrolysis half-life of over 120 years at pH 5 and 27°C has been given. Thus, hydrolysis is not expected to be an environmentally significant process.

Several studies have examined the aqueous photolysis of DDE. Zepp and Schlotzhauer found that DDE in the aqueous phase of sediment suspensions exposed to ultraviolet light of wavelength > 300 nm had a half-life of roughly 13 to 17 hours. Under the same conditions, DDE equilibrated with sediment for 60 days (i.e., sorbed to the sediment) photodegraded much more slowly. To reach 25% of its initial concentration, roughly seven half-lives were needed instead of the expected two, and little further degradation occurred. The authors suggested that over time, part of the DDE diffused into the sediment particles and became unavailable for photolysis. Chen et al. found the thin film photodegradation rate of p,p'-DDE to be about 90% of that for p,p'-DDT, and the half-life of DDE in aquatic systems at 40°N latitude has been estimated to range from one day in summer to six days in winter. These findings suggest that photolysis of DDE may be an important loss process, as it is for DDT. However, for photolysis to occur, the chemical must be exposed to sunlight, which often is not the case for a large fraction of the amount sorbed to soils or deep sediments.

The biological degradation of DDE in aquatic environments is believed to occur very slowly if at all. In modeling the fate of DDE in a quarry, Di Toro and Paquin considered biodegradation to be insignificant compared to loss by photolysis and volatilization. The half-life for biodegradation in sediments has also been found to be extremely slow. Using radiolabeled p,p'-DDE mixed with river sediment, Lee and Ryan measured a half-life of 1100 days based on the evolution of CO_2. In short, photolysis appears to be the only degradation process that affects DDE significantly under environmental conditions.

Information on the fate and transport parameters (i.e., solubility, vapor pressure, Henry's Law Constant, K_{oc}, K_{ow}, half-life and BCF) are provided in Table 3-5.

3.1.3.4 Metals

In general, metals tend to be persistent in the environment and relatively insoluble. The behavior of heavy metals in soil is unlike organic compounds in many aspects. For example, volatilization of metals from soil is not considered a realistic mechanism for contaminant migration and is not considered here. However, leaching and sorption will be considered.

Leaching of heavy metals from soil is controlled by numerous factors. The most important consideration for leaching of heavy metals is the chemical form (base metal or cation) present in the soil. The leaching of metals from soil is substantial if the metal exists as a soluble salt. Metallic salts have been identified as a component of such items as tracer ammunition, ignitor compositions, incendiary ammunition, flares, colored smoke and primer explosive compositions. In particular, barium nitrate, lead stearate, lead carbonate, and mercury fulminate are potential heavy metal salts or complexes which are components of ammunition that may have been tested or disposed of at SEDA. During the burning of these materials, a portion of these salts oxidize to their metallic oxide forms. In general, metal oxides are considered less likely to leach metallic ions than metallic salts. Upon contact with surface water or precipitation, the heavy metal salts may be dissolved, increasing their mobility and increasing the potential for leaching to the groundwater.

Heavy metals may also exist in the base metallic form as a component of the projectiles tested or disposed of at SEDA. Bullets are composed mainly of lead, which may contain trace amounts of cadmium and selenium. Metals which exist in metallic form, i.e., as bullets or projectiles, will tend to dissolve more slowly than the metallic salts.

Oxidation and reduction involves the change of the valence state of the metals and has a large influence on fate mechanisms. A good example of the variation in contamination fate due to oxidation and reduction changes is iron. Iron (Fe) normally exists in one of two valence states, +2 and +3 [Fe(II) and Fe(III)]. Fe(II) is far more soluble than Fe(III) and therefore has a greater mobility. The redox state may also affect the toxicity of a compound.

Soil pH is often correlated with potential metal migration. If the soil pH is greater than 6.5, most metals are fairly immobile, particularly those normally present as cations. At higher pH values, metals form insoluble carbonate and hydroxide complexes. Metals would be most mobile in highly acidic soil (pH of less than 5).

The surface soil at SEDA has pH values ranging from 5 to 8.4 (SCS, 1972). Subsurface soil has even higher pH values, with the data indicating values ranging from 7 to 9. Therefore, metals at SEDA would be expected to be present primarily in insoluble forms. A detailed evaluation of select metals (barium, copper, lead and mercury) is given below.

Lead is extremely persistent in both water and soil. Environmental fate processes may transform one lead compound to another; however, lead is generally present in the +2 oxidation state, and will form lead oxides. It is largely associated with suspended solids and sediment in aquatic systems, and it occurs in relatively immobile forms in soil. Lead which has been released to soil may become airborne as a result of fugitive dust generation.

Elemental mercury is insoluble in water and binds tightly to soil particles giving it a relatively low mobility. Bacterial and fungal organisms in sediment are capable of methylating mercury. Methyl mercury which is soluble in water, is a mobile substance and can then be ingested or absorbed. Until altered by biological processes, the primary transport method for mercury is the erosion and transportation of soil and sediment. Mercury most likely exists at SEDA in the elemental state as a result of the testing or demolition of munitions containing mercury fuzes. Although a mercury salt, mercury fulminate, was used in the past as a priming explosive, it has not been commonly used since 1925 (Dunstan and Bell, 1972), and its environmental fate will not be considered at the site.

3.1.3.5 Fuel Oils

The following discussion of fuel oils was obtained from the "Installation Restoration Program Toxicity Guide", Volume III, July, 1987.

Fuel oils have various uses for which they are specifically formulated. Fuel oil number 1 is used almost exclusively for domestic heating. Fuel oil number 2 is used as a general purpose domestic or commercial fuel in atomizing type burners. Number 4 oil is used in commercial or industrial burner installations not equipped with preheating facilities. Numbers 5 and 6 are used in furnaces and boilers of utility power plants, ships, locomotives, metallurgical operations and industrial power plants.

Diesel fuel is available in different grades. Number 1-D is used for engines in service requiring frequent speed and load changes. Number 2-D is used for engines in industrial and heavy mobile service while number 4-D is used in low and medium speed engines.

Composition

The discussion of fuel oil in this chapter largely focuses on diesel fuel. Limited information on residual fuel oils, which are generally defined as the product remaining after the removal of the appreciable quantities of the more volatile components is included but environmental fate data are not specifically addressed. Residual fuel oils are expected to be extremely complex in composition, with higher concentrations of the many high molecular weight asphaltic compounds and impurities present in the original crude oils. Available data suggest sulfur values ranging from 0.18 to 4.36% by weight; trace element data indicate that concentrations of many elements vary by one or more orders of magnitude. The environmental transport and transformation of the high molecular weight organics is expected to be minimal and is not addressed in detail.

Diesel fuel is usually that fraction of petroleum that distills after kerosene in the 200 C to 400 C range. Several commercial grades of diesel fuels are obtained by blending various feedstocks to achieve established specifications. Due to differences in feed stocks, refining methods, and blending practices, the composition of diesel fuel samples is expected to be highly variable. Sulfur content has been reported to vary by several orders of magnitude (0-0.57% by weight): similar variations have been documented for a number of trace elements.

Diesel fuel is predominantly a mixture of C_{10} through C_{19} hydrocarbons. Composition by chemical class has been reported to be approximately 64% aliphatic hydrocarbons (straight chain alkanes and cycloalkanes), 1-2% olefinic hydrocarbons and 35% aromatic hydrocarbons, including alkylbenzenes and 2-3 ring aromatics. Petroleum distillates may contain many non-hydrocarbon components in varying concentrations.

Fuel oils also contain a number of additives used as ignition improvers, combustion catalysts, antioxidants, flow improvers, metal deactivators, detergents and emulsifiers. Many compounds added to fuel oils are similar to those added to gasoline.

Environmental Fate and Exposure Pathways

A discussion of the environmental behavior of fuel oil is limited by the lack of data defining its major components. The environmental behavior of hydrocarbons selected from the major classes will be addressed; however, trace elements and the many diverse additives will not be specifically addressed.

In general, soil/groundwater transport pathways for low concentration of pollutants in soil can be assessed by using an equilibrium partioning model. For the purposes of assessing the environmental transport of diesel fuel, a group of specific hydrocarbons was selected from the dominant hydrocarbon classes, i.e., alkanes, cycloalkanes, and aromatics; there were no available data to confirm the presence of the selected compounds in a typical diesel fuel sample. The hydrocarbon portions associated with water and air phases of the soil are expected to have higher mobility that the adsorbed portion.

Estimates for the unsaturated topsoil indicate that sorption is expected to be an important process for all the dominant hydrocarbon categories. Partioning to the soil-vapor phase is much less important than for other petroleum distillates since many of the lower molecular weight aliphatic hydrocarbons (C_4-C_8) characterized by high vapor pressure and low water solubility are not expected to be major components of diesel fuel. The aromatics have slightly higher water solubilities and transport with infiltrating water may be more important for these compounds; volatilization, on the other hand, is not expected to be important. In saturated, deep soils (containing no soil air and negligible soil organic carbon), a significant percent of the aromatic hydrocarbons is predicted to be present in the soil-water phase and available for transport with flowing groundwater. Partitioning to the air and water phases is expected to be even less important for the organic components of residual fuel oils compared to components of diesel oil; sorption to soil particles is expected to be significant.

In interpreting these results, it must be remembered that this model is valid only for low soil concentrations (below aqueous solubility) of the components. Large releases of diesel fuel (spills, leading underground storage tanks) may exceed the sorptive capacity of the soil, thereby filling the pore spaces of the soil with the fuel. In this situation, the hydrocarbon mixture would move as a bulk fluid and the equilibrium partitioning model would not be applicable.

Transport and Transformation Processes

Transport and transformation of individual fuel oil constituents will depend on the physiochemical (and biological) properties of the constituents. Some constituents will dissolve more quickly in the percolating groundwaters, be sorbed less strongly on the soils thus being transported more rapidly, and may be more or less susceptible to degradation by chemical or biological action. Thus, the relative concentrations of the constituents of the fuel will vary with time and distance form the site of contamination. This effect is called "weathering". (This term is also used to describe the changes to oil following spills into surface waters where film spreading and breakup, and differential volatilization dissolution and degradation are all involved).

Transport processes have been shown to be more significant than transformation processes in determining the initial fate of lower molecular weight petroleum hydrocarbons released to soil/ground-water systems. However, due to the lower water solubilities and lower vapor pressures of the higher molecular weight hydrocarbons environmental transformation processes may be increasingly significant for hydrocarbons in the C_{10}-C_{19} range characteristic of diesel fuel and in the $> C_{19}$ range expected in residual fuel oils.

Under conditions of limited volatilization (low temperatures, subsurface release or concentrated spill) other transport processes including downward migration into the soil, sorption to soils, and transport to groundwater may be important. It has been reported that oil substances released in significant quantities to soils result in a separate organic phase which moves downward through the unsaturated zone to the less permeable layer, the soil/groundwater boundary, where they tend to accumulated and spread horizontally.

The organic layer floating on the groundwater is carried in the general direction of groundwater flow. At the oil-water interface, some hydrocarbons are leached according to their aqueous solubility. The pollution caused by the hydrocarbon phase is much less extensive than pollution caused by hydrocarbons dissolved in ground water. Furthermore, the pattern of migration of the hydrocarbon phase may be very different from that of the groundwater. Due to fluctuations in groundwater elevation over time, the organic layer on top of the aquifer may be transported into several zones where the components occur in the gaseous phase (able to diffuse in all directions, including upward), liquid phase (adsorbed onto rock particles or sealed under water), or dissolved/emulsified in water.

Migration through soils may be retarded by sorption. Sorption is expected to be significant for higher molecular weight aliphatics, particularly > C_{20}. Migration is expected to be fastest through previously contaminated soils where the sorptive sites may be unavailable; on the other hand, soil-water content increases sorption and slows migration of hydrocarbons. In fissured rock, the migration of hydrocarbons is much less uniform than in porous soils. Preferential spreading through crevices, sometimes changing the direction of flow, may occur. Determination of the potential groundwater contamination in fissured rock is thus very difficult.

The water-soluble portion of No. 2 fuel oil (a higher temperature distilling fraction than diesel oil) was shown to be almost entirely aromatic (99%) even though the product itself was 48% aliphatic; the aliphatic fuel oil hydrocarbons have very low water solubility compared with the aromatics. The largest percentage (40%) of the water-soluble fraction of fuel oil was represented by C_{11} - aromatics. In deep, saturated soils with no soil air, the aromatics represent the greatest threat of contamination to groundwater supplies. Solubility in aqueous solution of polar, non-hydrocarbon components of some higher boiling petroleum fractions such as diesel oil and other fuel oils has also been reported.

In summary, the physical distribution of fuel oil contamination affects its impact on, and removal from, the soil environment. Lateral spreading along the surface increases the initial contaminated area while facilitating evaporative removal or sorption of different hydrocarbons. Subsurface release or vertical penetration mediated by gravitation and capillary forces decreases evaporation, reduces the importance of some transformation pathways (see below), and may lead to groundwater contamination.

Photo-oxidation has been reported to play a significant role in the chemical degradation of petroleum hydrocarbons in the sunlit environment. Alkanes, benzenes, and mono-substituted benzenes have been shown to be relatively resistant to photolysis in aqueous systems; xylenes photolyzed slowly while trisubstituted benzenes and naphthalenes photolyzed at rates competitive with volatilization. Anthracene and other polycyclic aromatic hydrocarbons (PAH) in the carbon range of diesel fuel are subject to photochemical oxidation; benzo(a)pyrene is the most susceptible of the PAH compounds, suggesting that the residual fuel oils may be even more affected by photodegradation than diesel oil. Penetration of oil below the soil surface limits exposure to solar radiation while extensive lateral spreading of oil over impermeable or rocky surfaces may promote substantial photo-oxidative degradation. The oxygenated products of photo-oxidation are generally more water-soluble than the parent hydrocarbons and are thus more likely to be leached from soil.

Natural ecosystems have considerable exposure to petroleum hydrocarbons from natural emissions, accidental contamination through oil spills and storage tank leaks, and deliberate application to land in waste disposal activities such as land-farming; therefore, their biodegradation of petroleum hydrocarbons, and several extensive reviews and reports are available. An extensive and diverse group of petroleum hydrocarbon degrading bacteria and fungi are widely distributed in the environment. Although the microbiota of most non-contaminated soils include many naturally occurring hydrocarbon-degrading populations, the addition of petroleum selectively enriches that sector able to adapt and utilize the new substrate. Other environmental factors shown to have a major effect in biodegradability are availability of oxygen and moderate temperatures.

The qualitative hydrocarbon content of petroleum mixtures largely determines their degradability. In general, microorganisms exhibit decreasing ability to degrade aliphatic hydrocarbons with increasing chain length; aromatics are generally more rapidly biodegraded than alkanes. The composition of diesel oil suggests that some of the aromatic species will be biodegradable; biodegradation of the high molecular weight aromatics expected to be present in residual oils will be slower.

In summary, biodegradation of the petroleum hydrocarbons comprising diesel and fuel oils may occur under conditions favorable for microbial activity and when fuel components are freely available to the microorganisms. Degradation may be limited and/or slow in environments with few degrading organisms, low pH, low temperature, and high salinity. It should be mentioned that even under optimum conditions, total and complete biodegradation is not expected to occur except possibly over an extremely long time period.

Primary Routes of Exposure from Soil/Groundwater Systems

The above discussion of fate pathways suggests that pure fuel oils have low vapor pressure but that their components vary in their volatility from water. The components are strongly or very strongly sorbed to soil. The polycyclic aromatic hydrocarbons in fuel oils have a moderate or high potential for bioaccumulation, while the longer-chain aliphatic compounds have low potential for bioaccumulation. These fate characteristics suggest that the various components may have somewhat different potential exposure pathways.

Volatilization of fuel oils from a disposal site or spill would not be expected to result in significant inhalation exposures to workers or residents in the area. Gravity would tend to carry bulk quantities of the oil down towards the water table leaving only a relatively small fraction on the soil surface to volatize. Volatilization of the remaining oil would occur very slowly because of its low vapor pressure, especially for the heavier weight fuel oils, and because of strong sorption to soil.

Groundwater contamination may result from large spills that reach the water table. There, the more soluble components will dissolve in the groundwater or form emulsions with it. The soluble fraction is mainly aromatic and lower molecular weight aliphatic compounds. In one study using No. 2 fuel oil, 40% of the water soluble fraction was made up of aromatic compounds composed of 11 carbon atoms and 25% each of compounds containing 10 and 12 carbon atoms. The hydrocarbons dissolved in the groundwater may move hundreds to thousands of meters. By comparison, the undissolved fraction, which floats on the surface of the water table as a separate phase, would be expected to move only tens of meters, unless cracks or fissures were present.

The movement of fuel oil components in ground water may contaminate drinking water supplies, resulting in ingestion exposures. Groundwater discharges to surface water or the movement of contaminated soil particles to surface water drinking water supplies may also result in ingestion exposures and in dermal exposures from the recreational use of these waters. The potential also exists for the uptake of polynuclear aromatic compounds in fuel oil (e.g., naphthalene, methylnaphthalene and higher weight PAHs) by fish and domestic animals, which may also result in human exposures. Exposures to high concentrations of fuel oil components in drinking water and food are expected to be rare because tainting becomes apparent at relatively low concentrations.

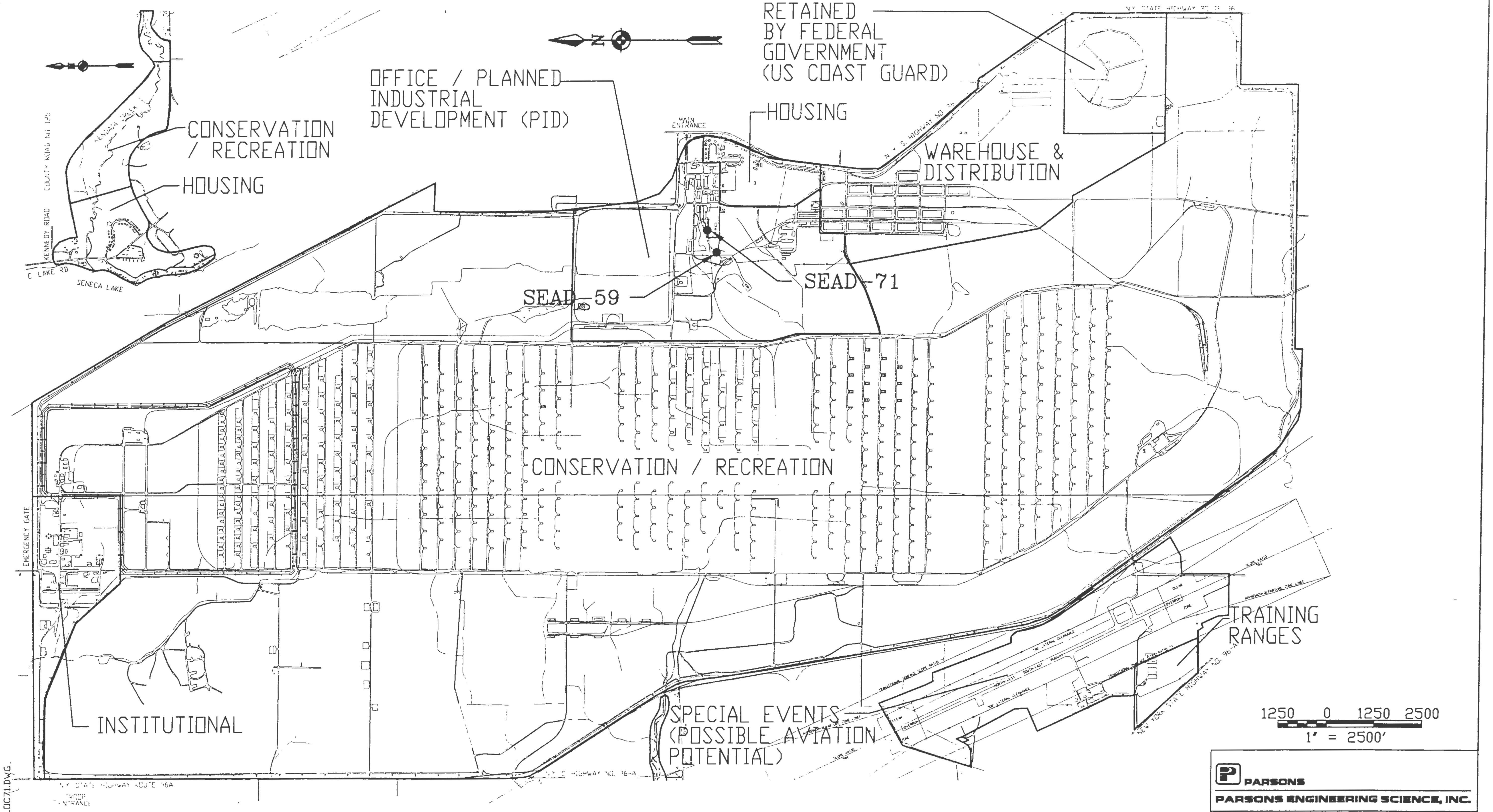
Volatilization of fuel oil hydrocarbons in soil is another potential source of human exposure. Despite their relatively low vapor pressure, the more volatile components of fuel oil in soil evaporate, saturating the air in the soil pores, and diffusing in all directions including upward to the surface. The vapors may diffuse into basements of homes or other structures in the area, resulting in inhalation exposures to the building's occupants. Exposures may be more intensive when the soil is contaminated from leaking underground storage tanks and pipes, rather than from surface spills, because the more volatile components do not have an opportunity to evaporate before penetrating the soil. Even then, this exposure pathway is expected to be much less important for fuel oils than for more volatile petroleum products like gasoline.

3.2 PRELIMINARY IDENTIFICATION OF POTENTIAL RECEPTORS AND EXPOSURE SCENARIOS

This section will identify the source areas, release mechanisms, potential exposure pathways and the likely human and environmental receptors at SEAD-59 and SEAD-71 based upon the results of the conceptual site models, which were described in the previous section.

This section discusses the current understanding of site risks for the two sites based upon the data gathered from the ESI. This information is used to assess whether sources of contamination, release mechanisms, exposure routes and receptor pathways developed in the conceptual site models for the sites are valid or if they may be eliminated from further consideration prior to conducting a risk assessment. Additionally, this information will determine what additional data are necessary to develop a better conceptual understanding of the sites in order to determine risks to human health and the environment, to better define the ARARs, and to develop appropriate remedial actions.

The future use of the land at Seneca Army Depot Activity is defined in the Reuse Plan and Implementation Strategy for the Seneca Army Depot (December 1996). Chapter 21 of this report describes the preferred land use for the entire Depot and identifies nine land uses. The portion of the Depot that is occupied by SEAD-59 and SEAD-71 is proposed as Planned Office/Industrial Development (Figure 3-17). The description under this land use as given in the Reuse Plan is as follows:



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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 AND SEAD-71

ENVIRONMENTAL ENGINEERING	728510-02007

FIGURE 3-17
FINAL LAND USE PLAN

1" = 2500'	FEBRUARY 1997	A

ACAD\SENECA\RIFS\SD71\MAPLOC71.DWG

> This approximately 620 acre site represents the main administrative area of the Depot. The Planned Office/Industrial Development (PID) area contains approximately 30 major buildings with an estimated 300,000 square feet of floor space. The site also contains more than 150 acres of developable land which could be used for the construction of new facilities in the future.
>
> The primary reason for recommending that the area be developed as PID is that it allows the LRA, or its successor entity, to influence the redevelopment of the site through the creation of flexible regulations that encourage development. The PID designation could allow a variety of uses including office, warehouse, light manufacturing, research and development and/or commercial uses. Certain performance standards, such as lot coverage, architectural features, or building height, can be required for any entity seeking to reuse or redevelop the facilities in this area. However, in order to encourage development some regulations, based on the need for the user, may need to be waived or modified.

Using the Reuse Plan, the future use scenario and the required degree of cleanup will be proposed on a site-by-site basis as part of each feasibility study.

3.2.1 SEAD-59

3.2.1.1 Potential Source Areas and Release Mechanisms

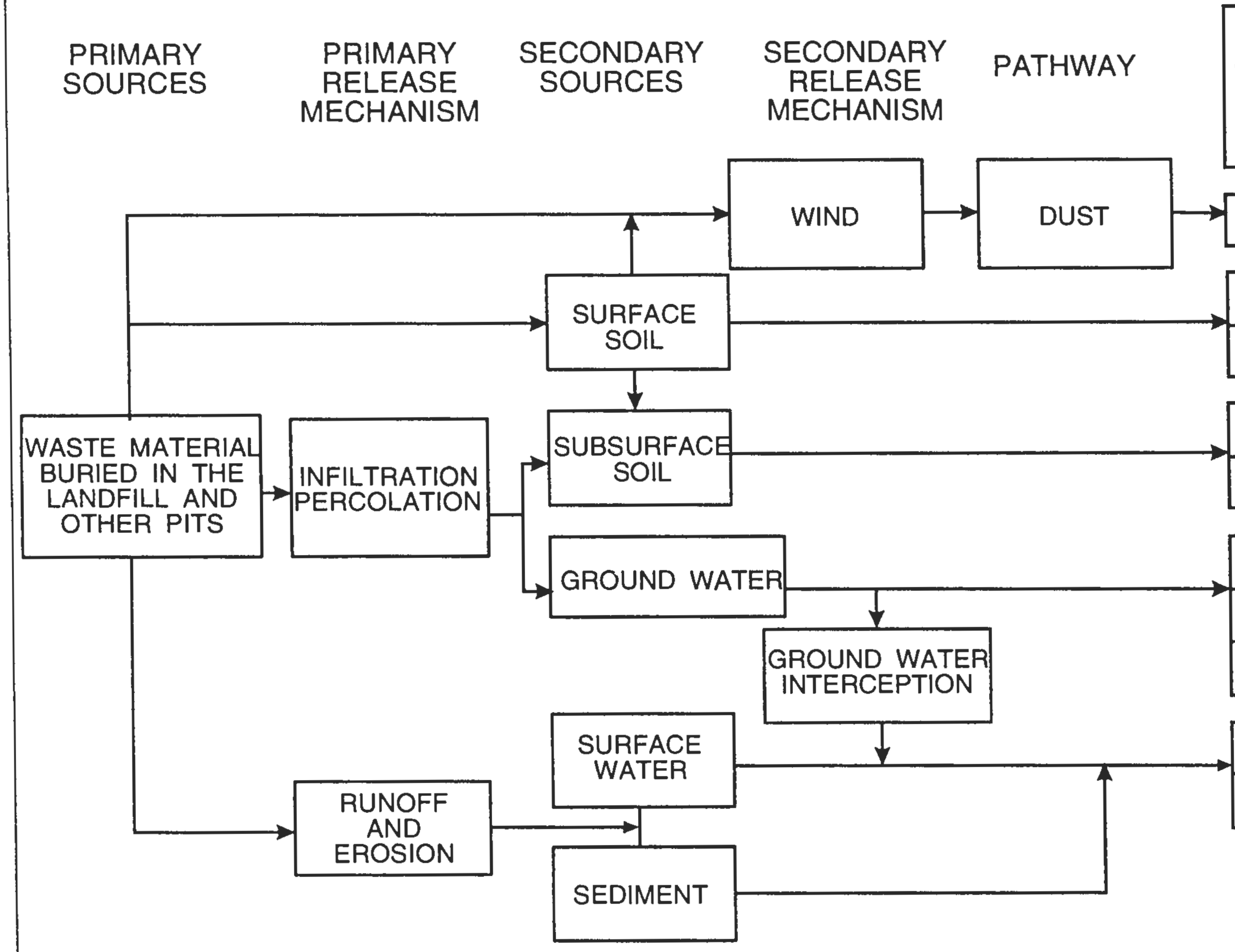
The suspected source area is waste material buried in a small fill area and in small disposal pits. The primary release mechanisms from the buried waste and soil that comprise the fill area and pits are infiltration and percolation of precipitation, and surface water runoff and erosion (Figure 3-__). Wind is also a release mechanism from impacted soil, although this is not expected to be significant because the site is vegetated. Groundwater, surface water, and sediment are secondary sources. Groundwater interception of surface water is a secondary release mechanism.

3.2.1.2 Potential Exposure Pathways and Receptors - Current Uses

The complete potential exposure pathways from sources to receptors, based upon current and future use scenarios, are shown in Figure 3-18. The potential for human exposures, with the exception of fugitive dust, is directly affected by the accessibility to the site. Human and vehicular access to the site is restricted by a chain-link fence with a locking gate, which is part of SEDA's general security provisions.

There are two primary receptor populations that could be affected by potential releases of contaminants from SEAD-59 and they are as follows:

1. Current site workers
2. Terrestrial biota and aquatic organisms on or near the site



EXPOSURE ROUTE	RECEPTOR: HUMAN: FUTURE CONSTRUCTION WORKER	HUMAN: FUTURE TRESPASSER	HUMAN: CURRENT SITE WORKERS	BIOTA: TERRESTRIAL	BIOTA: AQUATIC
INHALATION	●	●	●	●	NA
INGESTION	●	●	●	●	NA
DERMAL CONTACT	●	●	●	●	NA
INGESTION	●	NA	NA	●	NA
DERMAL CONTACT	●	NA	NA	●	NA
INHALATION	NA	NA	NA	NA	NA
INGESTION	NA	NA	NA	NA	NA
DERMAL CONTACT	NA	NA	NA	NA	NA
INGESTION	NA	●	●	●	●
DERMAL CONTACT	NA	●	●	●	●

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

NOTE: TERRESTRIAL AND AQUATIC BIOTA MAY BE EXPOSED TO CHEMICALS IN SURFACE WATER AND SEDIMENT.

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA
WEST OF BUILDING 135

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 727651-02007

FIGURE 3-18
EXPOSURE PATHWAY SUMMARY
FOR SEAD-59

SCALE NA
DATE FEBRUARY 1997

The exposure pathways and media of exposure are described below as they may affect the various receptors.

The numerical assumptions that will be used in the risk assessment for the current uses exposure scenario are listed in Table 4-3 of this Scoping Plan.

Ingestion and Dermal Exposure Due to Surface Water Runoff and Erosion

Surface water run-off on-site is controlled by the variable land surface topography and a well developed drainage ditch system. At the fill area, which is located in the northern portion of the site, overland flow is likely to be radial toward drainage ditches that surround the fill area. These ditches eventually flow beyond the site boundary.

Human receptors of impacted surface water and sediment include current site workers, who may incidentally ingest or come in contact with the surface water and sediment. Terrestrial biota and aquatic organisms that ingest and come in contact with impacted surface waters and sediment may also be affected.

Incidental Soil Ingestion and Dermal Contact

Incidental ingestion of, and dermal contact with surface soil are potential exposure pathways for current site workers. Ingestion of, and dermal contact with surface and subsurface soil are potential pathways for terrestrial biota.

Ingestion of Groundwater and Dermal Contact

Ingestion of, inhalation of, and dermal contact with groundwater are not potential exposure pathways for current site workers or terrestrial biota. The groundwater beneath SEAD-59 is not used currently 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 to current site workers or terrestrial biota.

Dust Inhalation and Dermal Contact

Inhalation and dermal contact with impacted dust is a potential exposure pathway for current site workers and terrestrial biota.

3.2.1.3 Potential Exposure Pathways and Receptors - Future Uses

The proposed future use of the area that encompasses SEAD-59 is as Plannned Office/Industrial Development. The potential for human exposure is directly affected by the accessiblity to the site and related facilities under this land use.

There are three primary receptor populations for potential releases of chemicals from SEAD-59 and they are as follows:

1. Future construction worker,
2. Future trespasser, and
3. Terrestrial biota and aquatic organisms on or near the site.

For the future construction worker, dermal contact with and ingestion of soils, along with inhalation of particulates in ambient air are considered. For the future child trespasser, the following pathways will be quantified: ingestion and dermal contact with site surface soils; ingestion and dermal contact with on-site surface water and sediment while wading; and inhalation of particulates in ambient air.

The numerical assumptions that will be used in the risk assessment for the future uses exposure scenario are listed in Table 4-3 of this Scoping Plan.

3.2.2 SEAD-71

3.2.2.1 Potential Source Areas and Release Mechanisms

The suspected source area is waste material buried in disposal pits. The primary release mechanisms from the buried waste and soil that comprise the pits are infiltration and percolation of precipitation, and surface water runoff and erosion (Figure 3-19). Wind is also a release mechanism from impacted soil, although this is not expected to be significant because the site is vegetated. Groundwater, surface water, and sediment are secondary sources. Groundwater interception of surface water is a secondary release mechanism.

3.2.2.2 Potential Exposure Pathways and Receptors - Current Uses

The complete potential exposure pathways from sources to receptors based upon current and future use scenarios are shown in Figure 3-19. The potential for human exposures is directly affected by the accessibility to the site with the exception of fugitive dust. Human and vehicular access to the site is restricted by a chain-link fence with a locking gate, which is part of SEDA's general security provisions.

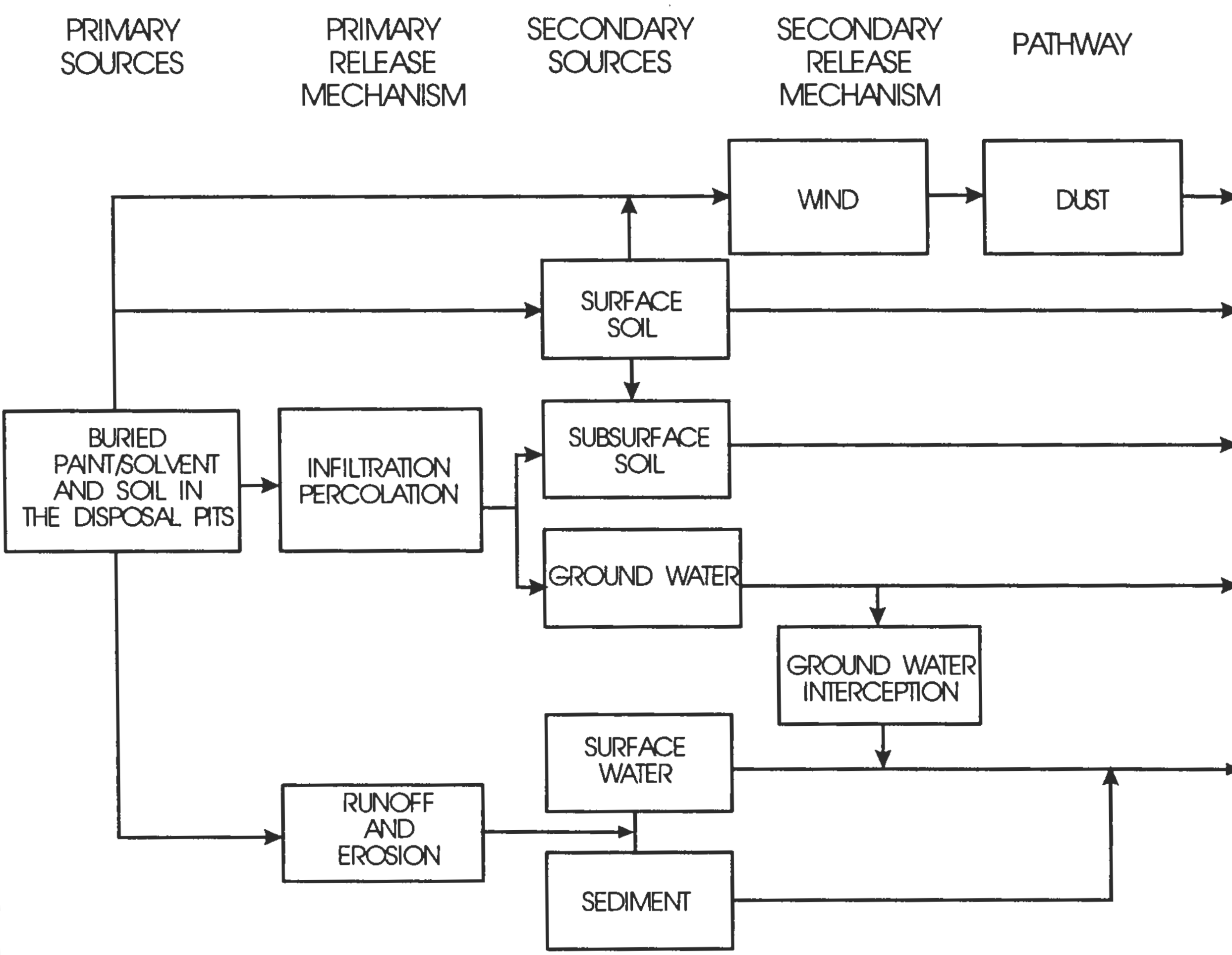
There are two primary receptor populations for potential releases of contaminants from SEAD-71:

- Current site workers, and
- Terrestrial biota on or near the site.

The exposure pathways and media of exposure are described below as they may affect the various receptors.

The numerical assumptions that will be used in the risk assessment for the current uses exposure scenario are listed in Table 4-3 of this Scoping Plan.

Ingestion and Dermal Exposure Due to Surface Water Runoff and Erosion



EXPOSURE ROUTE	RECEPTOR				
	HUMAN			BIOTA	
	FUTURE CONSTRUCTION WORKER	FUTURE TRESPASSER	CURRENT SITE WORKERS	TERRESTRIAL	AQUATIC
INHALATION	●	●	●	●	NA
INGESTION	●	●	●	●	NA
DERMAL CONTACT	●	●	●	●	NA
INGESTION	●	NA	NA	●	NA
DERMAL CONTACT	●	NA	NA	●	NA
INHALATION	NA	NA	NA	NA	NA
INGESTION	NA	NA	NA	NA	NA
DERMAL CONTACT	NA	NA	NA	NA	NA
INGESTION	NA	NA	NA	NA	NA
DERMAL CONTACT	NA	NA	NA	NA	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT
DISPOSAL AREA

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 727651-02007

FIGURE 3-19
EXPOSURE PATHWAY SUMMARY
FOR SEAD-71

SCALE NA

DATE FEBRUARY 1997

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The likelihood of ingestion and dermal exposure to surface water and sediment is low as these media are not well defined on-site. Any surface water run-off from the site is controlled by the gently southwest-sloping topography. Based on the topographic expression on the site, overland flow would likely be directed toward the low area immediately south of the site and occupied by railroad tracks. There are no well defined drainage ditches on the site.

Incidental Soil Ingestion and Dermal Contact

Incidental ingestion of soil is a potential exposure pathway for current site workers and terrestrial biota. Dermal contact with soil is a potential pathway for on-site workers, visitors and terrestrial biota.

Ingestion of Groundwater and Dermal Contact

Ingestion of, inhalation of, and dermal contact with groundwater are not potential exposure pathways for current site workers or terrestrial biota. The groundwater beneath SEAD-71 is not used currently 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 to current site workers or terrestrial biota.

Dust Inhalation and Dermal Contact

Inhalation and dermal contact with impacted dust is a potential exposure pathway for current site workers, visitors, and terrestrial biota.

3.2.2.3 Potential Exposure Pathways and Receptors - Future Uses

The proposed future use of the area that encompasses SEAD-71 is as Plannned Office/Industrial Development. The potential for human exposure is directly affected by the accessiblity to the site and related facilities under this land use.

There are three primary receptor populations for potential releases of chemicals from SEAD-71 and they are as follows:

1. Future construction worker,
2. Future trespasser, and
3. Terrestrial biota and aquatic organisms on or near the site.

For the future construction worker, dermal contact with and ingestion of soils, along with inhalation of particulates in ambient air are considered. For the future child trespasser, the following pathways will be quantified: ingestion and dermal contact with site soils; ingestion and dermal contact with on-site surface water and sediment while wading; and inhalation of particulates in ambient air.

The numerical assumptions that will be used in the risk assessment for the future uses exposure scenario are listed in Table 4-3 of this Scoping Plan.

3.3 SCOPING OF POTENTIAL REMEDIAL ACTION ALTERNATIVES

Remedial action alternatives for each site will be formed during the FS process from the general response actions and process options for each medium or operable unit. Depending on the site, two categories of alternatives will be assembled; the two categories are designated as source control and migration control. A number of remedial action alternatives, which are available for the treatment of soils impacted by semivolatile organics, metals, BTEX, and total petroleum hydrocarbons and explosives at the sites, will be considered during the development of remedial action alternatives. They include the following technologies:

- land treatment
- bioventing
- vapor extraction
- off-site disposal
- soil washing
- low temperature thermal desorption

Remedial action alternatives, which are available for treatment of the TPH and metals-impacted groundwater at the three sites, will be evaluated as remedial action alternatives. They include the following technologies:

- interceptor trench
- filtration
- carbon adsorption
- ion exchange
- reverse osmosis

Also, as required under CERCLA, a “no-action” alternative will also be considered to provide a baseline, or reference, for the other alternatives.

A comprehensive list of remedial response action alternatives are discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.4 PRELIMINARY IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND POTENTIAL SOURCES OF ITEMS “TO BE CONSIDERED” FOR ALTERNATIVES FOR ARARS

3.4.1 Potential ARARs

Identification and refinement of ARARs will be performed during the RI/FS process. As additional data is collected regarding the nature and extent of contamination, site specific conditions, and potential use of various remedial technologies, additional ARARs will be selected and existing ARARs will be reviewed for their applicability. These data will be reported in the SEAD-59 and SEAD-71 RI/FS Report.

A preliminary identification of ARARs has been performed based upon the initial site characterization data compiled by the Army. The following federal and state regulatory requirements are potentially applicable or relevant and appropriate to SEAD-59 and SEAD-71.

SOURCES OF CHEMICAL SPECIFIC ARARS

Federal:

- Resource Conservation and Recovery Act (RCRA), Groundwater Protection Standards and Maximum Concentration Limits (40 CFR 264, Subpart F)
- Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)
- Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-.16)

New York State:

- New York State Codes, Rules and Regulations (NYCRR) Title 6, Chapter X
- New York Groundwater Quality Standards (6 NYCRR 703)
- New York Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (10 NYCRR 5)
- New York Surface Water Quality Standards (6 NYCRR 702)
- New York State Raw Water Quality Standards (10 NYCRR 170.4)
- New York RCRA Groundwater Protection Standards (6 NYCRR 373-2.6 (e))
- New York State Department of Environmental Conservation, Division of Water, Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values, November 15, 1990
- Surface Water and Groundwater Classifications and Standards (6 NYCRR 700-705)
- Declaration of Policy, Article 1 Environmental Conservation Law (ECL)
- General Functions, Powers, Duties and Jurisdiction, Article 3 Environmental Conservation Law, Department of Environmental Conservation

- ECL, Protection of Water, Article 15, Title 5.
- Use and Protection of Waters, (6 NYCRR, Part 608)

SOURCES OF LOCATION SPECIFIC ARARS

Federal:

- Executive Orders on Floodplain Management and Wetlands Protection (CERCLA Floodplain and Wetlands Assessments) #11988 and 11990
- National Historic Preservation Act (16 USC 470) Section 106 et seq. (36 CFR 800) (Requires Federal agencies to identify all affected properties on or eligible for the National Register of Historic Places and consult with the State Historic Preservation Office and Advisory Council on Historic Presentation)
- RCRA Location Requirements for 100-year Floodplains (40 CFR 264.18(b)).
- Clean Water Act, Section 404, and Rivers and Harbor Act, Section 10, Requirements for Dredge and Fill Activities (40 CFR 230)
- Wetlands Construction and Management Procedures (40 CFR 6, Appendix A).
- USDA/SCS - Farmland Protection Policy (7CFR 658)
- USDA Secretary's memorandum No. 1827, Supplement 1, Statement of Prime Farmland, and Forest Land - June 21, 1976.
- EPA Statement of Policy to Protect Environmentally Significant Agricultural Lands - September 8, 178.
- Farmland Protection Policy Act of 1981 (FPPA)(7 USC 4201 et se q).
- Fish and Wildlife Coordination Act (16 USC 661)
- Endangered Species Act (16 USC 1531).
- Wilderness Act (16 USC 1131).

New York State:

- New York State Freshwater Wetlands Law (ECL Article 24, 71 in Title 23).
- New York State Freshwater Wetlands Permit Requirements and Classification (6 NYCRR 663 and 664).

- New York State Floodplain Management Act and Regulations (ECL Article 36 and 6 NYCRR 500).
- Endangered and Threatened Species of Fish and Wildlife Requirements (6 NYCRR 182).
- New York State Flood Hazard Area Construction Standards.

SOURCES OF ACTION SPECIFIC ARARS

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal systems, (i.e., landfill, incinerators, tanks, containers, etc.) (40 CFR 264 and 265); Minimum Technology Requirements.
- RCRA, Subtitle C, Closure and Post-Closure Standards (40 CFR 264, Subpart G).
- RCRA Groundwater Monitoring and Protection Standards (40 CFR, Subpart F).
- RCRA Generator Requirements for Manifesting Waste for Offsite Disposal (40 CFR 262).
- RCRA Transporter Requirements for Off-Site Disposal (40 CFR 263).
- RCRA, Subtitle D, Non-Hazardous Waste Management Standards (40 CFR 257).
- Safe Drinking Water Act, Underground Injection Control Requirements (40 CFR 144 and 146).
- RCRA Land Disposal Restrictions (40 CFR 268) (On and off-site disposal of excavated soil).
- Clean Water Act, - NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125).
- Effluent Guidelines for Organic Chemicals, Plastics and Resins (Discharge Limits) (40 CFR 414).
- Clean Water Act Discharge to Publically - Owned Treatment Works (POTW) (40 CFR 403).
- DOT Rules for Hazardous Materials Transport (49 CFR 107, 171.1-171.500).
- Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904, 1910, 1926).

- SARA (42 USC 9601)
- OSHA (29 CFR 1910.120)
- Clean Air Act (40 CFR 50.61)

<u>New York State:</u>

- New York State Pollution Discharge Elimination System (SPDES) Requirements (Standards for Stormwater Runoff, Surfacewater, and Groundwater discharges (6 NYCRR 750-757).
- New York State RCRA Standards for the Design and Operation of Hazardous Waste Treatment Facilities (i.e., landfills, incinerators, tanks, containers, etc.); Minimum Technology Requirements (6 NYCRR 370-373).
- New York State RCRA Closure and Post-Closure Standards (Clean Closure and Waste-in-Place Closures) (6 NYCRR 372).
- New York State Solid Waste Management Requirements and Siting Restrictions (6 NYCRR 360-361), and revisions/enhancements effective October 9, 1993.
- New York State RCRA Generator and Transporter Requirements for Manifesting Waste for Off-Site Disposal (6 NYCRR 364 and 372).

3.4.2 Potential Sources of Items "To Be Considered" (TBC) as Alternative Sources of ARARs

When ARARs do not exist for a particular chemical or remedial activity or when the existing ARARs are not protective of human health or the environment, other criteria, advisories and guidance may be usefull in designing and selecting a remedial alternative. A preliminary identification of potential sources of items "to be considered" as alternatives for ARARs has been performed based upon the initial site characterization data compiled by the Army. The federal and state TBC for SEAD-59 and SEAD-71 are as follows:

<u>Federal:</u>

- Safe Drinking Water Act National Primary Drinking Water Regulations, Maximum Contaminant Level Goals (MCLGs).
- Proposed Maximum Contaminant Levels (50 <u>Federal</u> <u>Register</u> 46936-47022, November 13, 1985).

- Proposed Maximum Contaminant Levels Goals (50 Federal Register 46936-47022, November 13, 1985).
- Proposed Requirements for Hybrid Closures (combined waste-in-place and clean closures) (52 Federal Register 8711).
- USEPA Drinking Water Health Advisories, long-term only.
- USEPA Health Effect Assessment (HEAs).
- TSCA Health Data.
- Toxicological Profiles, Agency for Toxic Substances and Disease Registry, U.S. Public Health Service.
- Policy for the Development of Water-Quality-Based Permit Limitations for Toxic Pollutants (49 Federal Register 9016).
- Cancer Assessment Group (National Academy of Science) Guidance.
- Groundwater Classification Guidelines.
- Groundwater Protection Strategy.
- Waste Load Allocation Procedures.
- Fish and Wildlife Coordination Act Advisories.
- Federal Guidelines for Specification of Disposal Site for Dredged or Fill Material.
- USEPA Interim Guidance for Establishing Soil Lead Clean Up Levels.
- RCRA Clean-Up Criteria for Soils/Groundwater (RFI Guidance), EPA 530-SW-89-031.

New York State:

- New York State Proposed Safe Drinking Water Standards Maximum Contaminant Levels for VOCs (10 NYCRR 5).
- New York State Underground Injection/Recirculation at Groundwater Remediation Sites (Technical Operating Guidance (TOG) Series 7.1.2).
- New York State Analytical Detectability for Toxic Pollutants (85-W-40 TOG).
- New York State Toxicity Testing for the SPDES Permit Program (TOG 1.3.2).

- New York State Regional Authorization for Temporary Discharges (TOG Series 1.6.1).
- Sediment Criteria - December, 1989 - Used as Guidance by the Bureau of Environmental Protection, Division of Fish and Wildlife, New York State Department of Environmental Conservation.
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Fish and Wildlife Impact Analysis for inactive Hazardous Waste Sites; October 1994.
- New York State Department of Environmental Conservation, Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, TAGM 4046, January 24, 1994 (revised).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Use of Inactive Hazardous Waste Disposal Site Numbers, February 1987, (HWR-4001).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Preparation of Annual "Short List" of Prequalified Consultants, January 1993, (HWR-4002).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Entries to the Quarterly Status Report of Inactive Hazardous Waste Disposal Sites, May 1987, (HWR-4003).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Classifying Inactive Hazardous Waste Disposal Sites, June 1987, (HWR-4004).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Insurance Requirements for Consultant and Construction Contracts and Title 3 Projects, September 1989, (HWR-4005).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Consultant Contract Overhead Rates and Multipliers, April 1988, (HWR-4006).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Generic Workplan, May 1988, (HWR-4007).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Oversight Guidance, November 1990, (HWR-4008).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Team Submissions in Responding to Requests for Proposals and Title 3 Projects, June 1992, (HWR-4009).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Roles and Responsibilities of the NYSDEC Regional Offices, January 1992, (HWR-4010).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contractor/Consultant Oversight Guidance - O&D Memo #88-26, July 1988, (HWR-4011).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Inactive Hazardous Waste Disposal Site Registry Petitions - O&D Memo #88-33, August 1988, (HWR-4012).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Emergency Hazardous Waste Drum Removal/Surficial Cleanup Procedures, January 1995, (HWR-4013).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Protocol Between Division of Hazardous Waste Remediation and Division of Environmental Enforcement, September 1988, (HWR-4014).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Policy Regarding Alteration of Groundwater Samples Collected for Metal Analysis, September 1988,

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Health and Safety Training and Equipment, October 1988, (HWR-4016).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Protocol Between DHWR and DHSR for Determining Lead Program for RCRA/CERCLA Title 13 Sites, November 1988, (HWR-4017).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase I Investigations, November 1988, (HWR-4018).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Oversight Note-Taking, November 1990, (HWR-4019).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Responding to Freedom of Information Law (FOIL) Requests, December 1988, (HWR-4020).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Start/End Definitions for Program Elements Within Funding Sources, March 1991, (HWR-4021).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Records of Decision for Remediation of Class 2 Inactive Hazardous Waste Disposal Sites - O&D Memo #89-05, February 1989, (HWR-4022).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Citizen Participation Plan, February 1989, (HWR-4023).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): NYSDOH Hazardous Waste Site Notification, March 1989, (HWR-4024).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Remedial Investigation/Feasibility Studies, March 1989, (HWR-4025).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Assistance for Contaminated Private and Public Water Supplies, April 1994, (HWR-4027).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Subcontracting under Hazardous Waste Remediation Contracts, April 1989, (HWR-4028).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Roles and Responsibilities of the Technology Section - Site-Specific Projects, April 1990, (HWR-4029).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 1990, (HWR-4030).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites, October 1989, (HWR-4031).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Disposal of Drill Cuttings, November 1989, (HWR-4032).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Inactive Sites Interface with Sanitary Landfills, December 1989, (HWR-4033).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Eligibility Determination for Work Performed Under the EQBA Title 3 Provisions, January 1900, (HWR-4034).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Project Manager and Contract Manager Responsibilities Under Standby Contract, March 1990, (HWR-4034).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Landfill Regulatory Responsibility, March 1990, (HWR-4036).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Major Milestone Dates for Tracking Remedial Projects, April 1990, (HWR-4037).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Remediation of Inactive Hazardous Waste Disposal Sites, April 1990, (HWR-4038).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Appeals, October 1990, (HWR-4039).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Permitting Jurisdiction Over Inactive Hazardous Waste Site Remediation - O&D Memo #94-04, March 1994, (HWR-4040).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Releasing Sampling Data, Findings and Recommendations, February 1991, (HWR-4041).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Interim Remedial Measures, June 1992, (HWR-4042).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Procedures for Handling RPP-Funded PSAs, February 1992, (HWR-4043).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills, March 1992, (HWR-4044).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Enforcement Referrals, July 1992, (HWR-4045).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994, (HWR-4046).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Priority Ranking System for Class 2 Inactive Hazardous Waste Sites, December 1992, (HWR-4047).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Interim Remedial Measures-Procedures, December 1992, (HWR-4048).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Referral of Sites to the Division of Water, December 1992, (HWR-4049).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Payment Review Process, April 1993, (HWR-4050).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Early Design Strategy, August 1993, (HWR-4051).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Administrative Records and Administrative Record File, August 1993, (HWR-4052).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Obtaining Property Access for Investigation, Design, Remediation and Monitoring/Maintenance, September 1993, (HWR-4053).

- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Conceptual Approval Process, November 1994, (HWR-4054).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Final Approval Process, November 1994, (HWR-4055).
- New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Remedial Action by PRPs, April 1995, (HWR-4056).

3.5 DATA QUALITY OBJECTIVES (DQOs)

The RI/FS process requires decisions regarding future site remedial actions, including whether or not any actions are required. These decisions will be based upon the data collected during the RI. Consequently, the collected data must be of sufficient quantity and quality to support this decision-making process. Data Quality Objectives (DQO)s are the portion of the RI/FS which consider issues related to data quality and quantity. As the name implies, DQOs establish objectives and requirements for data collection which, if reasonably met, will assure that the collected data is valid for its intended use.

Since the intended use of the data is to support several decisions for the RI/FS process, the first step in establishing DQOs is to identify these decisions. Once the decisions, which the collected data will support, have been identified, the levels of data quality can be specified. The sampling program and the analytical techniques to be employed must be consistent with the required levels of data quality. For the three sites described in this Scoping Plan these decisions have been identified and include the following:

- Determining the nature and extent of current environmental impacts;
- Monitoring for health and safety;
- Assessing the risk to human health and the environment;
- Selecting appropriate remedial alternatives;
- Designing remedial actions, if necessary;
- Determining background levels of constituents of concern; and
- Determining regulatory compliance with ARARs.

USEPA has indicated that at a minimum, Level 3 quality data should be collected to support many of the decisions to be made at these sites, such as Risk Assessment. However, in order to meet the requirements of New York State, samples for metals in soils/sediments and surface water/groundwater will be collected and analyzed according to NYSDEC CLP protocols and the data reported as Level 4. Specifying Level 4 quality data will assure that the data collected in this program is of sufficient quality for the intended use.

Level 4 data will be generated by analyses performed in the Contract laboratory Program (CLP). Routine Analytical Services (RAS) will be performed according to methods established by the USEPA and the CLP Statement of Work (SOW). The New York State Department of Environmental Conservation (NYSDEC) has also established CLP Protocols for routine analyses with requirements that are considered equivalent to the USEPA requirements for Level 4 data. Level 4 analyses are characterized by rigorous QA/QC requirements defined in the SOW. The data package submittal from the laboratory contains all the raw data generated in the analyses, including mass spectral identification charts, mass spectral tuning data, spike recoveries laboratory duplicate results, method blank results, instrument calibration, and holding times documentation.

Level 1 data, defined as field screening data, will be collected during soil boring operations. Precision and accuracy for Level 1 data has not been established by USEPA. The intended use of this information is for health and safety monitoring and to assist in the optimization of sampling locations. Data can be generated regarding the presence or absence of certain contaminants (especially volatile organic compounds, VOCs), at sampling locations. For these sites, the soils obtained from the split-spoon sampler will be screened for the presence of volatile organics using a hand-held instrument equipped with a Photoionization Detector (PID). The occurrence of high readings, above normal background levels, from a sampling location will provide a qualitative indication that volatiles are present and, therefore, samples collected from this location should be subjected to more rigorous analytical techniques.

Level 2 data will be collected during the surface soil screening program at SEAD-5. Level 2 data will include field analyses which require the use of portable analytical instruments at the site without the extensive QA/QC of the higher level of data quality. Depending upon the types of contaminants, sample matrices, and personnel skills, reliable qualitative and quantitative data can be obtained.

Further discussion of the DQOs as they pertain to SEDA is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.6 DATA GAPS AND DATA NEEDS

3.6.1 SEAD-59

The ESI at SEAD-59 was conducted to gain a preliminary understanding of the nature and extent of contamination. The data collected as part of the ESI were used to evaluate the potential for risks to human health and the environment. A conceptual site model was developed identifying potential source area release mechanisms and receptor pathways. The results of the investigations at SEAD-59 were used to determine additional data requirements for a complete evaluation of risks to human health and the environment, compliance with ARARs and the development of preliminary remedial action alternatives.

The data needs for SEAD-59 are a direct result of the need to meet the DQOs identified in the Generic Installation RI/FS Workplan. By media, these data needs are:

Soil Data

- Obtain additional geophysical data to evaluate the potential for occurrences of buried waste materials in the northeast portion of the site and east and south of the site,

- Establish the level of contamination in surface soils,
- Obtain additional soil samples from the fill area to evaluate whether the waste has impacted the soil quality,
- Excavate test pits to investigate all the geophysical anomalies detected in the ESI and any additional anomalies detected from the geophysical investigations completed as part of this RI/FS study,
- Determine the thickness and extent of the waste material in the SEAD-59 area using test pits and soil borings. Collect soil samples and analyze them for general chemical and physical parameters for the risk assessment and for the evaluation of remedial action alternatives,

- Conduct a soil gas survey on a 50 by 25 foot grid over the site to evaluate the potential for VOC emissions from the waste material,
- Establish a database to determine compliance with ARARs, to perform a baseline risk assessment and to develop remedial action alternatives, and
- Compare SEAD-59 data to site-wide soil background data that has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs and RIs performed at the OB Grounds and the Ash Landfill.

Groundwater Data

- Determine the hydraulic conductivity of the aquifer to assess the potential for contaminant migration and to select potential remedial action alternatives,
- Install 4 additional monitoring wells to further characterize the groundwater on-site,
- Analyze groundwater samples for general chemical parameters to evaluate potential remedial actions,
- Determine whether contaminants are present in the groundwater downgradient of the disposal areas identified in the ESI,
- Determine the background groundwater quality at SEAD-59 to allow comparison to other SEAD-59 groundwater data, and
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Surface Water/Sediment Data

- Define the hydrology of the site by determining the location of all drainage ditches and the direction of flow in the channels,
- Evaluate whether surface water runoff transports PAHs and metals present in the surface soils to the drainage swales,
- Determine background surface water and sediment quality by obtaining samples of surface water and sediment in the drainage ditches upstream of the site,
- Analyze surface water and sediment samples for general chemical parameters to evaluate potential remedial alternatives, and
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Ecological Data

- Conduct an ecological assessment to systematically document visual observations discriminating between obviously and potentially impacted and non-impacted areas, and
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

3.6.2 SEAD-71

Investigations conducted during the ESI at SEAD-71 were conducted to gain a preliminary understanding of the nature and extent of contamination. These data were to be used to evaluate the potential for risks to human health and the environment. A conceptual site model was also developed identifying potential source area release mechanisms and receptor pathways. The results of the investigations at SEAD-71 were used to refine the conceptual site model and determine additional data requirements for a complete evaluation of risks to human health and the environment, compliance with ARARs and the development of preliminary remedial action alternatives.

The data needs for SEAD-71 are a direct result of the need to meet the DQOs identified in the Generic Installation RI/FS Workplan. By media, these data needs are:

Soil Data

- Obtain additional geophysical data to evaluate the potential for occurences of the buried waste materials within the storage areas on the eastern half of the site,
- Establish the level of contamination in surface soils,
- Obtain additional soil samples from the fill area to evaluate whether the waste has impacted the soil quality,
- Excavate test pits to investigate all the geophysical anomalies detected in the ESI and any additional anomalies detected from the geophysical investigations completed as part of this RI/FS study,
- Determine the thickness and extent of the waste material in the SEAD-71 area using test pits and soil borings. Collect soil samples and analyze them for general chemical and physical parameters for the risk assessment and for the evaluation of remedial action alternatives,
- Establish database to determine compliance with ARARs, to perform a baseline risk assessment and to develop remedial action alternatives, and
- Compare SEAD-71 data to site-wide soil background data that has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs and RIs performed at the OB Grounds and the Ash Landfill.

Groundwater Data

- Determine the hydraulic conductivity of the aquifer to assess the potential for contaminant migration and to select potential remedial action alternatives,
- Install 2 additional monitoring wells to further characterize the groundwater on-site,

- Analyze groundwater samples for general chemical parameters to evaluate potential remedial actions,
- Determine whether contaminants are present in the groundwater downgradient of the disposal areas identified in the ESI,
- Determine the background groundwater quality at SEAD-71 to allow comparison to other SEAD-71 groundwater data, and
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Ecological Data

- Conduct an ecological assessment to systematically document visual observations discriminating between obviously and potentially impacted and non-impacted areas, and
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

4.0 TASK PLAN FOR THE REMEDIAL INVESTIGATION (RI)

This section describes the tasks required for completion of the Remedial Investigation (RI) at SEAD-59 and SEAD-71. These include the following:

- Pre-field Activities,
- Field Investigations,
- Data Reduction, Interpretation and Assessment,
- Data Reporting,
- Task Plan Summary.

4.1 PRE-FIELD ACTIVITIES

The pre-field activities include the following:

- A comprehensive review of the Health & Safety Plan with field team members to ensure that site hazards and preventive and protective measures are completely understood.
- Inspection and calibration of all equipment necessary for field activities to ensure proper functioning and usage.
- A comprehensive review of sampling and work procedures with field team members.
- Site clearance particularly in the northeastern portion of SEAD-59 where equipment is stored.
- Site clearance of the fenced storage area in the eastern portion of SEAD-71, which was investigated in the ESI, and the fenced storage area located immediately north.

4.2 FIELD INVESTIGATIONS AT SEAD-59

The following field investigations will be performed to complete the RI at SEAD-59:

- Geophysical Investigation,
- Soil Investigation (soil gas survey, test pits, soil borings),
- Surface Water and Sediment Investigation,
- Groundwater Investigation (overburden wells),
- Air Monitoring,
- Ecological Investigation,
- Surveying

These investigations are described in the following sections.

4.2.1 Geophysical Investigation

Electromagnetic (EM-31) and Ground Penetrating Radar (GPR) surveys will be performed at SEAD-59 in areas which were not accessible during the ESI and in extended areas adjacent to SEAD-59. The initial geophysical investigation will be an EM-31 survey performed on a 10 by 10 foot grid throughout the areas shown on Figure 4-1. The objective of the EM-31 survey will be to identify locations where metallic objects may be buried within the subsurface in two areas in the northeastern corner of the site, and to investigate areas in the southern and eastern portions of the site (including portions of SEAD-5. Upon completion of the EM-31 survey, contour maps of the in-phase and quadrature components of the electromagnetic field will be generated to aid in identifying the locations of possible buried metallic objects within the subsurface.

Subsequent to the EM-31 survey, a GPR survey will be performed. GPR data will be collected over each distinct EM-31 anomaly in order to provide a better characterization of the suspected anomaly source.

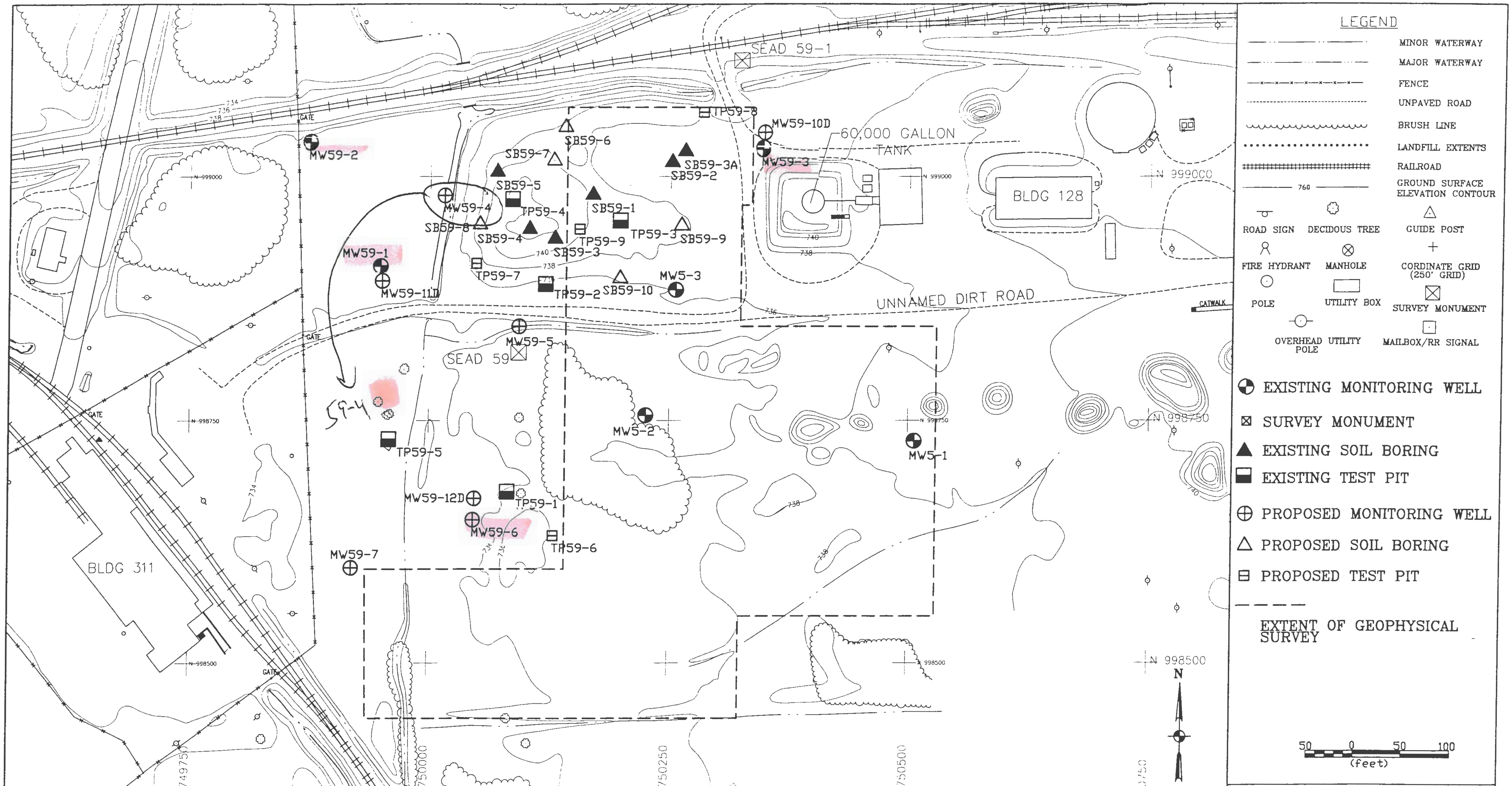
4.2.2 Soil Gas Survey

A soil gas survey will be performed at SEAD-59 to approximately locate the extent of VOCs in the waste material and soil. Soil gas samples will be collected on a 50 by 25 foot grid within the extent of the fill area, disposal pit area, and extended areas to the east and south of the site boundary. The extent of the soil gas survey is shown in Figure 4-2. Sample probes will be driven into the vadose zone at 25 foot intervals along lines spaced 50 feet apart. The soil vapor will be extracted from the probe and collected directly into a syringe. The soil gas samples will then be analyzed for VOCs in the field using a Photovac 1050S portable gas chromatograph. A map will be developed showing the concentrations of VOCs in the soil gas. The soil gas survey procedures are described in Section 3.8 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

From the soil gas survey results, five soil borings will be performed, located at the five survey points that yield the highest VOC concentrations. Three samples will be taken from each of the five borings, for a total of fifteen samples. Drilling procedures are outlined in Section 3.4 of Appendix A, Field Sampling and Analysis Plan, in the Generic Installation RI/FS Work Plan.

4.2.3 Soil Investigation

The soil investigation program will consist of collecting both surface and subsurface soil samples from soil borings and test pit excavations in the fill area and disposal pit area. Nine (9) soil borings and nine (9) test pit excavations will be performed at SEAD-59.



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NOTES:

1. Soil borings SB59-11, SB59-12,SB59-13, SB59-14, and SB59-15 will be located based upon the results of the soil gas survey.

2. Two (2) wells (MW59-8 and MW59-9) will be located based upon the results of the EM-31 and GPR geophysical surveys, and the soil gas survey.

3. Nine (9) test pits (TP59-10 through TP59-18) will be excavated in locations chosen after review of the geophsyical surveys and the soil gas survey.

PARSONS

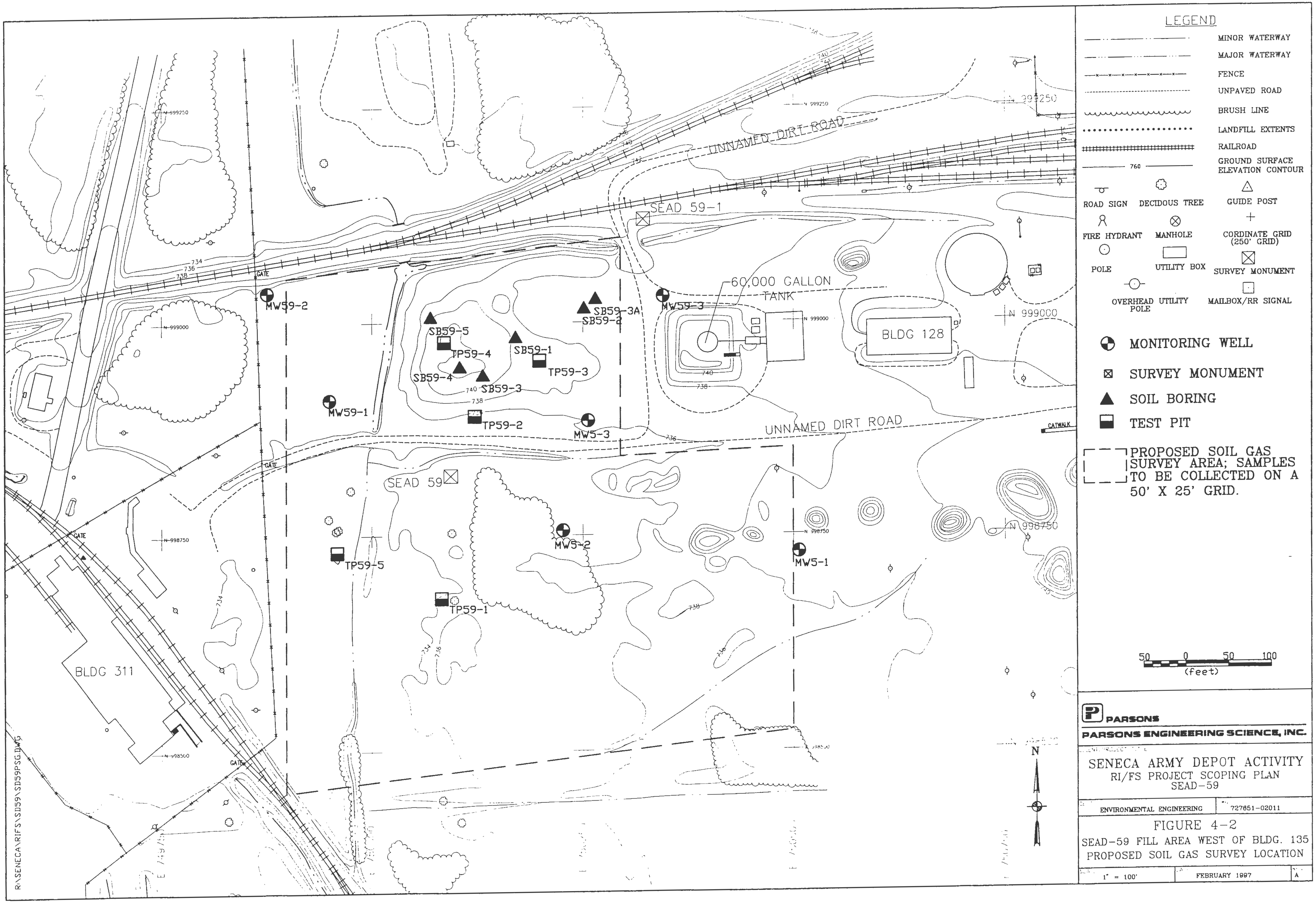
PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

ENVIRONMENTAL ENGINEERING	727651-02011

FIGURE 4-1
LOCATION OF EXISTING AND PROPOSED SAMPLING POINTS

1" = 100'	JANUARY 1996	A



PARSONS

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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-59

ENVIRONMENTAL ENGINEERING	727651-02011

FIGURE 4-2
SEAD-59 FILL AREA WEST OF BLDG. 135
PROPOSED SOIL GAS SURVEY LOCATION

1" = 100'	FEBRUARY 1997	A

4.2.3.1 Soil Boring Program

A total of 14 soil borings will be performed, four of which will be completed as monitoring wells. The 14 locations are shown in Figure 4-1 (9 of the locations are shown in definitive locations on the map and 5 are descretionary as explained in the "Note" on the map). The purpose of the soil borings will be to determine the thickness of the waste material, observe subsurface soils, measure the depth to bedrock, and obtain samples of the waste and underlying soil for chemical analysis. These data will also be used to assess the potential for contaminant migration to groundwater as part of the groundwater receptor pathway.

The four soil borings that will be completed as wells are as follows. Two soil borings (MW59-4 and MW59-5) will be drilled at locations west and south, respectively, of the fill area, and they will be completed as overburden monitoring wells. One soil boring (MW59-6) will be drilled in the disposal pit area south of the access road, and it will be completed as an overburden monitoring well. Another soil boring (MW59-7) will be drilled in a locations that is downgradient of TP59-1, and it will be completed as an overburden monitoring well.

Five soil borings (SB59-6, SB59-7, SB59-8, SB59-9, and SB59-10) will be drilled at locations within the fill area north of the access road (Figure 4-1). The five descretionary soil borings (SB59-11, SB59-12, SB59-13, SB59-14 and SB59-15) will be performed in locations defined by the results of the soil gas survey.

Soil borings will be performed by the continuous split-spoon method. Samples will be collected every two feet from the ground surface to the bottom of the boring. At each boring location a 0-2" surface soil sample will be collected and submitted for chemical testing. Two subsurface soil samples will also be collected from each soil boring to be submitted for chemical testing. The criteria for the selection of the subsurface soil samples submitted to the lab for chemical testing is provided in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan. Each soil boring will be drilled until split-spoon refusal is encountered. Auger refusal for this project is defined in Appendix A, Field Sampling and Analysis Plan.

In addition, soil samples will be collected for limited chemical testing and physical testing at 2 boring locations. One location will be in the area north of the access road and the second location in the area south of the road. At each of the two locations, 3 soil samples (one near the surface, one immediately below the water table and an intermediate sample) will be collected.

4.2.3.2 Test Pitting Program

A total of 13 test pits will be excavated at SEAD-59. The locations of these test pits are shown in Figure 4-1 (4 of the locations are shown in definitive locations on the map and 9 are descretionary as explained in the "Note" on the map). The test pits will be excavated within the fill area, disposal pit area, and adjacent areas to the east and south so that a visual evaluation of the subsurface soils and fill materials can be made, and also for the purpose of collecting soil samples for chemical testing. Test pits will be dug to the bottom of the fill layer. The bedrock surface (if encountered) and bottom of fill layer will be documented at each test pit location. Two (2) soil samples will be collected from each test pit. The samples will be collected from the surface (0-2") and at depth where there is evidence of impacts based upon field screening and visual observations. If no impacts are evident in the test pit, the subsurface sample will be collected from the mid-depth of the wall of the excavation.

Test pits TP59-6, TP59-7, TP59-8 and TP59-9 will be located in areas of geophysical anomalies identified during the ESI performed at SEAD-59. Nine additional descretionary test pits (TP59-10 through TP59-18) will be located based upon geophysical anomalies identified during the geophysical investigation to be performed for this RI/FS investigation.

All personnel performing the test pit operation will be wearing Level B equipment to avoid possible exposure. The excavated soils will be monitored for VOCs during test pitting. Test pitting procedures are provided in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

4.2.3.3 Soil Sampling Summary

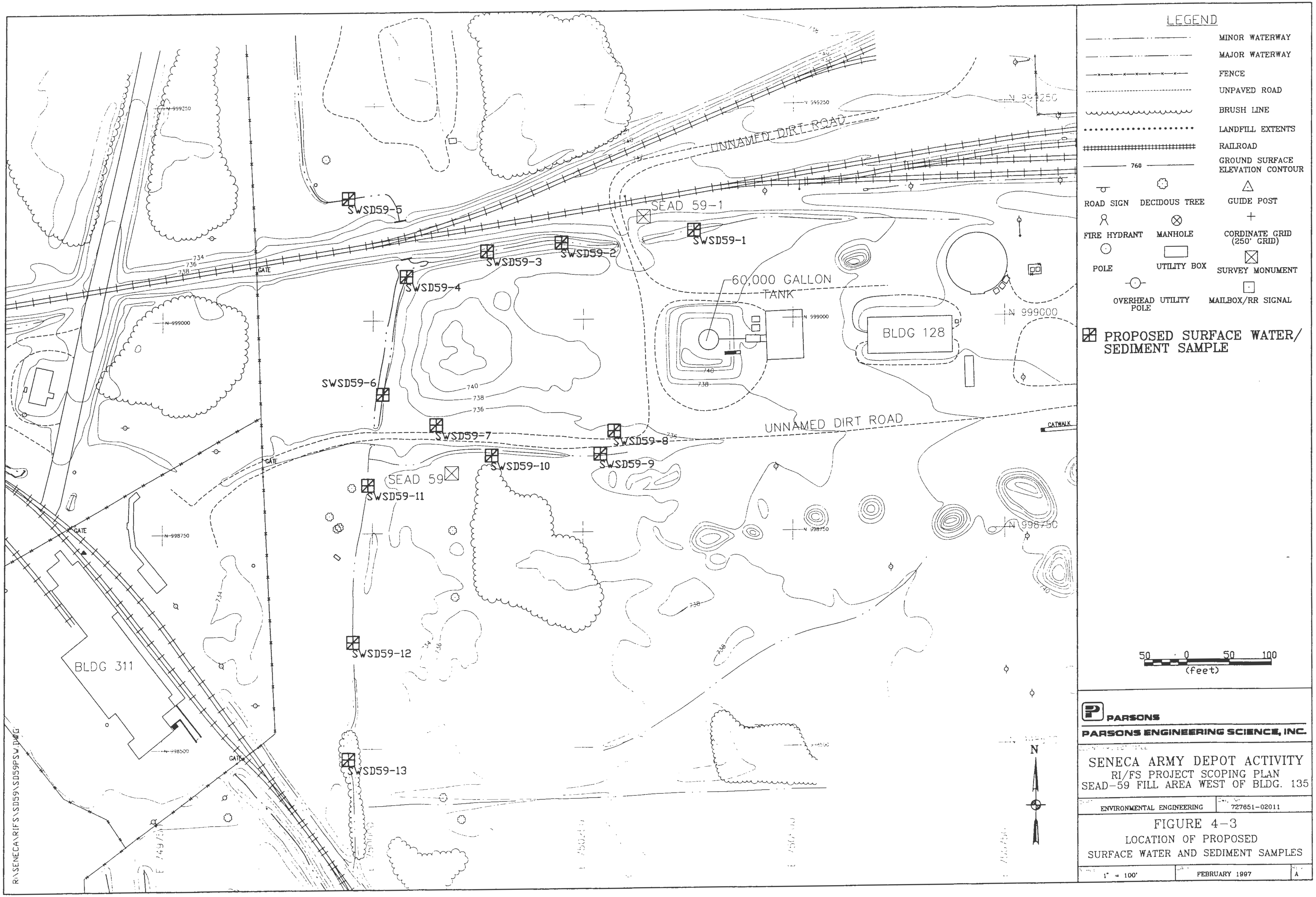
One (1) surface soil sample and 2 subsurface soil samples will be collected from each of the 14 soil borings. Two (2) soil samples will be collected from each of the 13 test pits. In total, the soil sampling program will consist of 27 surface soil samples and 41 subsurface soil samples from the 14 soil borings and 13 test pits. In total, 68 soil samples will be collected for chemical testing.

In addition, six (6) subsurface soil samples will be collected from two soil borings for physical testing and limited chemical testing. The soil samples will be tested according to the analyses specified in section 4.3.8, Analytical Program.

4.2.4 Surface Water and Sediment Investigation

Surface water and sediment sampling will be conducted in areas of SEAD-59 which have the potential for acting as an exposure pathway or for off-site transport of site chemicals.

Potential on-site surface water areas include small drainage swales on the northern, western, and southern sides of SEAD-59. A total of 13 surface water and sediment samples will be collected for this program. Eleven (11) surface water and sediment samples will be collected at the on-site locations shown on Figure 4-3 (the samples will be collected at these locations when surface water is present, such as during/after a storm event). And, two (2) surface water and sediment samples will be collected at off-site locations, one within the drainage swale south of the site and the second in the drainage swale flowing north and under the railroad tracks (Figure 4-3). The sediment samples, and by association the surface water samples, will be collected from depositional areas



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RI/FS PROJECT SCOPING PLAN
SEAD-59 FILL AREA WEST OF BLDG. 135

ENVIRONMENTAL ENGINEERING
727651-02011

FIGURE 4-3
LOCATION OF PROPOSED
SURFACE WATER AND SEDIMENT SAMPLES

1" = 100'
FEBRUARY 1997
A

that are identified near the proposed sample locations. The surface water and sediment will be tested according to the analyses described in Section 4.3.8, Analytical Program.

These data will be used to determine if there is a surface water or sediment exposure pathway at SEAD-59. If concentrations exceeding applicable guidelines are present, the data will be used to perform a baseline risk assessment for this exposure pathway. The surface water and sediment sampling procedures are described in Section 3.7 of Appendix A, Field Sample and Analysis in the Generic Installation RI/FS Work Plan.

4.2.5 <u>Groundwater Investigation</u>

4.2.5.1 Monitoring Well Installation and Sampling

Three groundwater monitoring wells were installed as part of the ESI completed at SEAD-59. Based upon water level measurements the groundwater flow direction was determined to be to the southwest. Groundwater samples from the ESI contained five metals (aluminum, iron, manganese, sodium, and thallium) at concentrations exceeding state or federal drinking water criteria. However, the vertical and lateral extents of potential contaminant migration from the fill area and disposal pit area has not been fully characterized.

The goals of the groundwater investigation during the RI are to verify previous sampling data, determine the extent of groundwater contamination, gather additional potentiometric data to confirm the groundwater flow direction, determine background groundwater quality, and determine the hydraulic conductivity of the aquifer.

For this RI program, a total of 9 new wells will be installed, which includes 6 overburden wells and 3 shallow bedrock wells. The 6 additional overburden monitoring wells will be installed at the approximate locations shown in Figure 4-1. Four (4) of the wells (MW59-4 through MW59-7) have definitive locations, and the locations of the remaining 2 (MW59-8 and MW59-9) wells are discretionary and to be based on the results of the geophysics and soil gas surveys. The 6 overburden wells will be continuously sampled to competent bedrock. A monitoring well will then be installed and screened in the saturated overburden overlying the bedrock. The 3 bedrock wells will be installed at the locations indicated in Figure 4-1 to investigate the potential for vertical migration of chemicals in groundwater. One bedrock well, MW59-10D, is a background location and it will be installed adjacent to the existing background well. The other two bedrock wells (MW59-11D and MW59-12D) will be installed at downgradient locations

Groundwater sampling will be performed at 15 well locations on the site. The sampling program will include 12 wells from SEAD-59 and also 3 wells from SEAD-5 (MW5-1, MW5-2, and MW5-3) because these latter wells overlap onto the SEAD-59 site, based on the area being investigated under this RI program. Therefore, groundwater from the 15 existing and new monitoring wells will be sampled twice and analyzed for the parameters listed in Section 4.3.8. The second round of sampling will occur approximately three months after the first round of sampling. The wells will be sampled using the latest version of the EPA groundwater sampling procedure, which is a low-flow pump purging and sampling methods.

Monitoring well installation, development, and sampling procedures are described in Appendix A, Field Sampling and Analysis Plan. All wells will be properly developed prior to sampling.

4.2.5.2 Aquifer Testing

Three rounds of water level measurements will be performed at the 15 wells on both SEAD-59 and SEAD-5. One measurement will take place before well development and the measurement will be used for well development calculations. The remaining two rounds of measurements will be performed before both rounds of groundwater sampling and will be used to construct a groundwater elevation contour map and evaluate seasonal changes in the groundwater flow direction. The latter two rounds of water levels will be made to coincide with water levels taken at SEAD-71, so that a more complete "snap-shot" of the water table can be constructed from the data.

Slug testing will be performed on the 15 wells at SEAD-59 (and SEAD-5) and used to estimate the hydraulic conductivity of the overburden and bedrock aquifers. Also, vertical connection testing will be performed at the three overburden/bedrock well pairs. Procedures for water level measurements, slug testing, and vertical connection testing are outlined in Section 3.11 of Appendix A, Field Sampling and Analysis Plan, in the Generic Installation RI/FS Work Plan.

4.2.6 Air Monitoring with a Flux Chamber

Air monitoring with a flux chamber at SEAD-59 will be performed to document ambient levels and emission rates from the site. These data will be used to evaluate this exposure pathway during the risk assessment.

The approach to documenting the ambient levels and emissions rate consists of first identifying the substances of concern and then specifying sufficient numbers, locations,and durations of monitoring. At SEAD-59, volatile organic compounds (VOCs) emitted from the surface will be sampled by the emission isolation flux chamber technique. The three (3) areas of the site with the highest concentrations of soil gases, based upon results from the soil gas survey, will be monitored.

The flux chamber technique employs an enclosed device (flux chamber) to sample the gaseous emissions from a known surface area defined by the cross sectional area of the flux chamber. The flux chamber is essentially a stainless steel tube. A flat plexiglass lid is attached to one end of the tube and an airtight seal is achieved with a neoprene gasket. A sheet of teflon is placed on the underside of the lid between the lid and the inside of the flux chamber to prevent any outgasing from the plexi-glass and contaminating the samples. The remainder of the inside of the flux chamber is stainless steel which is inert and poses no contamination threat to the samples. The bottom edge of the flux chamber has a saw-tooth edge to facilitate the "digging in" of the flux chamber into the surface of the fill area and disposal pit area. The chamber is buried into the ground approximately one to two inches so that surface emissions inside the chamber do not leak out from underneath the chamber. The chamber sides are equipped with numerous stainless steel ports which allow access for sampling instrumentation and input of calibration gases, and can easily be capped off to prevent contamination. A small metal fan in the center of the lid is used to enhance the mixing of the surface emissions and the sweep air inside the chamber.

Clean, dry, sweep air is added to the chamber at a fixed, controlled rate. The volumetric flow rate of sweep air through the chamber is recorded and after the chamber has equilibrated a known sample volume is extracted from the chamber through volatile organic sampling train (VOST) tubes. The VOST tubes contain a Tenax resin and activated charcoal which strip the sample air of the target VOC species. The tubes are then analyzed for the target species by gas chromatograph/mass spectrometry (GC/MS).

Sampling procedures for the flux chamber air sampling are provided in Appendix A, Field Sampling and Analysis Plan.

4.2.7 Ecological Investigation

The following procedure for the ecological investigation was developed from the New York State Department of Environmental Conservation (NYSDEC) Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). The investigation also considers USEPA guidance regarding ecological risk assessment, including EPA's draft *Ecological Risk Assessment for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1994) and *Proposed Guidelines for Ecological Risk Assessment* (EPA 1996). The purpose of the ecological investigation is to determine if aquatic and terrestrial resources have been affected by a release of contaminants from the site. The investigation will be completed in two parts. The first part will be the site description, which will involve the accumulation of data describing the physical characteristics of the site, as well as the identification of aquatic and terrestrial resources present or expected to be present at the site. The second part will be the contaminant-specific impact analysis, which involves the determination of whether the identified aquatic and terrestrial resources have been impacted by contaminants that have been released at the site. The second part of the ecological investigation is dependent upon the chemical analysis data obtained for the RI.

4.2.7.1 Site Description

The purpose of the site description is to determine whether aquatic and terrestrial resources are present at the site. The information to be gathered includes site maps, descriptions of aquatic and terrestrial resources at the site, the assessment of the value of the aquatic and terrestrial resources, and the appropriate contaminant-specific and site-specific regulatory criteria applicable to the remediation of the identified aquatic and terrestrial resources.

A topographic map showing the site and documented aquatic and terrestrial resources within a two mile radius from the site will be obtained. The aquatic and terrestrial resources of concern are Significant Habitats as defined by the New York State Natural Heritage Program; sources of this information are indicated in parentheses. These include the following: habitats supporting endangered, threatened or rare species or species of concern (letter from the United States Dept. of Interior Fish and Wildlife Service dated June 21, 1994); regulated wetlands (National Wetlands Inventory (NWI) maps of the Dresden, Geneva Smith, Ovid and Romulus quadrangles, and New York State Regulated Wetland maps for the same quadrangles); wild and scenic rivers; significant coastal zones (Federal Emergency Management Agency Flood Insurance Rate Maps (FIRM), Town of Varick, New York Seneca County Community-Panel Number 3607580010B, December 17, 1987); streams (United States Geological Survey Qqadrangles Romulus, Ovid, Dresden and Geneva South 7.5 minute quadrangles); lakes (United States Geological Survey Qqadrangles Romulus, Ovid, Dresden and Geneva South 7.5 minute quadrangles); and other major resources. Two additional sources of information are 1) NYSDEC Region 8 at 6274 Past Avalon-Lima Road in Avon, NY (716)225-2466 and 2) NYSDEC Wildlife Resources Center - Information Service, New York Heritage Program at 700 Troy-Schenectady Road in Latham, NY (518)783-3932.

A map showing the major vegetative communities within a half mile radius of the site will be developed. The major vegetative communities will include wetlands, aquatic habitats, NYSDEC Significant Habitats, and areas of special concern. These covertypes will be identified using the NYSDEC Natural Heritage Program descriptions and classifications of natural communities.

To describe the covertypes at the site, the abundance, distribution, and density of the typical vegetative species will be identified. To describe the aquatic habitats at the site, the abundance and distribution of aquatic vegetation will be identified. The physical characteristics of the aquatic habitats will also be described and will include parameters such as the water chemistry, water temperature, dissolved oxygen content, depth, sediment chemistry, discharge, flow rate, gradient, stream-bed morphology, and stream classification.

The aquatic and terrestrial species that are expected to be associated with each covertype and aquatic habitat will be determined. In particular, endangered, threatened and rare species, as well as species of concern, will be identified. Alterations in biota, such as reduced vegetation growth or quality will be described. Alterations in, or absence of, the expected distribution or assemblages of wildlife will be described.

A qualitative assessment will be conducted evaluating the ability of the area within a half mile of the site to provide a habitat for aquatic and terrestrial species. The factors that will be considered will include the species' food requirements and the seasonal cover, bedding sites, breeding sites and roosting sites that the habitats provide.

The current and potential human use of the aquatic and terrestrial resources of the site and the area within a half mile of the site will be assessed. In addition to assessing this area, documented resources within two miles of the site and downstream of the site that are potentially affected by contaminants will also be assessed. Human use of the resources that will be considered will be activities such as hunting, fishing, wildlife observation, scientific studies, agriculture, forestry, and other recreational and economic activities. The appropriate regulatory criteria will be identified for the remediation of aquatic and terrestrial resources and will include both site-specific and contaminant-specific criteria.

4.2.7.2 Contaminant-Specific Impact Analysis

Information from the site description developed in Section 4.3.7.1 and from the characterization of the contaminants at the site developed from the results of the RI will be used to assess the impacts of contaminants on aquatic and terrestrial resources. The impact analysis will involve three steps, each using progressively more specific information and fewer conservative assumptions and will depend upon the conclusion reached at the previous step regarding the degree of impact. If minimal impact can be demonstrated at a specific step, additional steps will not be conducted.

Pathway Analysis

A pathway analysis will be performed identifying aquatic and terrestrial resources, contaminants of concern and potential pathways of contaminant migration and exposure. After performing the pathway analysis, if no significant resources or potential pathways are present, or if results from field studies show that contaminants have not migrated to a resource along a potential pathway, the impact on aquatic and terrestrial resources will be considered to be minimal and additional impact analyses will not be performed.

Criteria-Specific Analysis

Presuming that the presence of contaminated resources and pathways of migration of site-related contaminants has been established, the contaminant levels identified in the field investigation will be compared with available numerical criteria or criteria developed according to methods established as part of the criteria. If contaminant levels are below criteria, the impact on resources will be considered to be minimal and additional impact analyses will not be performed. If numerical criteria are exceeded or if they do not exist and cannot be developed, an analysis of the toxicological effects will be performed.

Analysis of Toxicological Effects

The analysis of toxicological effects is based on the assumption that the presence of contaminated resources and pathways of migration of site-related contaminants has been established. The purpose of the analysis of toxicological effects is to assess the degree to which contaminants have affected the productivity of a population, a community, or an ecosystem and the diversity of species assemblages, species communities or an entire ecosystem through direct toxicological and indirect ecological effects.

A number of approaches are available to conduct an analysis of toxicological effects. One or more of the four following approaches will be used to assess the toxicological effects.

> **Indicator Species Analysis**–A toxicological analysis for a indicator species will be used if the ecology of the resource and the exposure scenarios are simple. This approach assumes that exposure to contaminants is continuous throughout the entire life cycle and does not vary among individuals.
>
> **Population Analysis**–A population level analysis is relevant to and will be used for the evaluation of chronic toxicological effects of contaminants to an entire population or to the acute toxicological effect of contaminant exposure limited to specific classes of organisms within a population.
>
> **Community Analysis**– A community with highly interdependent species including highly specialized predators, highly competitive species, or communities whose composition and diversity is dependent on a key-stone species, will be analyzed for alternations in diversity due to contaminant exposure.
>
> **Ecosystem Analysis**–If contaminants are expected to uniformly affect physiological processes that are associated with energy transformation within a specific trophic level, an analysis of the effects of contaminant exposure on trophic structure and trophic function within an ecosystem will be performed. Bioconcentration, bioaccumulation, biomagnification, etc., are concepts that may be used to evaluate the potential effects of contaminant transfer on trophic dynamics.

EPA's draft *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1994) states that the selection of assessment endpoints, which represent environmental values to be protected and generally refer to characteristics of populations and ecosystems, depends on the following:

1. The constituents present and their concentrations,
2. Mechanisms of toxicity to different groups of organisms,
3. Potential species present, and
4. Potential complete exposure pathways.

To assess whether significant adverse ecological effects have occurred or may occur at the site as a results of ecological receptor's exposure to chemical of potential concern (COPC), ecological endpoints will be selected. An ecological endpoint is a characteristic of an ecological component that may be affected by exposure to a stressor, such as a chemical.

Given the diversity of the biological world and the multiple values placed on it by society, there is no universally-applicable list of assessment endpoints. Therefore, EPA, in the Proposed Guidelines for Ecological Risk Assessment (EPA, 1996) has suggested three criteria that should be considered in selecting assessment endpoints suitable for a specific ecological risk assessment. There criteria are: ecological relevance, susceptibility to the contaminant(s), and representation of management goals.

The protocols and procedures for conducting the ecological investigation are discussed in detail in the Generic Installation RI/FS Work Plan that serves as a supplement to this RI/FS Project Scoping Plan.

4.2.8 Analytical Program

A total of 68 soil samples, 15 groundwater samples (30 including both rounds 1 and 2 of groundwater sampling), and 13 surface water and sediment samples will be collected from SEAD-59 for chemical testing. Analyses for all of the media to be sampled are summarized in Table 4-1. All of these samples will be analyzed for the following: Target Compound List (TCL) VOCs (EPA Method 524.2 for groundwater samples only), semivolatile organic compounds (SVOCs), TCL pesticides/PCBs, Target Analyte List (TAL) metals and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Statement of Work (SOW), total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1, and nitrate-nitrogen by EPA Method 352.1. Additional analyses to be performed on specific media are provided below.

Six (6) of the subsurface soil samples collected from two soil borings, will also be analyzed for limited chemical testing and physical testing including Total Organic Carbon (TOC) by EPA Method 415.1, grain size distribution (including the distribution within the silt and clay size fraction), Cation Exchange Capacity (CEC), pH, and density.

The 15 groundwater samples will be analyzed in the field for pH, temperature, specific conductivity, dissolved oxygen, turbidity and oxidation-reduction potential. The following analyses will be performed by the laboratory: alkalinity, sulfate, sulfide, nitrate, TOC, biological oxygen demand (BOD), hardness, total dissolved solids (TDS), and chemical oxygen demand (COD).

The 13 surface water samples will be analyzed in the field for pH, temperature, specific conductivity, and dissolved oxygen (DO) and turbidity. The following analyses will be performed by the laboratory: total suspended solids (TSS), total dissolved solids (TDS), alkalinity, hardness, ammonia, nitrate/nitrite, phosphate, and TOC.

Table 4-1

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-59

	VOCs		SVOCs	Pest/Pcbs	Metals	TPH	Nitrate-N03	Grain Size*	pH	Hardness	TSS	TDS	Alkalinity	Sulfate	Sulfide	BOD	COD	Ammonia	Phosphate	Cat Ex Cap.	Density	TOC
	NYSDEC	EPA	NYSDEC	NYSDEC	NYSDEC	EPA	EPA	ASTM	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	COE	EPA
	TCL	Method	TCL	TCL	TAL	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method
MEDIA	CLP	524.2 rev.2 (1992)	CLP	CLP	CLP	418.1	353.2	D:422-63	150.1/ 9045#	130.2	160.2	160.1	310.1/310.2	375.2	376.2	405.1	410.1	350.1/350.2	365.2	9081	1110	415.1/ Llyod Kahn^
Soil Surface	27	0	27	27	27	27	27@	2	2	0	0	0	0	0	0	0	0	0	0	2	2	2
Subsurface	41	0	41	41	41	41	41@	4	4	0	0	0	0	0	0	0	0	0	0	4	4	4
Groundwater	0	15	15	15	15	15	15	0	0	15	0	15	15	15	15	15	15	0	0	0	0	15
Surface water	13	0	13	13	13	13	13	0	13	13	13	13	13	0	0	0	0	13	13	0	0	13
Sediment	13	0	13	13	13	13	13@	13	13	0	0	0	0	0	0	0	0	0	0	13	0	13
Air (flux chamber)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

1) * Grain size analysis includes determination of the grain size distribution within the silt and clay size fraction.
2) @ The method for soil samples will be modified. For soils, a known quantity of soil will be mixed with known volume of water, stirred, and filtered to form an aqueous extract.
3) # Method 9045 will be used for soil samples. Method 150.1 will be used for water samples.
4) ^ Method 415.1 will be used for water and the Llyod Kahn Method will be used for soils.
5) QA/QC samples are not included in the totals shown above. QA/QC sampling requirements are described in Section 5.3 of Appendix C of the Generic Installation RI/FS Workplan.
6) EPA = Environmental Protection Agency
7) ASTM = American Society for Testing and Materials
8) COE = Corps of Engineers

The 13 sediment samples will be analyzed for grain size, TOC, CEC, and pH. The southern most sample from the north-south trending drainage ditch will also be analyzed for density. A detailed description of these methods, as well as lists of each compound included in each of the categories is presented in Appendix C, Chemical Data Acquisition Plan.

4.2.9 Surveying

Surveying will be performed at SEAD-59 to provide data to be used for the following purposes:

- Locate all the environmental sampling points
- Serve as the basis for volume estimates of impacted soil and sediment which may require a remedial action
- Map the extent of any impacted groundwater above established ARAR limits.

The location, identification, coordinates and elevations of all the control points recovered and/or established at the site and all of the geophysical survey areas, soil gas survey areas, soil borings, monitoring wells (new and existing) and all surface water and sediment sampling points will be plotted on a topographic map to show their location with respect to surface features within the project area.

Site surveys will be performed in accordance with good land surveying practices and will conform to all pertinent state, federal, and USCOE laws and regulations governing land surveying. The surveyor shall be licensed and registered in the state of New York.

A detailed discussion of the site field survey requirements is presented in Appendix A, Field Sampling and Analysis Plan of the Generic Installation RI/FS Workplan.

4.3 FIELD INVESTIGATIONS AT SEAD-71

The following field investigations will be performed to complete the RI characterization of SEAD-71:

- Geophysical Investigation,
- Soil Investigation (test pits, soil borings),
- Groundwater Investigation (overburden wells),
- Ecological Investigation, and
- Surveying.

These investigations are described in the following sections.

4.3.1 Geophysical Investigation

Geophysical investigations will be performed in two areas of the site, one in the eastern portion and one in the western portion. The extent of the soil investigation was expanded to the west in response to a SEDA employee who, at the completion of the ESI, recalled that the burial pits extended farther to the west, beyond the area that was previously investigated.

In the eastern portion of SEAD-71, electromagnetic (EM) and Ground Penetrating Radar (GPR) surveys will be performed in areas that were not accessible during the ESI, which includes extended areas adjacent to SEAD-71. The initial geophysical investigation will be an EM-31 or EM-61 survey performed on a 20 by 20 foot grid throughout the areas shown in Figure 4-4. The objective of the EM survey will be to identify locations where metallic objects may be buried within the subsurface in the storage area and to investigate the adjacent storage area located to the north. These two storage areas will be referred to as the southern and northern storage areas, respectively. Upon completion of the EM survey, contour maps of the in-phase and quadrature components of the electromagnetic field will be generated to aid in identifying the locations of possible buried metallic objects within the subsurface. Subsequent to the EM survey, a GPR survey will be performed in the two storage areas. GPR data will also be collected over each distinct EM anomaly in order to provide a better characterization of the suspected metallic source.

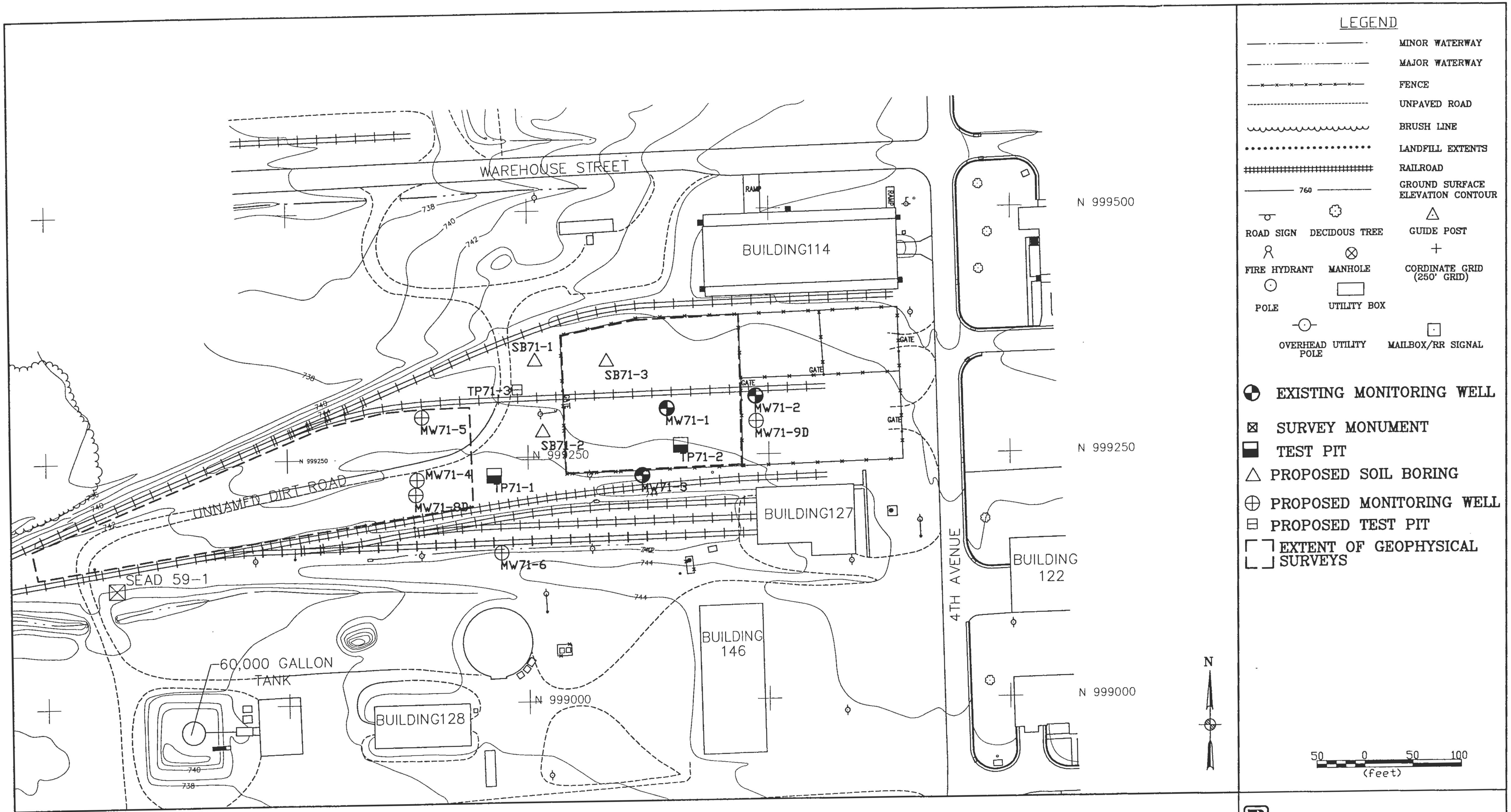
In the western portion of the site, GRP will be used to locate potential burial pits in the elongate areas immediately north and south of the east-west trending unpaved access road (the area is between two railroad spurs). An electromagnetic survey will not be performed in this area because of the inevitable interference caused by the nearby railroad tracks.

4.3.2 Soil Investigation

The soil investigation program will consist of both surface and subsurface soil samples from soil borings and test pit excavations in the storage areas and disposal pit area. Eleven (11) soil borings and 5 test pit excavations will be performed at SEAD-71.

4.3.2.1 Soil Boring Program

Eleven (11) soil borings will be performed at SEAD-71, four of which will be completed as monitoring wells. The purpose of the soil borings will be to determine the thickness of the waste material, observe subsurface soils, measure the depth to bedrock, and obtain samples of the waste and underlying soil for chemical analysis. This data will also be used to assess the potential for infiltration to groundwater as part of the groundwater receptor pathway. The locations of the soil borings are shown in Figure 4-4 (6 soil borings have definitive locations on the map, and the locations of the other 5 borings are discretionary).



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NOTES:

1. Four (4) test pits (TP71-4 through TP71-7) will be located in the eastern portion of the site based upon the results of the EM-31 and GPR geophysical surveys in the southern and northern storage areas that are enclosed by a chain-link fence.
2. Two (2) soil borings (SB71-4 and SB71-5) will be located in the eastern portion of the site based upon the results of the EM-31 and GPR surveys in the southern and northern storage areas that are enclosed by a chain-link fence.
3. Three (3) test pits (TP71-8, TP71-9, AND TP71-10) will be excavated in the western portion of the site based on the results of the GPR geophysical program in the western portion of the site.
4. Three (3) soil borings (SB71-6 and SB71-7, and MW71-7, which will be completed as a well) will be installed in the western portion of the site based on the results of the GPR and test pitting performed in the western portion of the site.

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02011

FIGURE 4-4
LOCATION OF EXISTING AND PROPOSED SAMPLING POINTS AND SURVEYS

SCALE 1" = 100'
DATE APRIL 1997
REV B

Two soil borings, MW71-4 and MW71-5, will be located in the western half of the site at locations downgradient of TP71-1 and the existing well MW71-1. Soil boring MW71-6 will be located south of TP71-1 on the south side of a set of railroad tracks. These three borings will be completed as overburden monitoring wells.

Two other soil borings, SB71-1 and SB71-2, will be located in the western half of the site which is the area of suspected burial pits. Soil boring SB71-3 will be located in the northern storage area.

Two discretionary soil borings (SB71-4 and SB71-5) will be located based upon geophysical anomalies identified during the geophysical investigation to be performed in the northern and southern storage areas enclosed by chain-link fencing in the eastern portion of the site.

Three more discretionary soil borings (SB71-6 and SB71-7, and MW71-7, which will be completed as an overburden well) will be performed in the western portion of the site and located based on the GPR results.

Soil borings will be performed by the continuous split-spoon method. Samples will be collected every two feet from the ground surface to the bottom of the boring. At each boring location a 0-2" surface soil sample will be collected and submitted for chemical testing. Two subsurface soil samples will also be selected from each soil boring to be submitted for chemical testing. The criteria for the selection of the subsurface soil samples submitted to the lab for chemical testing is provided in Appendix A, Field Sampling and Analysis Plan.

In addition, soil samples will be collected for limited chemical testing and physical testing at two boring locations. At each of the two locations, 3 subsurface soil samples (one near the surface, one immediately below the water table and an intermediate sample) will be collected.

The soil sampling will be performed until split-spoon refusal is encountered. The soil boring (i.e., augering) will continue until auger refusal is reached. Auger refusal for this project is defined in Appendix A, Field Sampling and Analysis Plan.

Soil boring procedures are described in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

4.3.2.2 Test Pitting Program

Eight (8) test pits will be excavated at SEAD-71 (the location of 1 test pit is definitive and the locations of the other 7 are discretionary). The test pits will be excavated within the storage areas and in the western portion of the site, which is the location of suspected burial pits, so that the a visual evaluation of the subsurface soils and fill materials can be made and also for the purpose of collecting soil samples for chemical testing. Test pits will be dug to the top of the weathered shale layer. The bedrock surface (if encountered) and bottom of debris layer (if encountered) will be documented at each test pit location. Two (2) soil samples will be collected from each pit. The samples will be collected at the surface (0-2") and a depth where there is evidence of impacts by oil or hazardous materials. If no impacts are evident in the test pit, the subsurface sample will be collected at the mid-depth of the wall of the excavation.

One test pit (TP71-3) will be located according to geophysical anomalies identified during the ESI performed at SEAD-71. The location of this test pit is shown in Figure 4-4. Four test pits (TP71-4 through TP71-7) will be located based upon geophysical anomalies identified during the geophysical investigation to be performed in the eastern portion of the site. The other three test pits TP71-8 through TP71-10 will be located in the western portion of the site. The excavated soils will be monitored for VOCs during test pitting. Test pitting procedures are provided in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

4.3.2.3 Surface Soil Program

A total of 20 surface soil samples will be collected from a grid at SEAD-71. Figure 4-5 shows the location of the gridded surface soil sampling points. The samples will be collected from a depth of 0-2 inches. These samples are intended to delineate the extent of lead and PAHs in surface soil. The distribution map of PAHs in soil was shown in Figure 3-16 of this report. The data shows higher concentrations of PAHs in TP71-1 located in the alleged disposal area in the western half of the site. These data will provide the information necessary for completion of a baseline risk assessment and development of remedial action alternatives.

The surface soil sampling procedures are described in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan. The samples will be tested according to the analyses specified in Section 4.4.5 Analytical Program.

4.3.2.4 Soil Sampling Summary

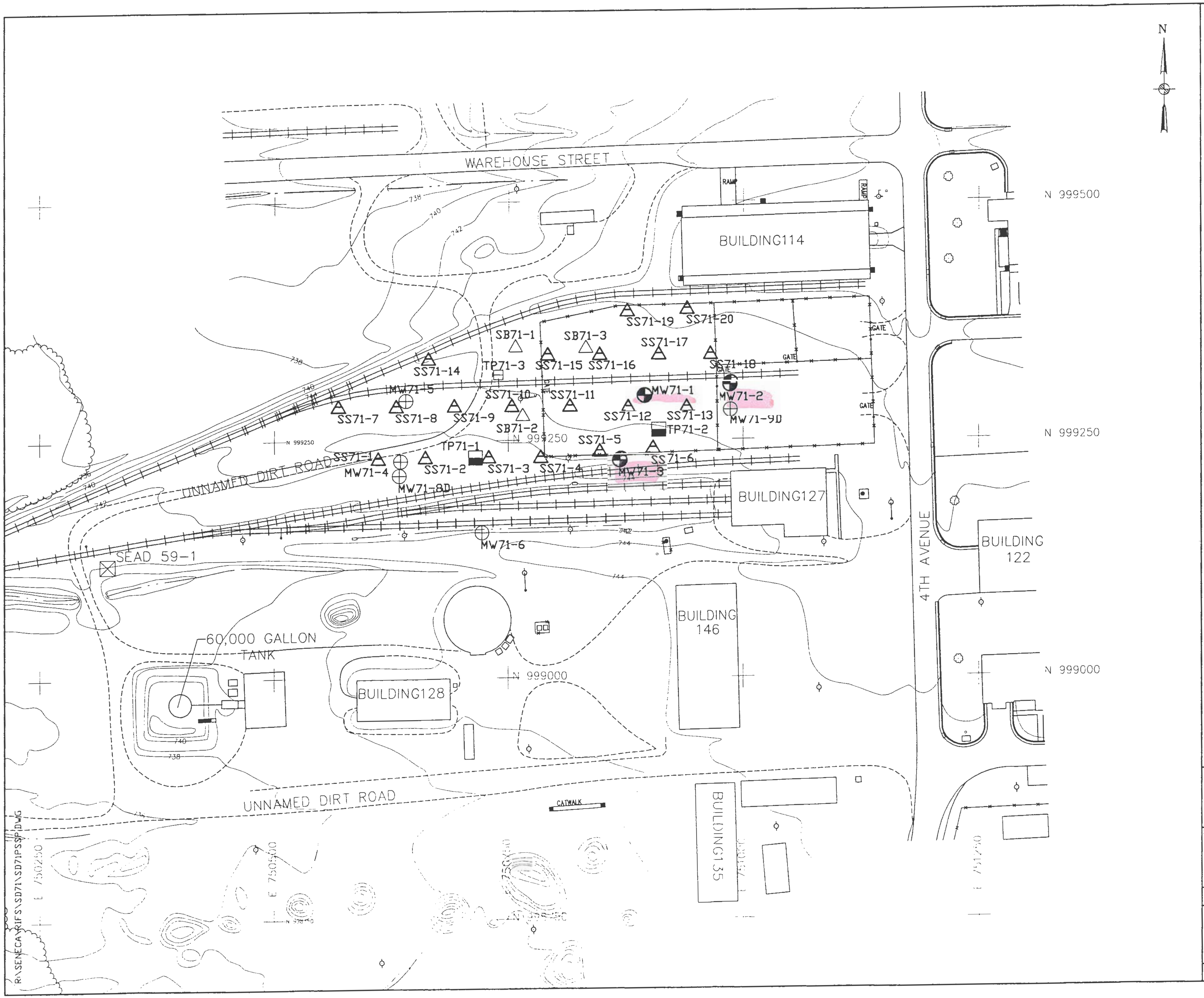
The sampling program will consist of soil samples from the 11 soil borings, 8 test pits, and 20 surface soil sampling. In total, 69 soil samples will be collected for chemical testing.

One (1) surface soil sample and 2 subsurface soil samples will be collected from eleven soil borings.

Two (2) soil samples will be collected from each of the eight test pits excavated in the storage areas and the disposal pit area.

Twenty (20) surface soil samples will be collected from the surface soil sampling program.

In addition, six (6) subsurface soil samples will be collected from two soil borings for physical testing and limited chemical testing.



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
EXISTING MONITORING WELL
⊠ SURVEY MONUMENT
TEST PIT
△ PROPOSED SOIL BORING
⊕ PROPOSED MONITORING WELL
⊟ PROPOSED TEST PIT
△ PROPOSED SURFACE SOIL

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-71 ALLEGED PAINT DISPOSAL AREA

ENVIRONMENTAL ENGINEERING | 727851-02011

FIGURE 4-5
LOCATION OF PROPOSED SURFACE SOIL SAMPLING POINTS

1" = 100' | JANUARY 1996 | A

The soil sampling procedures are described in Section 3.4 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

The soil samples will be tested according to the analyses specified in section 4.4.5, Analytical Program.

4.3.3 Groundwater Investigation

4.3.3.1 Monitoring Well Installation and Sampling

Three groundwater monitoring wells were installed as part of the ESI completed at SEAD-71. Based on the water level measurements, the groundwater flow direction was determined to be to the southwest. Groundwater samples from the ESI contained five metals (iron, manganese, aluminum, lead, and thallium) at concentrations exceeding state or federal drinking water criteria. However, the vertical and lateral extents of potential contaminant migration from the storage area and disposal pit area has not been fully characterized.

The goals of the groundwater investigation during the RI are to verify previous sampling data, determine the extent of groundwater contamination, gather additional potentiometric data to confirm the groundwater flow direction, determine background groundwater quality, and determine the hydraulic conductivity of the aquifer.

For this RI, a total of 6 additional monitoring wells will be installed (4 overburden and 2 bedrock well). The additional monitoring wells will be installed at the approximate locations shown in Figure 4-4 (4 of the wells have definitive locations and the location of 1 is discretionary). Two wells (MW71-4 and MW71-5) will be installed in the western portion of the site. A third monitoring well (MW71-6) will be installed south of TP71-1, on the other side of the railroad tracks. During the installation of these three wells, soil samples will be collected for chemical testing as described in Section 4.3.2.1. Another well (MW71-7), the location of which is discretionary, will be installed in the western portion of the site based on the results of the GPR results. All wells will be screened in the saturated overburden overlying the shale bedrock. Lastly, 1 bedrock well (MW71-8D) will be installed as a pair to well MW71-4 to investigate potential vertical impacts to groundwater. Another bedrock monitoring well MW71-9D, a background well, will be installed adjacent to the existing well MW71-2. Together, the bedrock wells at SEAD-59 and these wells will be used to define groundwater flow in the bedrock for this area.

Monitoring well installation, development, and sampling procedures are described in Section 3.6 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan. All wells will be properly developed prior to sampling.

Groundwater from the 8 existing and new monitoring wells will be sampled twice and analyzed for the parameters listed in Section 4.4.5. The second round of sampling will occur approximately three months after the first round of sampling. The wells will be sampled using the latest version of the EPA groundwater sampling procedure, which is a low-flow pump purging and sampling method.

4.3.3.2 Aquifer Testing

Three rounds of water level measurements will be performed. One measurement will take place before well development and the measurement will be used for well development calculations. The remaining two rounds of measurements will be performed before both rounds of groundwater sampling and will be used to construct a groundwater elevation contour map and evaluate seasonal changes in the groundwater flow direction. The latter two rounds of water levels will be made to coincide with water levels taken at SEAD-59 so that a more complete "snap-shot" of the water table can be constructed from the data.

Slug testing will be performed on the 9 wells at SEAD-71 and used to estimate hydraulic conductivity of the overburden and bedrock aquifers. A vertical connection test will be performed at the one overburden/bedrock well pair. Procedures for water level measurements, slug testing, and vertical connection testing and are outlined in Section 3.11 of Appendix A, Field Sampling and Analysis Plan in the Generic Installation RI/FS Work Plan.

4.3.4 Ecological Investigation

The following procedure for the ecological investigation was developed from the New York State Department of Environmental Conservation (NYSDEC) Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). The investigation also considers USEPA guidance regarding ecological risk assessment, including EPA's draft *Ecological Risk Assessment for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1994) and *Proposed Guidelines for Ecological Risk Assessment* (EPA 1996). The purpose of the ecological investigation is to determine if aquatic and terrestrial resources have been affected by a release of contaminants from the site. The investigation will be completed in two parts. The first part will be the site description, which will involve the accumulation of data describing the physical characteristics of the site, as well as the identification of aquatic and terrestrial resources present or expected to be present at the site. The second part will be the contaminant-specific impact analysis, which involves the determination of whether the identified aquatic and terrestrial resources have been impacted by contaminants that have been released at the site. The second part of the ecological investigation is dependent upon the chemical analyses of the samples collected for the RI.

4.3.4.1 Site Description

The purpose of the site description is to determine whether aquatic and terrestrial resources are present at the site and if they were present at the site prior to contaminant introduction; and if they were present prior to contaminant introduction, to provide the appropriate information to design a remedial investigation of the resources. The information to be gathered includes site maps, descriptions of aquatic and terrestrial resources at the site, the assessment of the value of the aquatic and terrestrial resources, and the appropriate contaminant-specific and site-specific regulatory criteria applicable to the remediation of the identified aquatic and terrestrial resources.

A topographic map showing the site and documented aquatic and terrestrial resources within a two mile radius from the site will be obtained. The aquatic and terrestrial resources of concern are Significant Habitats as defined by the New York State Natural Heritage Program; sources of this information are indicated in parentheses. These include the following: habitats supporting endangered, threatened or rare species or species of concern (letter from the United States Dept. of Interior Fish and Wildlife Service dated June 21, 1994); regulated wetlands (National Wetlands Inventory (NWI) maps of the Dresden, Geneva Smith, Ovid and Romulus quadrangles, and New York State Regulated Wetland maps for the same quadrangles); wild and scenic rivers; significant coastal zones (Federal Emergency Management Agency Flood Insurance Rate Maps (FIRM), Town of Varick, New York Seneca County Community-Panel Number 3607580010B, December 17, 1987); streams (United States Geological Survey Qqadrangles Romulus, Ovid, Dresden and Geneva South 7.5 minute quadrangles); lakes (United States Geological Survey Qqadrangles Romulus, Ovid, Dresden and Geneva South 7.5 minute quadrangles); and other major resources. Two additional sources of information are 1) NYSDEC Region 8 at 6274 Past Avalon-Lima Road in Avon, NY (716)225-2466 and 2) NYSDEC Wildlife Resources Center - Information Service, New York Heritage Program at 700 Troy-Schenectady Road in Latham, NY (518)783-3932.

A map showing the major vegetative communities within a half mile radius of the site will be developed. The major vegetative communities will include wetlands, aquatic habitats, NYSDEC Significant Habitats, and areas of special concern. These covertypes will be identified using the NYSDEC Natural Heritage Program descriptions and classifications of natural communities.

To describe the covertypes at the site, the abundance, distribution, and density of the typical vegetative species will be identified. To describe the aquatic habitats at the site, the abundance and distribution of aquatic vegetation will be identified. The physical characteristics of the aquatic habitats will also be described and will include parameters such as the water chemistry, water temperature, dissolved oxygen content, depth, sediment chemistry, discharge, flow rate, gradient, stream-bed morphology, and stream classification.

The aquatic and terrestrial species that are expected to be associated with each covertype and aquatic habitat will be determined. In particular, endangered, threatened and rare species, as well as species of concern, will be identified. Alterations in biota, such as reduced vegetation growth or quality will be described. Alterations in, or absence of, the expected distribution or assemblages of wildlife will be described.

A qualitative assessment will be conducted evaluating the ability of the area within a half mile of the site to provide a habitat for aquatic and terrestrial species. The factors that will be considered will include the species' food requirements and the seasonal cover, bedding sites, breeding sites and roosting sites that the habitats provide.

The current and potential use of the aquatic and terrestrial resources of the site by humans will be assessed. Included with the assessment of the site, the area within a half mile of the site, documented resources within two miles of the site, and documented resources downstream of the site that are potentially affected by contaminants will also be assessed. Human use of the resources that will be considered will be activities such as hunting, fishing, wildlife observation, scientific studies, agriculture, forestry, and other recreational and economic activities. The appropriate regulatory criteria will be identified for the remediation of aquatic and terrestrial resources and will include both site-specific and contaminant-specific criteria.

4.3.4.2 Contaminant-Specific Impact Analysis

Information from the site description developed in Section 4.4.4.1 and from the characterization of the contaminants at the site developed from the results of the RI will be used to assess the impacts of contaminants on aquatic and terrestrial resources. The impact analysis will involve three steps, each using progressively more specific information and fewer conservative assumptions and will depend upon the conclusion reached at the previous step regarding the degree of impact. If minimal impact can be demonstrated at a specific step, additional steps will not be conducted.

Pathway Analysis

A pathway analysis will be performed identifying aquatic and terrestrial resources, contaminants of concern and potential pathways of contaminant migration and exposure. After performing the pathway analysis, if no significant resources or potential pathways are present, or if results from field studies show that contaminants have not migrated to a resource along a potential pathway, the impact on aquatic and terrestrial resources will be considered to be minimal and additional impact analyses will not be performed.

Criteria-Specific Analysis

Presuming that the presence of contaminated resources and pathways of migration of site-related contaminants has been established, the contaminant levels identified in the field investigation will be compared with available numerical criteria or criteria developed according to methods established as part of the criteria. If contaminant levels are below criteria, the impact on resources will be considered to be minimal and additional impact analyses will not be performed. If numerical criteria are exceeded or if they do not exist and cannot be developed, an analysis of the toxicological effects will be performed.

Analysis of Toxicological Effects

The analysis of toxicological effects is based on the assumption that the presence of contaminated resources and pathways of migration of site-related contaminants has been established. The purpose of the analysis of toxicological effects is to assess the degree to which contaminants have affected the productivity of a population, a community, or an ecosystem and the diversity of species assemblages, species communities or an entire ecosystem through direct toxicological and indirect ecological effects.

A number of approaches are available to conduct an analysis of toxicological effects. One or more of the four following approaches will be used to assess the toxicological effects.

> **Indicator Species Analysis**–A toxicological analysis for a indicator species will be used if the ecology of the resource and the exposure scenarios are simple. This approach assumes that exposure to contaminants is continuous throughout the entire life cycle and does not vary among individuals.
>
> **Population Analysis**–A population level analysis is relevant to and will be used for the evaluation of chronic toxicological effects of contaminants to an entire population or to the acute toxicological effect of contaminant exposure limited to specific classes of organisms within a population.
>
> **Community Analysis**– A community with highly interdependent species including highly specialized predators, highly competitive species, or communities whose composition and diversity is dependent on a key-stone species, will be analyzed for alternations in diversity due to contaminant exposure.
>
> **Ecosystem Analysis**–If contaminants are expected to uniformly affect physiological processes that are associated with energy transformation within a specific trophic level, an analysis of the effects of contaminant exposure on trophic structure and trophic function within an ecosystem will be performed. Bioconcentration, bioaccumulation, biomagnification, etc., are concepts that may be used to evaluate the potential effects of contaminant transfer on trophic dynamics.

EPA's draft *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1994) states that the selection of assessment endpoints, which represent environmental values to be protected and generally refer to characteristics of populations and ecosystems, depends on the following:

1. The constituents present and their concentrations,
2. Mechanisms of toxicity to different groups of organisms,

3. Potential species present, and
4. Potential complete exposure pathways.

To assess whether significant adverse ecological effects have occurred or may occur at the site as a results of ecological receptor's exposure to chemical of potential concern (COPC), ecological endpoints will be selected. An ecological endpoint is a characteristic of an ecological component that may be affected by exposure to a stressor, such as a chemical.

Given the diversity of the biological world and the multiple values placed on it by society, there is no universally-applicable list of assessment endpoints. Therefore, EPA, in the Proposed Guidelines for Ecological Risk Assessment (EPA, 1996) has suggested three criteria that should be considered in selecting assessment endpoints suitable for a specific ecological risk assessment. There criteria are: ecological relevance, susceptibility to the contaminant(s), and representation of management goals.

The protocols and procedures for conducting the ecological investigation at SEAD-71 is discussed in detail in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.3.5 Analytical Program

A total of 69 soil samples and 9 groundwater samples (18 including both rounds 1 and 2 of groundwater sampling) will be collected from SEAD-71 for chemical testing (Table 4-2). All of these samples will be analyzed for the following: Target Compound List (TCL) VOCs (EPA Method 524.2 for groundwater samples only), semivolatile organic compounds, TCL pesticides/PCBs, Target Analyte List (TAL) metals and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Statement of Work (SOW), total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1, and nitrate-nitrogen by EPA Method 352.1. Additional analyses to be performed on specific media are provided below.

Six (6) of the soil samples from two borings will be analyzed for limited chemical and physical testing including Total Organic Carbon (TOC) by EPA Method 415.1, grain size distribution (including the distribution within the silt and clay size fraction), cationic exchange capacity (CEC), pH, and density.

The 9 groundwater samples will be analyzed in the field for pH, temperature, specific conductivity, dissolved oxygen, turbidity and oxidation-reduction potential. In addition, the following analyses will be performed by the laboratory: alkalinity, sulfate, sulfide, nitrate, TOC, biological oxygen demand (BOD), hardness, total dissolved solids (TDS), and chemical oxygen demand (COD).

Analyses for all of the media to be sampled are summarized in Table 4-2.

Table 4-2

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-71

	VOCs		SVOCs	Pest/Pcbs	Metals	TPH	Nitrate-N03	Grain Size*	pH	Hardness	TSS	TDS	Alkalinity	Sulfate	Sulfide	BOD	COD	Ammonia	Phosphate	Cat Ex Cap.	Density	TOC
	NYSDEC	EPA	NYSDEC	NYSDEC	NYSDEC	EPA	EPA	ASTM	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	EPA	COE	EPA
	TCL	Method	TCL	TCL	TAL	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method	Method
MEDIA	CLP	524.2 rev.2 (1992)	CLP	CLP	CLP	418.1	353.2	D:422-63	150.1/ 9045#	130.2	160.2	160.1	310.1/310.2	375.2	376.2	405.1	410.1	350.1/350.2	365.2	9081	1110	415.1/ Llyod Kahn^
Soil Surface	39	0	39	39	39	39	39@	2	2	0	0	0	0	0	0	0	0	0	0	2	2	2
Subsurface	30	0	30	30	30	30	30@	4	4	0	0	0	0	0	0	0	0	0	0	4	4	4
Groundwater	0	9	9	9	9	9	9	0	0	9	0	9	9	9	9	9	9	0	0	0	0	9
Surface water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sediment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Air (flux chamber)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
1) * Grain size analysis includes determination of the grain size distribution within the silt and clay size fraction.
2) @ The method for soil samples will be modified. For soils, a known quantity of soil will be mixed with known volume of water, stirred, and filtered to form an aqueous extract.
3) # Method 9045 will be used for soil samples. Method 150.1 will be used for water samples.
4) ^ Method 415.1 will be used for water and the Llyod Kahn Method will be used for soils.
5) QA/QC samples are not included in the totals shown above. QA/QC sampling requirements are described in Section 5.3 of Appendix C of the Generic Installation RI/FS Workplan.
6) EPA = Environmental Protection Agency
7) ASTM = American Society for Testing and Materials
8) COE = Corps of Engineers

A detailed description of these methods, as well as lists of each compound included in each of the categories is presented in Appendix C, Chemical Data Acquisition Plan.

4.3.6 Surveying

Surveying will be performed at SEAD-71 to provide data to be used for the following purposes:

1. Locate all the environmental sampling points
2. Serve as the basis for volume estimates of impacted soil and sediment which may require a remedial action
3. Map the extent of any impacted groundwater above established ARAR limits.

The survey will involve a field survey. The location, identification, coordinates and elevations of all the control points recovered and/or established at the site and all of the geophysical survey areas, soil borings, monitoring wells (new and existing) and all surface water sampling points will be plotted on a topographic map to show their location with respect to surface features within the project area.

Site surveys will be performed in accordance with good land surveying practices and will conform to all pertinent state, federal, and USCOE laws and regulations governing land surveying. The surveyor shall be licensed and registered in New York.

A detailed discussion of the site field survey requirements is presented in Appendix A, Field Sampling and Analysis Plan of the Generic Installation RI/FS Workplan.

4.4 DATA REDUCTION, ASSESSMENT AND INTERPRETATION

Data Reduction, assessment, and interpretation is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.5 BASELINE RISK ASSESSMENT

The baseline risk assessment is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

The scenarios and future receptors evaluated in the baseline risk assessment will be based on the land uses specified in the Reuse Plan and Implementation Strategy for Seneca Army Depot (December 1996). For SEAD-59 and SEAD-71 the proposed land use is Planned Office/Idustrial Development (Figure 3-17).

Also, the numerical assumptions listed in Table 4-3 will be used for the human health risk assessment.

4.6 DATA REPORTING

Data Reporting is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.7 TASK PLAN SUMMARY FOR THE RI

General information about the Task Plan Summary is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

A detailed Task Plan Summary that indicates the number and type of samples to be collected at SEAD-59 and SEAD-71 are provided in Tables 4-1 and 4-2, respectively.

Table 4-3
Standard Assumptions For Calculation of Chemical Intake

Seneca Army Depot Activity

PATHWAY	RISK EVALUATION	INTAKE ASSUMPTIONS
DERMAL WATER	CARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (children 1-6 years) AT = Averaging Time = 70 years x 365 days/year
DERMAL SOIL	CARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average) AT = Averaging Time = 70 years x 365 days/year AF = Soil to Skin Adherence = 2.77 mg/cm^2(Soil Std.)
	NONCARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (children 1-6 years) AT = Averaging Time = ED x 365 days/year AF = Soil to Skin Adherence = 2.77 mg/cm^2(Soil Std.)
INHALATION	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Inhilation Rate = 20 m^3/day (adult average); (no child) ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Inhilation Rate = 20 m^3/day (adult average) BW = Body weight = 70 Kg (adult average), 15 Kg (child average)
INGESTION WATER	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 2 liters/day (adult 90%); 1 liter/day (child) ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 2 liters/day (adult 90 %) BW = Body weight = 70 Kg (adult average), 15 Kg (child average)
INGESTION SOIL	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 100mg/day (adult average) ED = Exposure Duration adult = 30 years ED = Exposure Duration child = 6 years (child), 24 years (adult) BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 200 mg/day (child)/100 mg/day (adult) BW = Body weight = 15 Kg (child average)

Notes:

1) The values shown in this table were obtained from:

a) EPA Superfund's Standard Default Exposure Factors for the Central Tendancy and Reasonable Maximum Exposure

b) EPA Exposure Factors Handbook, EPA/600/8-89/043

5.0 TASK PLAN FOR THE FEASIBILITY STUDY (FS)

The task plan for the FS is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.1 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

A discussion of the development of remedial action objectives for the FS is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.2 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

A discussion of the development of remedial action alternatives for the FS is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

Additionally, as part of the FS process, at least one innovative technology will be evaluated for SEAD-59 and SEAD-71. And, a wetlands assessment and restoration plan will be needed for any wetlands impacted or disturbed by the contamination or remedial acitons.

5.3 SCREENING OF REMEDIAL ACTION ALTERNATIVES

A discussion of the screening of remedial action alternatives for the FS is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

Additionally, as part of the FS process, at least one innovative technology will be evaluated for SEAD-59 and SEAD-71.

5.4 DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

A discussion of the detailed analysis of remedial action alternatives for the FS is given in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

Additionally, as part of the FS process, at least one innovative technology will be evaluated for SEAD-59 and SEAD-71.

5.5 TASK PLAN SUMMARY FOR THE FS

The task plan summary for the FS is given in the Generic Installation RI/FS workplan that serves as a supplement to this RI/FS Project Scoping Plan.

6.0 PLANS AND MANAGEMENT

The purpose of this Work Plan is to present and describe the activities that will be required for the site Remedial Investigation/Feasibility Study at SEAD-59 and SEAD-71. The Field Sampling and Analysis Plan (Appendix A), details procedures which will be used during the field activities. Included in this plan are procedures for sampling soil, sediments, surface water, fish, shellfish and groundwater. Also included in this plan are procedures for developing and installing monitoring wells, measuring water levels and packaging and shipment of samples.

The Health and Safety Plan (Appendix B) details procedures to be followed during field activities to protect personnel involved in the field program.

The Chemical Data Acquisition Plan (Appendix C) describes the procedures to be implemented to assure the collection of valid data. It also describes the laboratory and field analytical procedures which will be utilized during the RI.

6.1 SCHEDULING

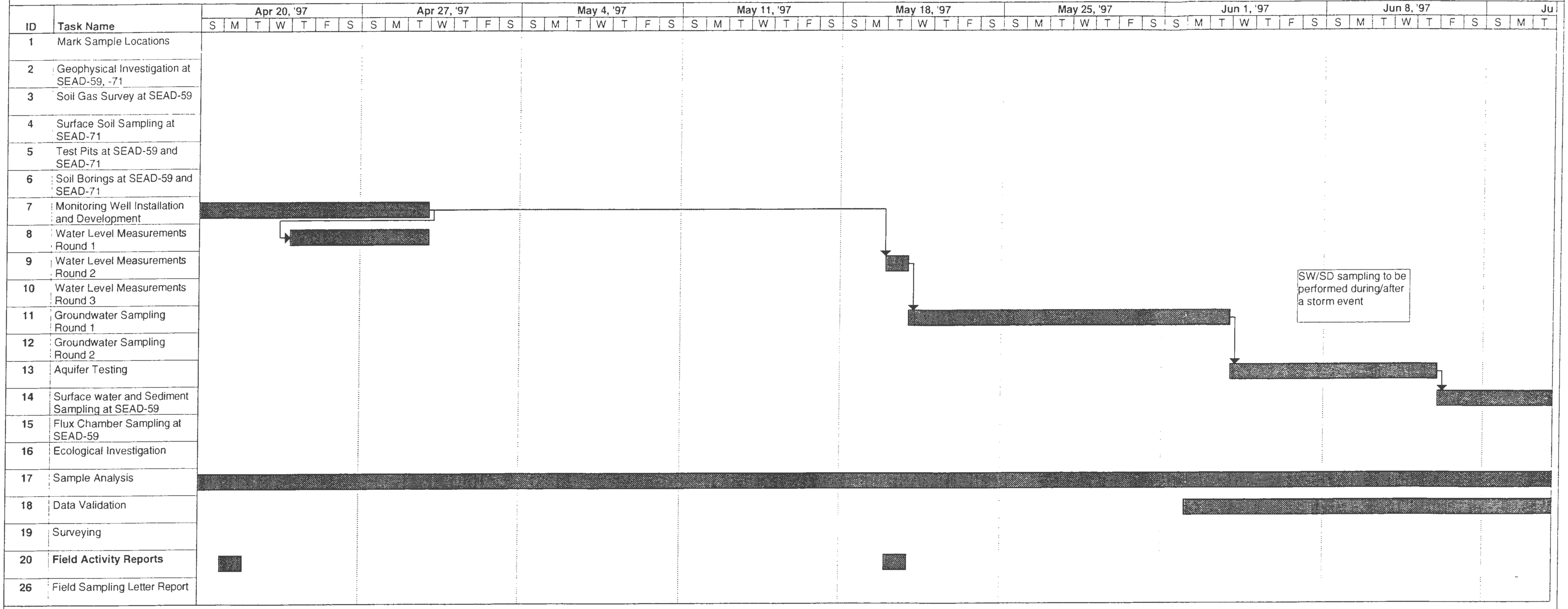
The proposed schedule for performing the RI/FS at SEAD-59 and SEAD-71 is presented in Figures 6-1.

6.2 STAFFING

The project team organization for performing the RI/FS at SEAD-59 and SEAD-71 is presented in Figure 6-2.

Figure 6-1
SEAD-59 and SEAD-71 RI Field Investigation Schedule
Seneca Army Depot Activity

Figure 6-1
SEAD-59 and SEAD-71 RI Field Investigation Schedule
Seneca Army Depot Activity



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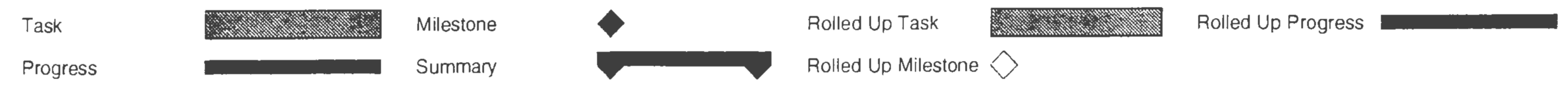
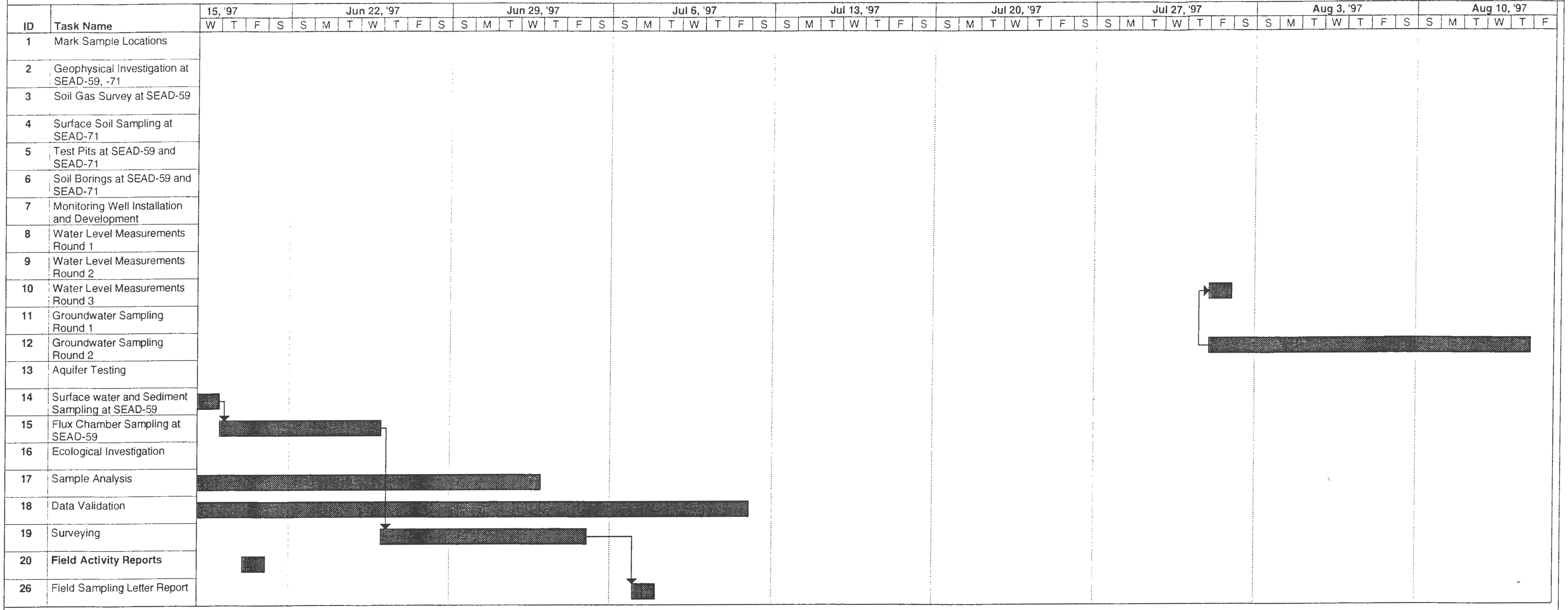


Figure 6-1
SEAD-59 and SEAD-71 RI Field Investigation Schedule
Seneca Army Depot Activity



Project:
Date: Thu 2/20/97

Task	▨	Milestone	◆	Rolled Up Task	▨	Rolled Up Progress	▬
Progress	▬	Summary	▬	Rolled Up Milestone	◇		

Parsons ES Project Team Organization

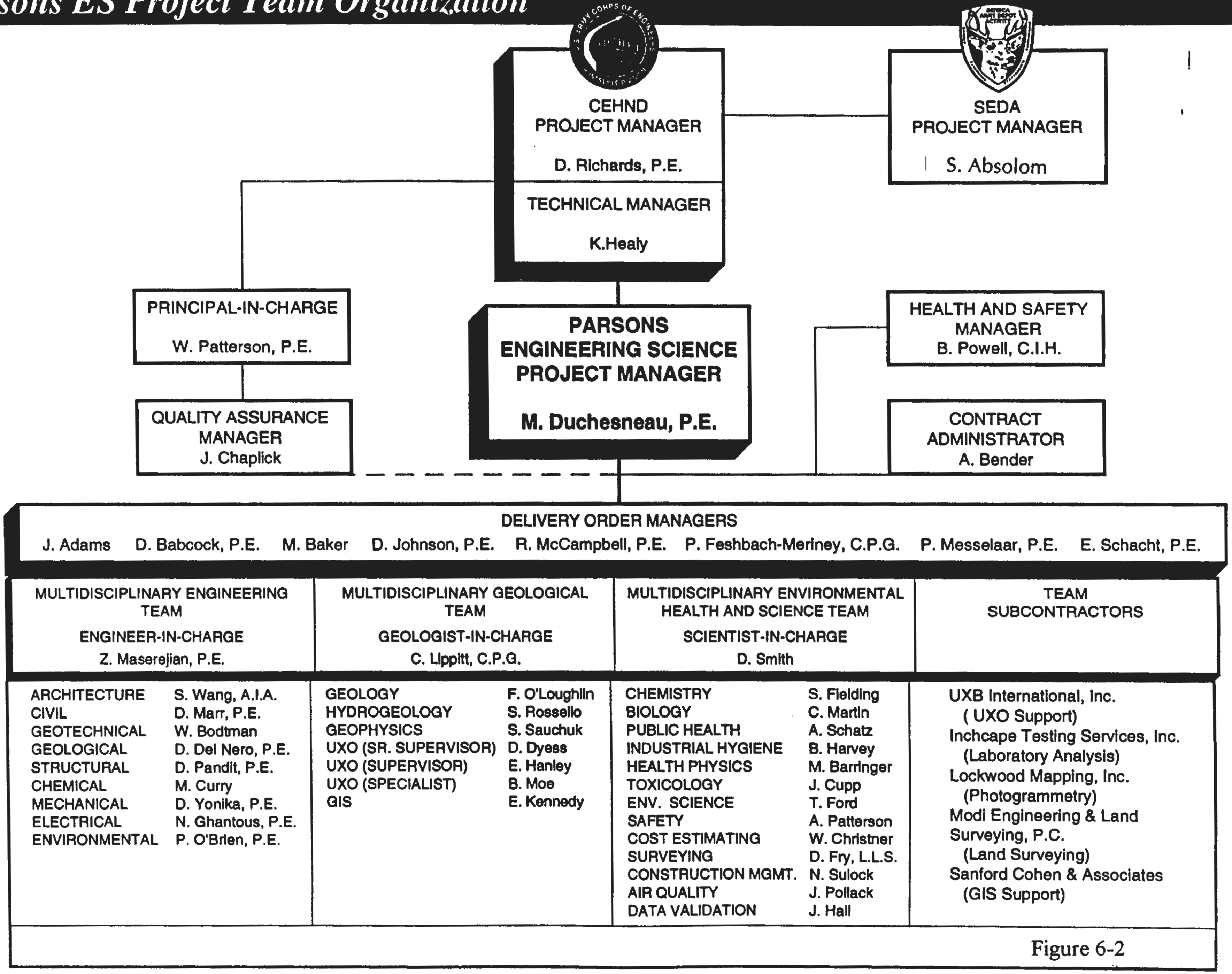


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Figure 6-2

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7.0 REFERENCES

American Society for Testing and Materials (ASTM), 1984, Standard Practice for Desicrption and Identification of Soils (Visual-Manual Procedure): D-2488-84.

American Society for Testing and Materials, (ASTM), 1984, Methods for Penetration Test and Split-Barrel Sampling of Soils: D-1586-84.

American Society for Testing and Material (ASTM), 1984, Standard Method for Paricle Size Analysis of Soils, D-422-63.

Arthur D. Little, Inc., 1985. The Installation Restoration Program Toxicology Guide.

Beyer, W.N., 1990. *Evaluating Soil Contamination*. Biological Report 90 (2) U.S. Fish and Wildlife Service. Washington, D.C.

Bouwer H. and Rice R.C., 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells, Water Resources Research, Vol. 12, No. 3 pp. 423-428.

Bouwer, H., 1989. The Bouwer and Rice Slug Test - An Update, Groundwater, Vol. 27, No.3, pp. 304-309.

Bowen, H.J.M, 1966. *Trace Elements in Biochemistry*. Academic Press, Inc. London.

Brett, C.E., Dick, V.B, Baird, G.C., 1991, "Comparative and Paleoecology of Middle Devoniam Dark Gray and Black Shale Facies from Western New York;" in eds., Landing, E.L. and Brett, C.E., Dynamic Stratigraphy and Depositional Environments of the Hamilton Group (Middle Devonian) in New York State, Part II, New York State Museum Bulletin Number 469. pp. 5-36.

Brunge, J.R. and D.I. Mount. 1978. Introduction to a Discussion of the Use of Aquatic Toxicity Tests for Evaluation of the Effects of Toxic Substances in J. Cairs, Jr., K.L. Dickson, and A.W. Maki, eds. Estimating the Hazards of Chemical Substances to Aquatic Life. American Society for Testing and Materials. Philadelphia, Pennsylvania. ASTM 657.

Buffington, B., 1991, Significant Habitat Unit, New York State Department of Environmental Conservation. Personal communications with R.B. Olsen, Chas. T. Main, Inc. October 8, 1991, Seneca Chamber of Commerce 1991, Seneca County Vineyards.

Cowardin, L.M., 1965, "Annotated List of the Vascular Plants of the Montezuma National Wildlife Refuge, Seneca Falls, New York Final Report 3." New York Cooperative Wildlife Research Unit. 59 pp.

Cowardin, L.M., et. al., December, 1979. Classification of Wetlands and Deepwater Habitats of the United States, U.S. Fish and Wildlife Service, U.S. Department of the Interior.

Crain, L.J., "Groundwater Resources of the Western Oswego River Basin, New York. "U.S. Geological Survey and State of New York Basin Planning Report ORB-5, 1974.

Dalrymple, B.W., 1978. North American Game Animals, Times Mirror Magazines, Inc., 516 pp.

de Marsily, Ghislain, 1986. Quantitative Hydrogeology Academic Press, Inc., Austin.

Dictonary of Geological Terms, Revised Edition, 1976. Anchor Press/Doubleday, New York.

Dragun, James, 1988. The Soil Chemistry of Hazardous Materials, The Hazardous Materials Control Research Institute.

Driscoll, F.G., 1986, Groundwater and Wells, Johnson Division, St. Paul, Minnesota 55112.

Federal Interagency Committee for Wetland Delineation, 1989, Unified Federal Method for Wetland Delineation.

Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Town of Varik, New York, Panel 5 (360758-0005B).

Freeze, R.A. and Cherry, J.A., 1979. Groundwater, Prentice-Hall, Inc. Englewood Cliffs, New Jersey 07632, 604 pp.

Gas Research Institute, 1988, Management of Manufactured Gas Plant Sites, Volume III, Risk Assessment, GRI-87/0260.3.

Gough, L.P., Shacklette, H.T., and Case, A.A., 1979, Element Concentrations Toxic to Plants, Animals, and Man, Geological Survey Bulletin 1466, U.S. Geological Survey. Washington, D.C.

Gray, L.M., 1991. "Paleoecology, Origin, and Significance of a Shell-Rich Bed in the Lowermost Part of the Ludlowville Formation (Middle Peronian, Central New York)," in eds. Landing, E.L. and Brett, C.E., Dynamic Stratigraphy and Depositional Environments of the Hamilton Group (Middle Devonian) in New York State, Part II, New York State Museum Bulletin 469, p.93-105.

Houlsby, A.C., 1976, "Routine Interpretation of the Lugeon Water-Test," Quarterly Journal of Engineering Geology, Vol. 9, pp. 303-313.

Howard, P.H., 1990, Handbook of Environmental Fate and Exposure Data for Organic Chemicals, Volumes II, III, and IV, Lewis Publishers, Michigan.

Hvorslev, M.J., 1951. Time Lag and Soil Permeability in Ground-water Observations, Bulletin No. 36, Waterways Experiment Station, Corps of Engineers, U.S. Army.

Hyder, Z. and Butler Jr., J.J., Slug Tests in Unconfined Formations: An Assessment of the Bouwer and Rice Technique, Ground Water, Vol. 33, No.1.

IRP Technology Guide

LaSala, A.M. Jr., 1968. Groundwater Resources of the Erie-Niagara Basin, New York: Basic Planning Report ENB-3, State of New York Conservation Department with Resources Commission.

Mackay, D. and Paterson, S. 1981, "Calculating Fugacity," Environmental Science and Technology, pp. 3-12.

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).

Metcalf & Eddy, 1989. Criteria Development Report for the Closure of Nine Burning Pads Seneca Army Depot, Seneca, New York; Vol. I.

Micromedia, 1992. Integrated Risk Information System (IRIS).

Morrison, R., 1992. Forest Resource Management Bureau, New York State Department Environmental Conservation, Personal Communication with R.B. Olson, Chas. T. Main, Inc.

Mozola, A.J., 1951. "The Groundwater Resources of Seneca County, New York," Bulletin GW-26. Water, Power and Control Commission, Department of Conservation, State of New York, Albany, New York.

Muller E.H. and Cadwel D.H., 1986. Surficial Geologic Map of New York State Finger Lakes Sheet. Survey, Map and Chart Series No. 40.

National Academy of Sciences (NAS) and National Academy of Engineering (NAE), 1972. Water Quality Criteria 1972. A Report of the Committee on Water Quality Criteria. Prepared for U.S. Environmental Protection Agency. Washington, D.C.

National Oceanic and Atmospheric Administration (NOAA), Technical Memorandum No. 5, OMA52, August 1991. The Potential for Biological Effects of Sediment-Sorbed Contaminats Tested in the National Status and Trends Program.

National Oceanic and Atmospheric Administration (NOAA), 1974, "Climates of the States," Volume 1.

National Oceanic and Atmospheric Administration (NOAA), Climate of New York, Climatography of the United States No. 60, June 1982.

New York State, Official Compilation of Codes, Rules and Regulations, Title 10, Chapter 1, Part 5 June 1995.

New York State Department of Environmental Protection, 1994, TAGM Determination of Soil Cleanup Objectives and Cleanup Levels.

New York State Department of Environmental Protection, November 1993, TAGM for Screening Contaminated Sediments.

New York State Department of Environmental Protection, 1994, TAGM Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites.

New York State Department of Environmental Conservation (NYSDEC), 1991b, Division of Water Technical and Operational Guidance Series (1.1.1). Ambient Water Quality Standards and Guidance Values, November 15, 1991.

New York State Department of Environmental Conservation (NYSDEC), 1989a, Clean-up Criteria for Aquatic Sediments, Department of Environmental Conservation, Albany, New York.

New York State Department of Environmental Conservation (NYSDEC), 1988a, Division of Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Generic Workplan, HWR-88-4007.

New York State Department of Environmental Conservation (NYSDEC), 1988b, Division of Technical and Administrative Guidance Memorandum (TAGM): HWR 88-4015.

New York State Department of Environmental Conservation (NYSDEC), Undated, New York State 1989-90 Fishing Regulations Guide.

New York State Department of Transportation Quadrangle for Romulus, New York and Geneva South, New York, 1978.

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Fish and Wildlife Impact Analysis for inactive Hazardous Waste Sites; October 1994.

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, November 16, 1992.

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Use of Inactive Hazardous Waste Disposal Site Numbers, February 1987, (HWR-4001).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Preparation of Annual "Short List" of Prequalified Consultants, January 1993, (HWR-4002).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Entries to the Quarterly Status Report of Inactive Hazardous Waste Disposal Sites, May 1987, (HWR-4003).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Classifying Inactive Hazardous Waste Disposal Sites, June 1987, (HWR-4004).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Insurance Requirements for Consultant and Construction Contracts and Title 3 Projects, September 1989, (HWR-4005).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Consultant Contract Overhead Rates and Multipliers, April 1988, (HWR-4006).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Generic Workplan, May 1988, (HWR-4007).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Oversight Guidance, November 1990, (HWR-4008).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Team Submissions in Responding to Requests for Proposals and Title 3 Projects, June 1992, (HWR-4009).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Roles and Responsibilities of the NYSDEC Regional Offices, January 1992, (HWR-4010).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contractor/Consultant Oversight Guidance - O&D Memo #88-26, July 1988, (HWR-4011).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Inactive Hazardous Waste Disposal Site Registry Petitions - O&D Memo #88-33, August 1988, (HWR-4012).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Emergency Hazardous Waste Drum Removal/Surficial Cleanup Procedures, January 1995, (HWR-4013).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Protocol Between Division of Hazardous Waste Remediation and Division of Environmental Enforcement, September 1988, (HWR-4014).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Policy Regarding Alteration of Groundwater Samples Collected for Metal Analysis, September 1988,

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Health and Safety Training and Equipment, October 1988, (HWR-4016).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Protocol Between DHWR and DHSR for Determining Lead Program for RCRA/CERCLA Title 13 Sites, November 1988, (HWR-4017).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase I Investigations, November 1988, (HWR-4018).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Phase II Investigation Oversight Note-Taking, November 1990, (HWR-4019).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Responding to Freedom of Information Law (FOIL) Requests, December 1988, (HWR-4020).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Start/End Definitions for Program Elements Within Funding Sources, March 1991, (HWR-4021).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Records of Decision for Remediation of Class 2 Inactive Hazardous Waste Disposal Sites - O&D Memo #89-05, February 1989, (HWR-4022).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Citizen Participation Plan, February 1989, (HWR-4023).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): NYSDOH Hazardous Waste Site Notification, March 1989, (HWR-4024).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Remedial Investigation/Feasibility Studies, March 1989, (HWR-4025).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Assistance for Contaminated Private and Public Water Supplies, April 1994, (HWR-4027).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Subcontracting under Hazardous Waste Remediation Contracts, April 1989, (HWR-4028).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Roles and Responsibilities of the Technology Section - Site-Specific Projects, April 1990, (HWR-4029).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 1990, (HWR-4030).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites, October 1989, (HWR-4031).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Disposal of Drill Cuttings, November 1989, (HWR-4032).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Inactive Sites Interface with Sanitary Landfills, December 1989, (HWR-4033).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Guidelines for Eligibility Determination for Work Performed Under the EQBA Title 3 Provisions, January 1900, (HWR-4034).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Project Manager and Contract Manager Responsibilities Under Standby Contract, March 1990, (HWR-4034).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Landfill Regulatory Responsibility, March 1990, (HWR-4036).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Major Milestone Dates for Tracking Remedial Projects, April 1990, (HWR-4037).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Remediation of Inactive Hazardous Waste Disposal Sites, April 1990, (HWR-4038).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Appeals, October 1990, (HWR-4039).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Permitting Jurisdiction Over Inactive Hazardous Waste Site Remediation - O&D Memo #94-04, March 1994, (HWR-4040).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Releasing Sampling Data, Findings and Recommendations, February 1991, (HWR-4041).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Interim Remedial Measures, June 1992, (HWR-4042).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Procedures for Handling RPP-Funded PSAs, February 1992, (HWR-4043).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills, March 1992, (HWR-4044).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Enforcement Referrals, July 1992, (HWR-4045).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994, (HWR-4046).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Priority Ranking System for Class 2 Inactive Hazardous Waste Sites, December 1992, (HWR-4047).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Interim Remedial Measures-Procedures, December 1992, (HWR-4048).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Referral of Sites to the Division of Water, December 1992, (HWR-4049).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Payment Review Process, April 1993, (HWR-4050).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Early Design Strategy, August 1993, (HWR-4051).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Administrative Records and Administrative Record File, August 1993, (HWR-4052).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Obtaining Property Access for Investigation, Design, Remediation and Monitoring/Maintenance, September 1993, (HWR-4053).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Conceptual Approval Process, November 1994, (HWR-4054).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Contract Final Approval Process, November 1994, (HWR-4055).

New York State, Division Technical and Administrative Guidance Memorandum (TAGM): Remedial Action by PRPs, April 1995, (HWR-4056).

Northeast Regional Climate Center, Monthly Precipitation Data (1958-1992) Aurora Research Farm, Cornell University, Ithica, New York.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross, and R.M. Hughes, 1989, Rapid Bioassessment Protocols For Use In Streams and Rivers: Benthic Macroinvertebrates and Fish, EPA/444/4-89-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC 20460.

Richardson, G.M., 1987. Inventory of Cleanup Criteria and Methods to Select Criteria. Unpublished report, Committee on Industrial Site Decommissioning, Industrial Programs Branch, Environment Canada. Ottawa, Ontario.

Rickard L.V. and Fischer D.W., 1970, Bedrock Geologic Map of New York, Finger Lakes Sheet.

Scott, J.H., 1977, SIPT - A Seismic Refraction Inverse Modeling Program for Time Share Terminal Computer Systems, U.S. Geological Survey, Open File Report 77-366.

SEDA, Off-site Well Inventory Map.

Seneca Army Depot (SEAD), 1992. Natural Resources Management Plan.

Shacklette, H.T. at 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.

Swaine, D.J., 1955. The Trace Element Content of Soils. *Commonw. Bur. Soil Sci. Techn. Comm. No. 48.* Herald Printing Works. York, England.

Todd, D.K., 1976. Groundwater Hydrology, John Wiley and Sons, New York, 535 pp.

U.S. Bureau of Reclamation (USBR), 1989, Procedure for Constant Head Hydraulic Conductivity Tests in Single Drill Hole, in Earth Manual, Washington, D.C.

United States Department of Agriculture, Soil Conservation Service, April 1972 Soil Survey, Seneca County, New York.

United States Army, "Safety and Occupational Health Document Requirements for Hazardous Waste Site Remedial Actions," U.S. Army Engineering Regulation (ER) 385-1-192.

U.S. Army Environmental Hygiene Agency, Hazardous Waste Study No. 37-26-0778-86, January 1986

U.S. Army Environmental Hygiene Agency (USAEHA), 1981, Water Quality Engineering Special Study, Innovative Wetlands Wastewater Treatment Project, Seneca Army Depot, Romulus, NY, 21 July-1 August 1980. Army Pollution Abatement Program Study No. D1671-W, Control No. 81-24-88-23-81.

U.S. Army Environmental Hygiene Agency, (USAEHA), Phase 4 Evaluation of the Open Burning/Open Detonation Grounds. Investigation of Soil Contamination, Hazardous Waste Study No. 37-26-0479-85, 1984.

U.S. Army Environmental Hygiene Agency (USAEHA), 1987, "Evaluation of Solid Waste Management Units, Seneca Army Depot, Romulus, New York, Interim Final Report,Groundwater Contamination Survey, No. 38-26-0868-88."

U.S. Army Environmental Hygiene Agency (USAEHA), Geohydrologic Study No. 38-26-0313-88, Seneca Army Depot, Romulus, New York, 13-21, October 1987.

U.S.Army Environmental Hygiene Agency (USAEHA), 1988, Evaluation of Solid Waste Management Units, Seneca Army Depot, Interim Final Report, Groundwater Contamination Survey No. 38-26-0868-88.

U.S. Army Environmental Hygiene Agency, 1980.

U.S. Army Material Development and Readiness Command (DARCOM), "Phase 2, Hazardous Waste Management Special Study: No. 39-26-0147-83 Darcom Open-Burning/Open-Detonation Grounds Evaluatin, Seneca Army Depot, Seneca, New York, 1983.

U.S. Army Toxic and Hazardous Materials Agency, (USATHMA), Installation Assessment of Seneca Army Depot, Report No. 157, AMXTH-IR-A-157, January 1980.

U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), 1985, Evaluation of Critical Parameters Affecting Contaminant Migration through Soils, Report No. AMXTH-TE-CR-85030, July 1985.

U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), 1988, Task Order 8k, Field Demonstration Composting of Explosives-Contaminated Sediments at LAPP.

U.S. Department of Agriculture (USDA), 1968, "Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss. Agriculture Handbook No. 346.

U.S. Department of Commerce, 1961, "Rainfall Frequency Atlas of the United States" TP-40, Washington, D.C.

U.S. Environmental Protection Agency (USEPA), May 5, 1995, "Draft SOP - Ground Water Sampling using Low Flow Pump Purging and Sampling."

U.S. Environmental Protection Agency, 1983. Hazardous Waste Land Treatment (revised edition). Office of Solid Waste and Emergency Response. Washington, D.C. SW-874.

U.S. Environmental Protection Agency, 1994, Water Quality Criteria Summary. Office of Science and Technology. Washington, D.C.

U.S. Environmental Protection Agency (USEPA), 1993f, Wildlife Exposure Factors Handbook (Vols. Iand II). (EPA/600/R-93/187a and 187b).

U.S. Environmental Protection Agency (USEPA), 1992, Guideline for Predictive Baseline Emissions Estimation Procedures for Superfund Sites (Interim Final). (EPA-450/1-92-002.January 1992).

U.S. Environmental Protection Agency (USEPA), 1992, Dermal Exposure Assessment: Principles and Applications (Interim Report). (EPA/600/8-91-011B.January 1992).

U.S. Environmental Protection Agency (USEPA), February 1992, "Framework for Ecological Risk Assessment. (EPA/630/R-92/001).

U.S. Environmental Protection Agency (USEPA), December 1991, "Ecological Assessment of Superfund Sites; An Overview" (ECO Update, Vol. 1, No. 2).

U.S. Environmental Protection Agency, 1990, Handbook on In-Situ Treatment of Hazardous Waste-Contaminated Soils, Washington, D.C.

U.S. Environmental Protection Agency (USEPA), April 1990, "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers" (EPA, Office of Emergency and Remedial Response.

U.S. Environmental Protection Agency, 1991b, Handbook on Remediation of Contaminated Sediments, Washington, D.C.

U.S. Environmental Protection Agency, 1992, The Superfund Innovative Technology Program, Washington, D.C.

U.S. Environmental Protection Agency, 1993, Vendor Information System for Innovative Treatment Technologies, Washington, D.C.

U.S. Environmental Protection Agency (USEPA), 1985, Asbestos in Buildings: Simplified Sampling Science for Viable Surface Materials. Washington, D.C.

U.S. Environmental Protection Agency (USEPA), "Use of the Water Balance Method for Predicting Leachate Generation from Solid Waste Disposal Sites", EPA/550/SW-168, 1975.

U.S. Environmental Protection Agency, 1985, "Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface Water and Groundwater" EPA/600/6-85/002, Athens, Georgia, September, 1985.

U.S. Environmental Protection Agency (USEPA), 1988, "Superfund Exposure Assessment Manual", EPA/540/1-88/001. Washington, DC, April 1988.

U.S. Environmental Protection Agency (USEPA), Interim Final, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," OSWER Directive 9355.3-01, Office of Emergency and Remedial Response, October, 1988.

U.S. Environmental Protection Agency (USEPA), 1989, "Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF) - Air Emission Models", April 1989.

U.S. Environmental Protection Agency (USEPA), 1989b, Ecological Assessment ofHazardous Waste Sites: A Field and Laboratory Reference. EPA/600/3-89/013. Washington, DC

U.S. Environmental Protection Agency (USEPA), 1989a, "Risk Assessment Guidance for Superfund" EPA/540/1-89/002, April 1989.

U.S. Environmental Protection Agency (USEPA), 1989b, "Supplemental Risk Guidance for the Superfund Program" EPA 901/5-89/001, June 1989.

U.S. Environmental Protection Agency (USEPA), 1990, Basics of Pump-and-Treat Groundwater Remediation Technology, EPA/600/8-90/003, March 1990.

U.S. Environmental Protection Agency (USEPA), 1990. "Guidance for Data Useability in Risk Assessment." EPA/540/G-90/008, October 1990.

U.S. Environmental Protection Agency (USEPA), 1990b, "Macroinvertebrate Field and Laboratory Methods for Evaluating the Biological Integrity of Surface Waters," EPA/600/4-90/030 Washington, DC 256 pps.

U.S. Environmental Protection Agency (USEPA, 1989, Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells. (EPA 600/4-89/034).

U.S. Environmental Protection Agency (USEPA), 1986, Measurement of Gaseous Emission Rates from Land Surfaces Using An Emissions Isolation Flux Chamber User's Guide EPA/600/8-86/008, Washington, D.C.

U.S. Environmental Protection Agency (USEPA), 1989, USEPA Region II CERCLA Quality Assurance Manual.

U.S. Environmental Protection Agency (USEPA), 1991, "Risk Assessment Guidance for Superfund. Volume 1-Human Health Evaluation Manual. Supplemental Guidance Standard Default Exposure Factors." OSWER Directive 9285.6-03, March 1991.

U.S. Environmental Protection Agency (EPA), 1991, Letter from Robert Wing of EPA Region II to Gary Kittell of the U.S. Army Corps of Engineers, dated September 16, 1991.

U.S. Environmental Protection Agency (USEPA), 1993, Health Effects Assessment Summary Tables - Annual Update. March 1993.

U.S. Environmental Protection Agency (USEPA), "Manual of Water Well Construction Practices, Publ. No. EPA/570/9-75-001.

U.S. Environmental Protection Agency (USEPA), "Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish, 1989.

U.S. Fish and Wildlife Service, 1990, 1991a, 1991b, Montezuma National Wildlife Refuge.

U.S. Fish and Wildlife Service, 1990, Montezuma National Wildlife Refuge.

U.S. Fish and Wildlife Service, 1991, Birds of Montezuma Wildlife Refuge.

U.S. Fish and Wildlife Service and New York State Department Environmental Conservation, 1991, Northern Montezuma Wetlands Project, Final Environmental Impact Statement, 223 pp.

U.S. Geological Survey Quadrangle Maps, Towns of Ovid and Dresden, New York, 1970.

U.S. Geological Survey, A Water-Supply Paper 888, Washington, D.C.

Water Information Center, "Water Atlas of the United States," 1973.

Woodruff, D., 1992, Wildlife biologist, N.Y.S. February 2, 1992. Dept. Envir. Conservation Region 8, Personal communication with R.B. Olson, Chas. T. Main, Inc. February 27, 1992.

Zlotnik, V., 1994, Interpretation of Slug and Packer Tests in Anisotropic Aquifers, Ground Water, Vol. 32, No. 5.

APPENDIX A

FIELD SAMPLING AND ANALYSIS PLAN

Appendix A information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX B

HEALTH AND SAFETY PLAN

Appendix B information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX C

CHEMICAL DATA AQUISITION PLAN

Appendix C information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX D

UNITED STATES DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICES ENDAGERED AND THREATENED SPECIES LETTER

Appendix D information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX E

RESPONSE TO REVIEW COMMENTS

Response to Comments
by
USEPA
for Draft Final Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at the Sewage Sludge Waste Piles (SEAD-5), The Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot Activity
Romulus, New York
Comment Date: March 1997

Comment #8 No note, as described in the response to the original comment, has been added to the referenced figure.

Response #8 Agreed. The original response to comment 8 did not state that a note was to be added to the figures, it stated that the figure already noted the EPA recommendation that terrestrial and aquatic biota may be impacted by COCs in both surface water and sediment (i.e., the black dots in Figure 3-18 indicated this potential exposure pathway for SEAD-59; at SEAD-71 there is no surface water and sediment media, so no exposure has been indicated for this site). However, to ensure that this exposure pathway is properly recognized at SEAD-59, a note has also been added to Figure 3-18.

Comment #21 In addition to the single downgradient bedrock monitoring well proposed, at least one up-gradient monitoring well should be installed to monitor groundwater quality directly up-gradient of the site.

Response #21 Agreed. One upgradient, shallow bedrock monitoring well has been added to SEAD-71. The text on pages 4-22, 4-23, and 4-27 has been modified accordingly, and Table 4-2, and Figure 4-4 have also been updated to reflect this new well.

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ARMY

COMMENTS AND RECOMMENDATIONS
PRE-DRAFT PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR
SEWAGE SLUDGE PILES, SEAD-5
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

<u>Comments By: VanCleef</u>

Comment #1 General Comment, Section 3.1.2.6.

This refers to PAHs exceeding their associated "Technical and Administrative Guidance Memorandum (TAGM) values", but does not give any additional information on the TAGM. Clarify whether the TAGM is an applicable or relative and appropriate requirement for this site.

Response #1 Criteria for soils are presented in the NYSDEC TAGM titled "Determination of Soil Cleanup Objectives and Cleanup Levels" (HWR-94-4046), January 1994, which is an applicable or relative and appropriate requirement for SEDA. An introduction section, which discusses the sources of the criteria used to analyze the chemical analysis results for the three sites, has been added to Sections 3.1.1.2.6,3.1.2.2.5,and 3.1.3.2.5.

Comment #2 From review of this document, here is my concern.

(1) Drinking water does not appear to be a problem because the iron, manganese, and sodium detected do not constitute hazardous substances under CERCLA and there are no established federal primary drinking water standards (MCLs) for these metals.

(2) The RCRA metals in the soil are sufficiently low to be unregulated for disposal per federal guidelines - EPA's contained-in policy for soils. (I assumed that the values listed were totals, not TCLP).

(3) The driving force behind conducting further action appears to be the PAHs at the site. However when comparing the listed maximum PAH values in the document to the EPA Region III Risk-Based Concentration Table dated 1/31/95, the PAHs all are well below the screening values listed for industrial soil. So it leads me to question the basis for the values in the TAGM and whether they are being appropriately applied.

Response #2 Agreed. The high concentrations of PAHs and inorganic elements in the soils from several of the above ground sewage sludge piles are the reason for the recommendation for a remedial investigation/feasibility study at this site. The analytical results from the ESI sampling program were compared to NYSDEC TAGM values and appropriate Federal standards. The NYSDEC TAGM values are derived from consideration of exposure factors for residential use. This method for determining whether a threat exists at this site was agreed upon by the USEPA, NYDSEC, and the Army prior to beginning the ESI.

Comments By: Tate

Comment #1 Page 3-13

The acronym "TAGM: Technical and Administrative Guidance Memorandum" doesn't seem to have a consistent meaning for SEAD. The parallel SEAD documents refer to TCLP for limits on metals. If there is a ROD or another document with specific criteria for the site, it should be referred to by the proper title or date.

Response #1 Agreed. There is no description of the criteria used to evaluate the chemical analysis results for this site in this Scoping Plan. An introduction, which discusses the criteria for evaluation of the soil and groundwater media, has been added to Section 3.1.1.2.6.

The TCLP Extraction Guidance Values and TCLP Alternative Guidance Values are criteria used in the NYSDEC Spill Technology & Remediation Series Memo #1, Petroleum - Contamination Soil Guidance Policy. This document was used for the closure process for removal of an underground storage tank at SEAD-16 and was referenced in the Scoping Plan for that site.

Comment #2 Page 3-15

The background concentrations of the metals in the groundwater should be identified. None of the high concentrations under consideration can be attributed to the site without due consideration of the background levels for each.

Response #2 The upgradient monitoring well, MW5-1, was used to collect the background groundwater sample for the site. The Groundwater Sampling Summary compares the concentrations of metals in the groundwater sample from the upgradient monitoring well and the two downgradient monitoring wells.Four metals were found in the groundwater from all three wells at concentrations which exceeded the federal or state groundwater criteria. The highest concentrations of the four metals were found in the groundwater sample from in the downgradient monitoring well MW5-3.

Comment #3 Page 3-15

Ammonia/ammonium forms of nitrogen are better indicators of recent contamination.

Response #3 Agreed. Ammonia/ammonium forms of nitrogen are better indicators of recent contamination. However, these compounds were not analyzed for as part of the ESI chemical analyses.

Comment #4 The list of contaminants and concentrations discussed in this report are scarcely enough to justify a full blown RI/FS for this site. Iron, manganese, and nitrate nitrogen below drinking water standard do no justify declaring this a hazardous waste site.

Response #4 The results of the ESI for Eight Moderately Low Priority SWMUs at SEDA indicated that the soils in the five sludge piles located at SEAD-5 have been impacted by PAHs and the metals, antimony, copper, magnesium, mercury, silver, and zinc. Aluminum, iron, sodium, and manganese were found in the groundwater at concentrations above the associated criteria. As part of the November 1994 Project Manager's Meeting at Seneca Army Depot Activity, Dr. Kathleen Buchi (AEC), Mr. Randall Battaglia (SEDA), Mr. Kevin Healy (CEHND), and Mr. Michael Duchesneau and Mr. James Chaplick (Parsons ES) discussed reasonable recommendations for SEAD-5. This site, based on the current understanding of site conditions, was classified as a site that would be evaluated further in a RI/FS. This decision reflects the final decisions that were agreed upon at the time by all parties involved in the meeting.

<u>Comments By: Healy</u>

Comment #1 Section 3.1.3, Section Title

Please correct "SEAD-60" to SEAD-5".

Response #1 Agreed. The section title has been revised.

Comment #2 Section 3.2, Page 3-34

In the third paragraph, delete "Currently, the Army ...transfer the ownership." In paragraph 4, delete "Until the BRAC ...installation will remain open." and combine paragraphs 4 and 5. Finally, delete "However, not all ... for residential use."

Response #2 Agreed. The referenced text has been removed from Section 3.2 and the paragraphs combined.

Comment #3 Section 3.2, Page 3-36

In the first paragraph on this page, reference is made to "significant releases" twice. To my knowledge, the <u>sludge piles</u> are "contaminated" while nothing has yet been proven that would indicate contamination has been released to the surrounding area. I believe "significant releases" would more appropriately be "significant presence".

Response #3 Agreed. The text has been revised.

Comment #4 Section 3.2.3, Page 3-38

In the first line, recommend changing "is a potential ...as their water supply." to "would become a potential route of exposure to all future on-site residents if on-site groundwater were ever used as their water supply. This scenario will, however, continue to be extremely unlikely.

Response #4 Agreed. The text has been revised.

Comment #5 Section 4.2.1.1

In Line 2, change "by the release" to "by the presence".

Response #5 Agreed. The text has been revised.

<u>Comments By: Bradley</u>

Comment #1 General

Comments provided verbally to K. Healy (ED-CS-G).

Response #1 Acknowledged.

<u>Comments By: E. Hines</u>

Comment Proc: The RI/FS for this site does not appear to be justified by the data. Iron, manganese, and nitrate are not "HTRW."

Response Refer to Response to Comment #4 on page 2.

RESPONSE TO ARMY CORPS OF ENGINEERS
COMMENTS AND RECOMMENDATIONS
PRE-DRAFT PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR
FILL AREA WEST OF BUILDING 135, SEAD-59
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Comments By: Forget

Comments #1 Another scoping plan described Seneca may be put on the BRAC list. If it does, as described in the BRAC guidance, the scenarios evaluated in the baseline risk assessment should be based on the community reuse plan. Therefore, revise future receptors to be evaluated in the risk assessment when the reuse plan is developed.

Even if the project remains under CERCLA, EPA's new Future Land Use guidance emphasizes input from the community to determine the future land use. This guidance also states that assuming current non-residential sites become residential in the future is not always warranted. This important risk management decision should be carefully evaluated at this time.

Response 1 Agreed. The scenarios evaluated in the baseline risk assessment will be based on the community reuse plan, as described in BRAC guidance. Specifically, the future receptors currently identified in the baseline risk assessment will be revised when the community reuse plan is written. The text in Section 4.4, Baseline Risk Assessment, has been modified to include this recommendation.

Comments By: Breckenridge

Comment #1 See previous comments on Generic Installation RI/FS Work Plan.

Response #1 Acknowledged.

Comment #2 Recommend that at least one innovative technology be evaluated for this site.

Response #2 Agreed. The workplan has been changed to state that at least one innovative technology will be evaluated for this site. Text was added to Sections 5.3 and 5.4 of the Project Scoping Plan.

Comment #3 Recommend on future submittals for individual sites that the applicable portions of the Generic Installation RI/FS Work Plan be provided in the document rather than referenced. This will insure that the generic work plan is tailored more specifically for a particular site rather than blindly referencing the generic work plan and allow for more continuity in the review process.

Response #3 Acknowledged. However, though a cooperative effort between the Army and Parsons ES, the preparation of RI/FS workplans at SEDA has been formulated so that the Project Scoping Plans contain specific information about the site and additional information that is not specific to the site is contained in the Generic RI Installation Workplan. This was done to avoid repeating large sections of generic text for the individual scoping plans.

Comments By: Healy

Comment #1 Appendix E

It appears that the "Response to Comments" was omitted. The reference to the Generic Work Plan is incorrect.

Response #1 The explanation page for Appendix E has been removed. Comments from the Army, EPA, and NYSDEC will be inserted into the appendix as they are received.

Comments By: S. Bradley

Comment #1 Section 4.2.3,page 4.5

Discussion of statistical techniques generally defined in the Generic Work Plan must be supplemented in this section to justify numbers and locations of samples. The statistical analysis method and resulting confidence interval should be specified.

Response #1 Disagree. Statistical methods were not used to locate the soil borings because the source areas for the impacts are generally known, and the proposed soil borings are designed to define the extent of these impacts. In our opinion, these samplings are best located using professional judgement, considering existing analytical data and physical site characteristics (i.e., size of source areas, and groundwater flow directions) and not statistical analyses. The statistical methods mentioned in the Generic Workplan (variogram analysis and kriging) would be more suitable for sites where source areas are not as well characterized as they are at SEAD-59 and where one is trying to define the spatial continuity of a regionalized variable. No change was made to the text.

Comment #2 Section 4.2.4,page 4-7

See Comment 1.

Response #2 Disagree. Statistical methods were not used to locate the surface water and sediment samples for the same reasons given in response number 1. The workplan states that the surface water and sediment samples will be taken in areas that have the potential to act as an exposure pathway for off-site transport of site contaminants (i.e., the samples are located near the source areas identified in the ESI). No change was made to the text.

Comment #3 Section 4.2.5,page 4-7

See Comment #1.

Response #3 Disagree. Parsons ES does not feel that it is appropriate to locate the monitoring wells at SEAD-59 using statistical techniques. As noted above in responses 1 and 2, the wells are designed to determine the extent of the impacts. Specifically, they are located upgradient and downgradient of the source areas, and for this purpose we believe that they are best located using professional judgement, supporting analytical data, and physical site characteristics (i.e., size of the source areas and directions of groundwater flow). No change was made to the text.

Comment #4 Section 4.2.7,page 4-9

Identify sources of required information.

Response #4 Agreed. The sources of the information to be gathered in Sections 4.2.3.1, 4.3.7.1,4.4.4.1have been added to the text.

Comments By: W. Bojarski, K. Hoddinott

Comment #1 Table 3-4, Page 1 of 1, Groundwater Analysis Results from ESI - Bojarski

There is a required correction to the column titled "Federal Drinking Water MCL (f)". For aluminum, the value should read 50-200 not the listed 50-100. In addition, only the secondary MCL is listed for copper. Should the action level of 1300 be listed to be consistent with lead (action level listed)? These values are listed in EPA, Drinking Water Regulations and Heath Advisories, Office of Water, May, 1994.

Recommendation: Make the necessary change for aluminum and consider the addition of the action level for copper.

Response #1 Agreed. The values for aluminum has been changed to the range of 50-200 ug/L in Table 3-8, Groundwater Analysis Results. A footnote has been added to the table to include the action level for copper.

Comment #2 Page 3-31, Section 3.1.2.5,Chemical Analysis Results: Metals subsection - Bojarski

This section states that aluminum was found above the Federal MCL of 50 ug/L, which is not entirely correct. The Federal secondary MCL for aluminum has a range of 50 to 200 ug/L.

Recommendation: Make the necessary change to the section to include the range.

Response #2 Agreed. The Federal secondary MCL range has been added to the text.

Comment #3 Page 4-5, Section 4.2.3, Soil Investigation - Hoddinott

The soil sampling outlined in this section does not include a determination of soil background.

Recommendation: Include an adequate determination of the background levels of chemicals in the soil.

Response #3 Agreed. A background soil boring (MW59-7) is proposed for this RI as described in Section 4.3.3.1. The three (3) soil samples collected from this boring will be added to the soil background database for all of SEDA which contains approximately 57 samples. The background soil concentrations for all sites at SEDA are derived from this large data base.

Comment #4 Appendix E, Response to Comments - Hoddinott

How can the response to comments about this report be in the generic workplan?

Recommendation: Remove the explanation page for this section until you have received comments about this report.

Response #4 Agreed. The explanation page for Appendix E has been removed. Comments from the Army, EPA and NYSDEC will be inserted into this appendix when they are received.

COMMENTS AND RECOMMENDATIONS
PRE-DRAFT PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR ALLEGED PAINT DISPOSAL AREAS, SEAD-71
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

<u>Comments By: Maly, Waterbury, Hoddinott</u>

Comment #1 Page 1-1, Section 1.1, A. Maly - Purpose of the Report.

Why are the sites for a CERCLA investigation referred to as SWMUs, which is a RCRA term?

<u>Recommendation</u>: Provide a clarification for this issue.

Response #1 Agreed. The sites for the CERCLA RI/FS investigations are called SWMUs (a RCRA term) because the Army elected in their Federal Facilities Agreement to combine RCRA and CERCLA obligations, and the Army has decided to use RCRA terms in referencing various units. Clarification of this issue is provided on page 1-1.

Comment #2 Page 2-1, Section 2.0, A. Maly - Site Conditions.

The lack of including the Generic RI/FS workplan means that relevant information may have been overlooked in this review.

<u>Recommendation</u>: If specifically requested information is contained in other documents, refer the reader to the proper document.

Response #2 Acknowledged. However, though a cooperative effort between the Army and Parsons ES, the preparation of RI/FS workplans at SEDA has been formulated so that the Project Scoping Plans contain specific information about the site and additional information that is not specific to the site is contained in the Generic RI Installation Workplan. This was done to avoid repeating large sections of generic text for the individual scoping plans.

Comment #3 Page 3-12, Section 3.1.2.5,A. Maly - Chemical Analysis Results.

The impact of potential laboratory contaminants seem to be ignored, and the presence of such contaminants may potentially be the basis for site-wide investigations. No discussion is made of these "hits" which are potential laboratory contaminants.

<u>Recommendations</u>: Explain the impact of laboratory contaminants on the

existing data, whether such an evaluation was made, and what were the results of the evaluation.

Response #3

Agreed. A discussion of the impact of laboratory contaminants on the existing data was added to the soil discussion in Section 3.1.3.2.5,Chemical Analysis Results, Volatile Organic Compounds.

Comment #4

Page 3-21, Section 3.1.2.5, M. Waterbury - Chemical Analysis Results - Ground Water Sampling Summary

The water samples that exceeded the metals criteria were quite turbid (1860 and 64 NTUs). The turbidity level suggests that the nitric acid preservative probably mobilized metals which are naturally incorporated in the soil mineral matrix; therefore, it does not appear that metals have impacted the groundwater at the site.

<u>Recommendation</u>: Discuss turbidity of samples and the consequence of preserving a turbid sample. Identify the well with the highest metal levels as the most turbid sample. Sample new and existing wells with greater emphasis placed on collecting low turbidity ground-water samples (this may require more development of the well screen pack and using a low flow sampling procedure). Collect additional filtered metal samples for comparison with the unfiltered metal samples.

Response #4

Agreed. A sentence has been added to the metals section of the Groundwater Sampling Summary in Section 3.1.3.2.5 that states that the higher metals concentrations in the monitoring well MW71-1 may be due to silt as evidenced by the high turbidity of the groundwater sample.

As part of this RI field investigation, groundwater samples will be collected from the 3 existing and 2 proposed monitoring wells. Because the collection of low turbidity samples is a goal of the groundwater sampling program for this RI, we will use the USEPA low flow sampling method in these wells. To ensure that low turbidity samples are collected, the wells will be developed using a surge block and purged with a peristaltic pump using low flows at the end of the development process to remove all of the silt and clay from the wells. Then low flow sampling (100 ml/min) will be performed with a submersible pump such as the Redi-Flow2.

NYSDEC has indicated that filtered groundwater samples are unacceptable. During earlier RIs conducted at SEDA both filtered and unfiltered samples were collected, and comparisons between the two types were made, but the NYSDEC indicated that only unfiltered results were valid. For this reason, and to save on unnecessary analytical costs, only unfiltered samples are collected for the RIs at SEDA. No changes were made to the text.

Comment #5

Page 4-1, Section 4.2, A. Maly - Field Investigations at SEAD-71

This section alludes to there being a sediment/surface water investigation. No recommendations are given for sediment nor surface water sampling. There appears to be no surface water nor sediment location near this site.

Recommendation: Remove the surface water and sediment investigation from the list of field activities to be performed.

Response #5

Agreed. The surface water and sediment investigation has been removed from the list of field activities to be performed.

Comment #6

Page 3-12, Section 3.1.2.5,M. Waterbury - Chemical Analysis Results - Soil Sampling Summary

This section does not give background levels of metals that can be compared (statistically) with site metal concentrations. A decision can not be made on whether additional sampling for metals is necessary (e.g., a release may have occurred) until background metal levels are established. The knowledge of background metal levels is a deficiency of the Expanded Site Inspection. The EPA Guidance (Guidance for Performing Site Inspection Under CERCLA, September 1992, Page 60) states that "Expanded SI sampling should focus on demonstrating and documenting a release based on data of rigorous quality. The full complement of background, QA/QC, and attribution samples should be collected." This deficiency may lead to unnecessary additional soil sampling and analysis (for metals) at the site.

Recommendation: Greater emphasis should be placed on determining background metal levels. This should be done at the expense of any further soil sampling for metals, if necessary.

Response #6

Disagree. The determination that soils have been impacted by metals is based on a comparison with NYSDEC TAGMs, and if no TAGM exists it is based on a comparison to background soil concentrations established from a large database at SEDA. In instances where both a TAGM and a soil background concentration are available, the higher of the two values is used for the comparison (i.e., as the TAGM). In this way the natural background soil concentrations are factored into the evaluation as to whether the soil has been impacted. Because it is not clear in the text or tables how the background soil concentrations are factored into the TAGM values, an explanation of this has been added to the text in Sections 3.1.1.2.6,3.1.2.2.5, and 3.1.3.2.5.

Comment #7

Page 4-2, Section 4.2.2,K. Hoddinott - Soil Investigation.

The soil sampling outlined in this section does not seem to include a determination of soil background.

Recommendation: Include an adequate determination of the background levels of chemicals in the soil.

Response #7

Agreed. The background soil concentrations for all sites at SEDA are derived from the background soil database which contains approximately 57 soil samples collected from 25 ESI sites and four RI sites at SEDA. A background soil boring was not proposed for this site because the area upgradient of the site is industrial, which would make it difficult to obtain an uncontaminated background soil sample.

Comment #8

Page 4-7, Section 4.2.3.1,M. Waterbury - Monitoring Well Installation and Sampling

Considering the problems with turbid samples stated in Section 3.1.2.5, emphasis should be placed on collecting low turbidity samples to ensure that dissolved metal levels are not artificially elevated in groundwater samples.

Recommendation: Sample new and existing wells with greater emphasis placed on collecting low turbidity groundwater samples (this may require more development of the well screen pack, filter pack of a smaller grain size for new wells, and using a low flow sampling procedure). Collect additional filtered metal samples for comparison with the unfiltered metal samples.

Response #8

Agreed. As part of this RI field investigation, groundwater samples will be collected from the 3 existing and 2 proposed monitoring wells. Because the collection of low turbidity samples is a goal of the groundwater sampling program for this RI, we will use the USEPA low flow sampling method in these wells. To ensure that low turbidity samples are collected, the wells will be developed using a surge block and purged with a peristaltic pump using low flows at the end of the development process to remove all of the silt and clay from the wells. Then low flow sampling (100 ml/min) will be performed with a submersible pump such as the Redi-Flow2.

NYSDEC has indicated that filtered groundwater samples are unacceptable. During earlier RIs conducted at SEDA both filtered and unfiltered samples were collected, and comparisons between the two types were made, but the NYSDEC indicated that only unfiltered results were valid. For this reason, and to save on unnecessary analytical costs, only unfiltered samples are collected for the RIs at SEDA.

Comment #9

Appendix E, K. Hoddinott - Response to Comments

How can the response to comments about this report be in the generic workplan?

Recommendation: Remove the explanation page for this section until you get comments about this report.

Response #9 Agreed. The explanation page for Appendix E has been removed. Comments from the Army, EPA, and NYSDEC will be inserted into this section when they are received.

<u>Comments By: Forget</u>

Comment #1 Another scoping plan described Seneca may be put on the BRAC list. If it does, as described in the BRAC guidance, the scenarios evaluated in the baseline risk assessment should be based on the community reuse plan. Therefore, revise future receptors to be evaluated in the risk assessment when the reuse plan is developed.

Even if the project remains under CERCLA, EPA's new Future Land Use guidance emphasizes input from the community to determine the future land use. This guidance also states that assuming current non-residential sites become residential in the future is not always warranted. This important risk management decision should be carefully evaluated at this time.

Response #1 Agreed. The scenarios evaluated in the baseline risk assessment will be based on the community reuse plan, as described in BRAC guidance. Specifically, the future receptors currently identified in the baseline risk assessment will be revised when the community reuse plan is written. The text in Section 4.4, Baseline Risk Assessment, on page 4-16 has been modified to include this recommendation.

<u>Comments By: Breckenridge</u>

Comment #1 General

See previous comments on Generic Installation RI/FS Workplan.

Response #1 Acknowledged.

Comment #2 Recommend that at least one innovative technology be evaluated for this site.

Response #2 Agreed. The workplan has been changed to state that at least one innovative technology will be evaluated for this site. Text was added to Sections 5.3 and 5.4 of the Project Scoping Plan.

Comment #3 Recommend on future submittals for individual sites that the applicable portions of the Generic Installation RI/FS Work Plan be provided in the document rather than referenced. This will insure that the generic work plan is tailored more specifically for a particular site rather than blindly referencing the generic work plan and allow for more continuity in the review process.

Response #3 Acknowledged. However, though a cooperative effort between the Army and

Parsons ES, the preparation of RI/FS workplans at SEDA has been formulated so that the Project Scoping Plans contain specific information about the site and additional information that is not specific to the site is contained in the Generic RI Installation Workplan. This was done to avoid repeating large sections of generic text for the individual scoping plans.

Comments By: Tate

Comment #1 Page 1-2, Section 1.3.

It is not clear whether cadmium and lead or solvents have been detected.

Response #1 Soils at the site have been impacted by PAHs and metals. Thirteen metals were detected in one or more soil samples at concentrations above associated TAGM criteria. All metals except lead, were found at concentrations just slightly above the criteria. Aluminum, iron, lead, manganese and thallium were detected in groundwater at concentrations above the associated criteria. The discussion in Section 1.3 is intended to be very general. The Soil Sampling Summary and Groundwater Sampling Summary discussions in Section 3 provide more detail.

Comments By: Healy

Comment #1 Section 3.2, Page 3-28

The Army has graciously pulled the rug out from under our attempts to avoid having to use the future residential use scenario for risk calculations by listing the Depot for closure. Therefore, recommend deleting the sentence "Currently the Army has no plans ...transfer the ownership." from paragraph 4. This should also be performed with each of the Project Scoping Plans currently being prepared.

Response #1 Agreed. The sentence has been removed from Section 3.2.

D#14

Response to Comments
by
U.S. Army
for Draft Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at
The Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot Activity
Romulus, New York
Comment Date: March 1996

Note: As point of clarification, SEAD-5 has been dropped from this RI/FS Scoping Plan, and it has instead been recommended for a Removal Action by the Army. Thus, the responses provided below address only general comments, and those that are specific to SEAD-59 and SEAD-71. The Draft Final RI/FS Scoping Plan that was issued with the responses to these comments addresses only SEAD-59 and SEAD-71.

Bradley

Comment #1 General. Previous comments adequately addressed.

Response #1 Acknowledged.

Nebelsick

Comment #1 General. The compounds detected at SEAD-5 were PAHs and metals. By the very nature of the material (i.e., sewage sludge) this would be expected. The ESI showed the contaminants were not mobile and the pathway of concern was by ingestion. During the initial review of the ESI for the Eight Moderately Low AOCs, this reviewer recommended additional field work would not be necessary but instead a focused study to address removal/disposal of sludge materials that were disposed against the County/State regulations. A discussion describing the reasons for further action should be included in the text.

Response #1 Agreed. SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

Comment #2 Section 4.2.4. Historical information and current knowledge of operations of SEAD-5 were used to identify the contaminants of concern for the site; SVOCs, pesticides, and metals in soils. If additional investigations were required, this reviewer does not see the rationale for analysis of pesticides/PCBs and nitrate-nitrogen in soils since they were identified as not of concern during the ESI. In addition, the analysis of VOCs was not justified. Contaminants of concern for groundwater were metals only. Therefore, analysis of all additional analytes do not appear warranted. Generally, site investigations would analyze a broad range of contaminants if historical information was not available. Based on the analyses, the list of contaminants could be reduced (in discussion with the regulators) to concentrate on the contaminants that are of concern. The process proposed here is opposite of the majority of environmental designers. Clarify.

Response #2 Agreed. SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

Comment #3 Section 4.2.4. Based on the data provided, the soil and groundwater sampling program appears excessive. If sampling is necessary, recommend field screening be considered to focus the investigation.

Response #3 Agreed. SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

Comment #4 Section 4.3. Based on the ESI, the only criteria that was exceeded was VOCs in soils. VOCs in groundwater did not exceed any criteria. Therefore, the proposed field investigations appear excessive. This reviewer does not see the rationale for all of the additional soil borings and test pits since the levels detected in the soil were relatively low. The site strategy or overall approach as to how the team is going from the current site condition to site closeout is not clear. This reviewer still recommends that the wells be monitored (with additional wells added if downgradient extent is not defined) for the contaminants of concern (i.e., VOCs only) defined by historical or current knowledge.

Response #4 Disagree. Not all areas were investigated during the ESI and as pointed out by the agency reviewers monitoring wells were not located downgradient of potential source area that were identified during the ESI. Thus, the RI is designed to investigate the potential releases associated with these areas. No change was made the text of the Scoping Plan.

Comment #5 Section 4.3.8. If additional investigation is warranted, this reviewer has similar concerns about the sampling program as stated for SEAD-5. Specifically, the rationale for additional analysis of SVOCs, pesticides/PCBs, and metals. Clarify.

Response #5 Agreed. SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

Comment #6 Section 4.4.5. Based on the ESI, the site does not appear to be a threat to human health and the environment. Of the contaminants detected, the SVOCs appear to be an isolated occurrence that a removal action would eliminate. The only other contaminant of concern was lead that was also detected at very low concentrations. Therefore, this reviewer recommends that the site be considered for closure instead of an RI/FS.

Response #6 Disagree. The ESI was performed to determine if there had been a release on the site and not to dermine the horizontal and vertical extent of impacts. On the basis of the data obtained from the ESI, an RI/FS was propsed by the Army. There is no data to indicate that the release of SVOCs in soils is isolated. Also, after the completion of the ESI, a SEDA employee reported that the potential burial pits extend farther west beyond the area that was investigated for the ESI. This additional area is included in the investigation under this RI.

<u>Frye</u>

Comment #1 Performing and RI/FS at this site seems to be overkill and not the most effective use of project funds. Given that the PAH levels in the sewage sludge exceeds residential risk screening values, it would seem more appropriate to do a removal action. Studying the waste piles is not going to reduce the risk. Site history indicates the depot off-site disposed of 560 tons of the sludge in 1992. Why not just send the remaining sludge to the same facility rather than performing costly studies that will probably conclude with the recommendation for a removal action anyway? A removal action would allow for a final clean closure of the site, especially in light of the fact that groundwater has not been impacted.

Response #1 Agreed. SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

<u>Tate</u>

Comment #1 This document is supposed to cover SEAD-5, SEAD-59, and SEAD-71. The feasibility study plan only addresses SEAD-59. Even the selection of the "No Further Action" alternative should be documented in a feasibility analysis.

Response #1 Agreed. The text in Section 5.0 has been revised so that is addresses both SEAD-59 and SEAD-71; SEAD-5 has been removed from this Scoping Plan and the Army has proposed that it be addressed via a Removal Action, and not through the RI/FS process.

EPA

Response to Comments
by
USEPA
for Draft Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at the Sewage Sludge Waste Piles (SEAD-5), The Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot Activity
Romulus, New York
Comment Date: September 1996

Note: As point of clarification, SEAD-5 has been dropped from this RI/FS Scoping Plan, and it has instead been recommended for a Removal Action by the Army. Thus, the responses provided below address only general comments, and those that are specific to SEAD-59 and SEAD-71. The Draft Final RI/FS Scoping Plan that was issued with the responses to these comments addresses only SEAD-59 and SEAD-71.

SECTION 1.0

Comment #1 Figure 1-3: Based on the results of Test Pit TP59-1 (BTEX of 2,100,000 ug/kg) the area of the AOC delineated in Figure 1-3 should be expanded.

Response #1 Agreed. The extent of the area that defines SEAD-59 has been extended to the south as recommended in the comment. Figure 1-2 (formerly Figure 1-3) has been revised.

SECTION 3.0

Comment #2 Figure 3-11: It is unclear what control was used to construct the 730 foot contour line presented on this figure. This same comment was made in the EPA's November 28, 1995 letter commenting on the Draft ESI Report for the Eight Moderately Low AOCs. In response to this comment the 730 foot contour was removed in the Draft Final version of this document.

Response #2 Agreed. The 730 foot contour was removed from Figure 3-7 (formerly Figure 3-11) as recommended in the comment.

Comment #3 Figure 3-13: Monitoring wells MW5-1, MW5-2, and MW5-3 should be shown on this Figure as they are on Figure 3-11 and Figure 3-12.

Response #3 Agreed. Monitoring wells MW5-1, MW5-2, and MW5-3 were added to Figure 3-9 (formerly Figure 3-13) as recommended in the comment.

Comment #4 Pages 3-34, 3-62: For metals in soils, the criteria used in this report were either TAGM guidance or site background levels, whichever was the greater. In the eventual RI report, when summarizing the metals data for soils, the data summary tables should include both the TAGM values and the SEDA background concentrations. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Response #4

Acknowledged. As noted in the comment, the TAGMs listed in 4046 and the soil background concentrations for metals were used for comparison to the metals concentrations found on-site. This list of "TAGMs" included both values listed in TAGM 4046 and background concentrations of metals obtained from a SEDA-wide data base of background samples from many sites. These background samples were collected from upgradient locations at these sites that were in unimpacted areas. Thus, the TAGMs for metals reflect both background conditions and values listed in TAGM 4046, and together these concentrations form the basis for the TAGM listed in the data summary tables. In light of this, we do not believe that a separate column of background metals data should be listed in the data summary tables. However, background concentrations of metals in the till will be presented in Section 1.0 of the RI, as has been customary in previous RI reports.

Comment #5

Page 3-36, P3: The text states "Xylene (total) was also detected in soil samples TP59-4 (410 ug/kg) and solids sample TP 59-3X (1,200 ug/kg) at concentrations which were below the associated criteria of 1,200 ug/kg". The text should state, "at or below the associated criteria."

Response #5

Agreed. The text in Section 3.1.1.2.5 of the Scoping Plan has been revised as recommended in the comment.

Comment #6

Figure 3-19: It is unclear what control was used to construct the 740 foot contour line presented on this figure.

Response #6

Acknowledged. We agree that there is no control downgradient of MW71-3, however, the elevation of groundwater at this well (740.06 feet) is very close to the elevation of the 740.00 foot contour represented on the figure, and, thus, the 740.00 contour line is likely to be located as it is shown on the contour map. Also, there is no significant change in the gradient of the land surface west of the site, which might otherwise provide evidence that the groundwater gradient would be different west of the site. On this basis, and considering that the 740.00 countour helps the reader better envision the water table at the site, we believe that there is some justification for including this contour. However, because of the lack of a control point, the 740.00 foot contour was dashed to indicate that it is inferred and shortened a bit to reduce the amount of extrapolation on the map. A note was added to the legend of Figure 3-15 (formerly Figure 3-19) that addresses the inferred line.

Comment #7

Figure 3-20: See comment for Figure 3-19. The construction of the groundwater contours in Figure 3-20 is not consistent with Figure 3-19. In general, even though the contour lines are dashed on Figure 3-20 to indicate that the are inferred, they extend well beyond any control points.

Response #7 Ageed. The groundwater contours in Figure 3-16 (formerly 3-20) have been revised so that they are the same as those shown in Figure 3-15 (formerly Figure 3-19).

Comment #8 Pages 3-107 and 3-110: Under "Ingestion and Dermal Exposure Due to Surface Water Runoff and Erosion," it should be noted that terrestrial biota may be impacted by COCs in both surface water and sediment. Aquatic organisms should be included as potential receptors for SEAD-59.

Response #8 Agreed. The figures that present the exposure pathways for both SEAD-59 and SEAD-71 [Figure 3-17 (formerly 3-22) and Figure 18 (formerly 3-23)] already reflect the recommended notes, however, the text does not completely describe these exposure pathways. So, the text in these sections has been revised to note that terrestrial biota may be impacted by COCs in both surface water and sediment. Also, a note has been added that states that aquatic organisms are potential receptors at SEAD-59.

Comment #9 Section 3.4: A list of TBCs should be included and the NYSDEC TAGM 4046 soil cleanup guidance should be listed for the sites.

Response #39 Agreed. A list of TBCs, including NYSDEC TAGM 4046, has been added to the end of Section 3.4.

Comment #10 Section 3.4: "Preliminary Identification of Applicable or Relevant and Appropriate Requirements (ARARs)," the Fish and Wildlife Coordination Act (16 USC 661) which requires the protection of fish and wildlife and their habitat, should be included under federal sources of location specific ARARs.

Response #10 Agreed. The Fish and Wildlife Coordination Act (USC 661) has been added to the federal list of location-specific ARARs in Section 3.4.

Comment #11 We recommend that freshwater sediments be screened against the lowest effect levels (LELs) and severe effect levels (SELs) taken from "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (Persaud, et.al., 1993). Samples obtained from drainage ditches should represent depositional or sedimentation areas.

Response #11 Agreed. For the RI, the freshwater sediments will be screened against the LELs and SELs taken from Persuad et al., 1993, which is currently done for the RIs at SEDA. However, because the table and the discussion are from the Final ESI for SEAD-13 the text was not changed. Also, in the RI for SEAD-59 and SEAD-71, 1994 NYSDEC sediment guidance will be used; as a note the 1994 guidance is currently used in the RIs prepared for SEDA. TOC data will be available for sediment samples collected during the SEAD-59 and SEAD-71 RI to make adjustments to the parameters whose guidance values are based on a TOC-correction. The proposed sediment sampling locations are shown on Figure 4-3, and they are intended to be in depositional areas. A note has been added to the text in Section 4.2.4 that sediments samples are to be collected in depositional areas that are identified near the proposed sample location.

SECTION 4.0

Comment #12 Appendix A Page 4035-11, Part 1: It is unclear what the asterisks mean next to Clay in this table.

Response #12 Acknowledged. This screening method was proposed at SEAD-5 only, however, SEAD-5 has been dropped from this Scoping Plan. Therefore, the method description is no longer applicable and it has been removed from Appendix A of this Scoping Plan.

Comment #13 Sections 4.3.7 and 4.4.4: Although the Ecological Investigation described in these sections in consistent with the NYSDEC Fish and Wildlife Impact Analysis for Inactive Waste Sites (1994), no mention is made of USEPA guidance regarding Ecological Risk Assessment. USEPA guidance should be considered in the investigation and risk assessment portions of the project.

Response #13 Agreed. The text in Section 4.2.7 has been revised to make reference to EPA guidance regarding ecological risk assessment. Currently, EPA guidance is considered for the investigation and risk assessment portions of the project, as has been the case for previous RIs completed at SEDA.

Comment #14 Page 4-14 Section 4.3.: Some of the areas being investigated using the EM-31 will only have three data points collected along their short axis. This limited number of data points will make data interpretation difficult. The grid spacing in these areas should be reduced or the areas expanded to collect additional data.

Response #14 Agreed. In response to this comment we have adjusted the interval of the centers in the grid to 10 feet and have expanded the grid boundaries so that they are all encompassed by one area. This modification will provide for overlap with previous data and will make collecting and analyzing the EM-31 data less difficult.

Comment #15 Page 4-19 Section 4.3.4: The locations of the two additional sampling points should be indicated on a figure.

Response #15 Acknowldged. The locations of the additional surface water and sediment samples SW/SD59-5 and SW/SD59-13 are shown on Figure 4-1 (formerly Figure 4-3). The text has been revised so that it is clear which samples are the two nearby off-site samples.

Comment #16 Page 4-20 Section 4.3.5.1 P1: In order to better define the vertical extent of contamination, bedrock monitoring wells should be installed downgradient and upgradient of the disposal area. This is especially important at this site since, based on the existing data, it appears as if the wastes are in direct contact with bedrock.

Response #16 Agreed. To address possible verical impacts at the site three (3) shallow bedrock monitoring wells have been proposed. Two of the bedrock wells are proposed in downgradient locations and one is proposed as a background location. The text in Section 4.2.5.1 and Figure 4-1 were revised to reflect this change in the field program.

Comment #17 Page 4-26 Section 4.3.8: This section states that only seven groundwater samples will be collected. This contradicts previous text which states that two rounds of samples will be collected, giving a total of 14 samples.

Response #17 Agreed. The text in Section 4.2.8 has been revised so that it is clear what the total number of groundwater samples is for the RI (i.e., including rounds 1 and 2).

Comment #18 Figure 4-5: Groundwater contours should be shown on this Figure. Comparison of this Figure with Figure 3-19 indicates that the proposed monitoring wells may only monitoring part of the area which is hydraulically downgradient of the SEAD. Figure 3-19 indicates that groundwater flow is to the west-southwest. The proposed monitoring wells are all located to the west of the SEAD. An additional monitoring well should be installed to the south of the rail lines leading to Building 127 to the south of Test Pit TP71-1 to monitor groundwater quality downgradient of the SEAD.

Response #18 Agreed. An additional well has been proposed for the location recommended in the comment. But, we do not believe that it is necessary to show the groundwater countours on this map because this would make the map look cluttered and more difficult to read; however, the groundwater contours are shown are shown on Figure 3-15. The new well was added to the text in Section 4.3.3 and it was added to Figure 4-4.

Comment #19 Figures 4-3: As with Figure 4-5, groundwater contours should be shown on this Figure. Also the locations of monitoring wells MW5-1, MW5-2, and MW5-3 should be shown on this Figure as they are on Figures 3-11 and 3-12. The rationale for the proposed location of monitoring well MW59-6 should be provided. The proposed location for this well is approximately 60 feet from Test Pit TP59-6 in which 2,100,00 ug/kg of BTEX was present. Proposed well MW59-6 should be moved next to this test pit in order to better characterize groundwater quality in this area.

Response #19 Agreed. The wells MW5-1, MW5-2, and MW5-3 were added to this figure. Also, well MW59-6 was moved so that it is closer to test pit TP59-6 as recommended in the comment. But, we do not believe that it is necessary to show the groundwater countours on this map because this would make the map look cluttered and more difficult to read; however, the groundwater contours are shown are shown on Figure 3-7. The location of this well on Figure 4-1 was revised.

Comment #20 Page 4-31 P1: The text should discuss the basis for locating the two additional soil borings.

Response #20 Agreed. The basis for locating these two borings has been clarified in Section 4.3.2 of the text of the RI/FS Scoping Plan.

Comment #21 Page 4-34 Section 4.4.3.1 P1: The scope as defined in this paragraph, for the monitoring wells, is to define vertical extent of contamination. To define the vertical extent of contamination bedrock wells will have to be installed.

Response #21 Agreed. One bedrock monitoring well was proposed for SEAD-71 to address vertical impacts to groundwater. One bedrock well will be installed in a downgradient location in the west-central portion of the site adjacent to an overburden well. This well, and the three bedrock wells at SEAD-59, will be used to define the direction of groundwater flow in bedrock for this area. The text in Section 4.3.8 was revised to show this change and the well was added to Figure 4-4 of the Scoping Plan.

Comment #22 Page 4-39: Surface soil samples proposed for SEAD-71 (page 4-39) should undergo the full range of analyses recommended for soil samples, rather than be limited to SVOCs and TAL metals.

Response #22 Agreed. The sampling program has been modified and will include analysis of all soil samples for the full range of analyses. For reasons discussed below, the soil sampling program was modified so that both surface soils and subsurface soils will be collected at SEAD-71.

Also, not that the extent of the soil investigation was expanded to the west in reponse to a SEDA employee who, at the completion of the ESI, recalled that the location of the potential burial pits extended farther west, beyond the area that was previously investigated during the ESI. Therefore, 1) a GPR survey will be performed in the western portion of the site along the extent of the unpaved dirt road until it bends south near the confluence of two sets of railroad tracks, and 2) 3 soil borings and 3 test pits will be performed at locations that will be based on the results of the GPR geophysical results from the central and western portions of the site.

The additional GPR survey to be performed in the central and western portion of the site was added to the text in Section 4.3.1 and the location of the GRP geophysical survey is indicated on Figure 4-4. The soil sampling program in Section 4.3.2 of the Scoping Plan was revised and appropriate changes were made to Figure 4-4.

NYSDEC

Response to Comments
by
NYSDEC
for Draft Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at
The Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot Activity
Romulus, New York
Comment Date: February 1997

Note: As point of clarification, SEAD-5 has been dropped from this RI/FS Scoping Plan, and it has instead been recommended for a Removal Action by the Army. Thus, the responses provided below address only general comments, and those that are specific to SEAD-59 and SEAD-71. The Draft Final RI/FS Scoping Plan that was issued with the responses to these comments addresses only SEAD-59 and SEAD-71.

Comment #1 Section 3.1.2.2.5 - Groundwater Sampling Summary (SEAD-59): If groundwater does flow to the southwest as stated in this document it is not surprising that no volatile organic compounds (VOCs) have been detected in groundwater sampled from SEAD-59. There are no groundwater wells located to the southwest of test pit 59-1, although very high levels of VOCs were detected in soil samples collected from this test pit. The placement of additional groundwater monitoring wells downgradient from test pit 59-1 should allow the consultant to better characterize the nature and extent of contamination in this area.

Response #1 Agreed. The Scoping Plan currently calls for a till/weathered shale well near TP59-1, and based on EPA comments this wells has been moved even closer to the test pit location; also, a bedrock well is proposed for this location as well. Because the comment suggests that multiple wells will be necessary to define the extent of the possible VOC impacts in groundwater, another well has been proposed to be installed even farther downgradient of TP59-1, near the SEAD-59 boundary. The text in Section 4.2.5 was revised as well as Figure 4-1.

Comment #2 Section 3.2 - Preliminary Identification of Potential Receptors and Exposure Scenarios: In this section it is stated that Table 4-1 of the generic Installation RI/FS work plan contains the numerical assumptions that will be used in the risk assessments for these sites. However Table 4-1 was removed from the work plan in response to the USEPA's comment letter of May 1995. Therefore, each individual project scoping plan will need to contain a table of the numerical exposure assumptions made for the risk assessment for that solid waste management unit. These exposure assumptions must be reviewed and accepted by the New York State Department of Health.

We have made this comment before regarding several draft project scoping plans, and it is valid for all the draft project scoping plans submitted after finalization of the Generic Installation RI/FS work plan.

Response #2

Agreed. Table 4-1 has been added to the Scoping Plan, as recommended in the comment. We acknowledge that Table 4-1 was removed from the Generic RI/FS Installation Work Plan, however, this Scoping Plan was submited prior to the original comment (and prior to the removal of the table from the Generic Work Plan). Therefore, the change was not reflected in this plan. Unfortunately, there is a unavoidable circumstance that develops when Scoping Plans are issued for other SEADs during the time of agency review of another plan and, as a result, these Scoping Plans can not incorporate comments that the agency is forumulating at the same time. However, we are incorporating the agency's global comments into the Scoping Plans as they are produced so that they reflect the most recent comments at the time of preparation.

Comment #3

Section 3.2.3.2 - Potential Exposure Pathways and Receptors - Current Uses: The consultant has mixed "future" on-site residents with current exposure pathways and receptors in this section. Please correct this apparent error.

Response #3

Agreed. The current and future pathways and receptors for both SEAD-59 and SEAD-71 have been revised. Note that the future receptors are based on proposed land use stated in the Reuse Plan and Implentation Stategy for Seneca Army Depot (December 1996), which was developed under BRAC.

Comment #4

4.3.1 Geophysical Investigation: An Electromagnetic (EM-31) and Ground Penetrating Radar (GPR) Surveys are proposed in an area south and southeast of the disposal area. We agree with this work and in addition, strongly recommend extending this investigation further on the eastern side of this area. Our recommendation is based on the fact that historical information of disposal in sketchy; the boring log of MW5-1 indicates disposal of construction debris in this area, and it would be worthwhile if an investigation was undertaken for anomalies as drums or waste disposal pits.

Response #4

Agreed. The EM-31 and GPR surveys have been expanded into the area that is occupied by SEAD-5. As a result, the soil gas survey has also been expanded into this same area (Figure 4-2).

Comment #5

4.3.3.1 Soil Boring Program and 4.3.5.1 Monitoring Well Installation and Sampling: I) The draft scoping plan does not provide any rationale for providing additional wells MW59-7 (upgradient) and monitoring well MW59-4 (downgradient). It should be explained why an additional upgradient well is proposed when an upgradient well (MW59-3) already exists. Based on the groundwater flow direction shown on Figure 3-12, it appears that MW59-1 and proposed MW59-4 are in the same line of groundwater flow direction and therefore MW59-4 may not provide any additional useful data.

We expect that geophysical investigation will identify additional disposal areas in south and southeast (see comment no. 4) and therefore recommend that these two monitoring wells be placed downgradient to those disposal areas.

ii) Two soil borings proposed at monitoring wells MW59-4 and MW59-7 may not provide any additional useful information, since we already have a large data base for upgradient soil and many soil borings are proposed around MW59-4. We recommend placing these borings based on the soil gas or geophysical investigation results. We further suggest that if too many geophysical anomalies are determined by geophysical investigation, these soil borings should be replaced by test pits.

Response #5 Responses to the issues raised in this comment are provided below.

Agreed. Based on this comment, MW59-7 has been moved from a background location to a location downgradient of TP59-1, as recommended in another comment by EPA. We propose to keep MW59-4 in its present location to detedect any impacts associated with migration from the mound of fill (an explanation for this has been added to the text in Section 4.2.5).

Agreed. We agree that it is likely that additional disposal areas will be identified in the areas southern and southeastern portions of the site, and we have added two monitoring wells to be installed based on the results of the geophysics and the soil gas. Also, four additional test pits have been added to address the added area to be surveyed by both geophysics and soil gas near SEAD-5.

Comment #6 Section 4.3.3.2 and Section 4.4.2.2 Test Pitting Program: It is inappropriate to exclude the results of the test pit soil samples from the risk assessment for this site; all data regarding soil contamination will be relevant to the risk assessment. It is reasonable to anticipate that excavation and final exposure to subsurface soils under a future residential use scenario.

In addition to the USEPA's established procedures for conducting a risk assessment, the New York State Department of Health (NYSDOH) encourages the use of a more conservative approach for evaluation of a maximally exposed individual. Consistent with this, the NYSDOH recommends the use of the maximum detected values of each contaminant in each media of concern to calculate risk. It is important to note that due to general sampling limitations, higher contaminant concentrations may potentially go undetected; further, it would be improper to exclude these test pit soil sample results from the risk assessment just because the consultant expects to encounter high levels of contamination. All available data must be utilized in the risk assessment.

Moreover, to our knowledge, no efforts have been made in the past to eliminate selection bias from the sampling plan of this or other environmental investigations at the Seneca Army Depot. As is stated in the introduction of this report, "the purpose of the RI/FS is to determine the nature and extent of environmental impacts, and to evaluate and select appropriate remedial actions". By selectively excluding sampling results, the consultant may be hindering the attainment of the stated goals of this investigation.

Response #6 Agreed. The risk assessments will use chemical results from the test pits.

APPENDIX F

SCOPE OF WORK

PAINT.SOW
16 JUL 1996

DRAFT

APPENDIX A

ANNEX H

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES
AT THE
FILL AREA WEST OF BUILDING 135 (SEAD-59)
AND THE ALLEGED PAINT DISPOSAL AREA (SEAD-71)
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NEW YORK

1.0 GENERAL STATEMENT OF SERVICES

1.1 Background.

1.1.1 General. As part of its continuing program of evaluating its hazardous waste management practices, the Army is performing Remedial Investigation/Feasibility Studies (RI/FS) at Seneca Army Depot Activity (SEDA). Recently completed site investigations at the Fill Area West of Building 135 and the Alleged Paint Disposal Area (Solid Waste Management Unit (SWMU) Designations SEAD-59 and SEAD-71, respectively) have confirmed the existence of contamination. RI/FS investigations will be required to determine the magnitude of environmental impacts and appropriate remedial actions. The U.S. Army Corps of Engineers, Huntsville Division, is contracting for the required work.

1.1.2 Fill Area West of Building 135 (SEAD-59).

1.1.2.1 The Fill Area West of Building 135 is located in the eastern portion of SEDA. The site encompasses an area between Building 128 and 311 which is bordered and crossed by railroad tracks and an unnamed dirt road. The north part of the site contains waste piles while the southern half of the site is covered with vegetation.

1.1.2.2 Past employees have indicated that the SEAD-59 site was used to dispose of construction debris and oily sludges. Large amounts of miscellaneous "roads and grounds" wastes may have been buried at the site. Results of the SI showed soil and groundwater impacts in excess of state and federal standards and guidance. Consequently, an RI/FS was proposed to define and delineate the actual extent of contamination.

Encl 1

1.1.3 Alleged Paint Disposal Area (SEAD-71).

1.1.3.1 The Alleged Paint Disposal Area is located in the east-central portion of the installation approximately 200 feet west of 4th Avenue near Buildings 127 and 114. The site is approximately 350 by 100 feet and is bounded on the north and south by railroad tracks serving both buildings.

1.1.3.2 It is rumored that paints and/or solvents were disposed of in burial pits at this site. The Site Investigation revealed impacts to soils and groundwater that exceeded state and federal guidelines and standards.

1.2 Location. SEDA is a US Army facility located in Seneca County, New York. SEDA occupies approximately 10,600 acres. It is bounded on the west by State Route 96A and on the east by State Route 96. The cities of Geneva and Rochester are located to the northwest (14 and 50 miles, respectively); Syracuse is 53 miles to the northeast and Ithaca is 31 miles to the south. The surrounding area is generally used for farming.

1.3 Regulatory Status. SEDA was included on the Federal Facilities National Priorities List on 13 July 1989. Consequently, all work to be performed under this contract shall be performed according to CERCLA guidance as put forth in the EPA Interim Final "Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA", dated October 1988 (Reference 12.1) and the Federal Facilities Agreement in effect for Seneca Army Depot (Reference 12.2).

1.4 Previous Investigations. Previous investigations have been performed at various SEDA units. An "Installation Assessment" and an "Update" (USATHAMA Reports No. 157 (1980) and 157(U) (1987), respectively) were conducted by the U.S. Army Toxic and Hazardous Materials Agency. The purpose of the assessments was to identify potentially contaminated areas at the Depot. The U.S. Army Environmental Hygiene Agency's Groundwater Contamination Survey No. 38-26-0868-88, "Evaluation of Solid Waste Management Units, Seneca Army Depot" identified and described all SWMU's identified at SEDA at the time. A formal Preliminary Assessment entitled "SMWU Classification Report, Seneca Army Depot Activity" presented all currently available information on the current universe of SWMU's. Site Investigations, to confirm the conclusions of the Preliminary Assessments, have been completed at the sites in question (References 12.4 and 12.5).

1.5 Basis of this Investigation. The Site Investigation results for these sites and the RI/FS Work Plan prepared by Engineering Science, Inc., (References 12.6, 12.7 and 12.8) are the basis under which the remedial investigation activities under this Statement of Work (SOW), as well as any future investigations and studies, are to be carried out. The Work Plans are currently being reviewed by the EPA and the State of New York Department of Environmental Conservation (NYSDEC).

1.6 Security Requirements. Compliance with SEDA security requirements is mandated. These requirements are presented in Section 9.0.

2.0 OBJECTIVE

The objective of this Statement of Work is to perform a Remedial Investigation/Feasibility Study at the Fill Area West of Building 135 and the Alleged Paint Disposal Area sites of SEDA as defined by the Office of Solid Waste and Emergency Response Directive 9355 and as laid out in the final Work Plans.

3.0 DETAILED DESCRIPTION OF SERVICES

3.1 General Requirements. All work performed by the A-E shall be designed and implemented in a manner which complements earlier investigations and shall conform to this SOW, the approved RI/FS Workplan, and the requirements of EPA, NYSDEC and SEDA. In the event that any conflicts arise, it will be the Huntsville Center Project Manager's responsibility to assure resolution. The A-E shall present a complete description of the RI/FS process as applied to the sites. All work shall be performed under the general supervision of a Professional Engineer registered in the State of New York.

3.2 (Task 1) Site Visit and Records Review. The A-E shall visit the SEAD-59 and 71 sites for the purpose of gaining familiarity with the physical characteristics of each site. Additionally, the A-E shall review pertinent records and prior investigations.

3.3 Remedial Investigations.

3.3.1 Field Investigations.

3.3.1.1 (Task 2) Fill Area West of Building 135 (SEAD-59).

3.3.1.1.1 (Task 2.1) Geophysical Investigations. The A-E shall perform geophysical investigations at the site for the purpose of identifying potential burial locations and to provide better characterization of any suspected anomaly sources.

3.3.1.1.2 (Task 2.2) Soil Gas Investigations. The A-E shall define contamination in the soil gas. Contamination shall be plotted on a map to show its distribution in the vadose zone.

3.3.1.1.3 (Task 2.3) Soil Investigation. The A-E shall define contamination in the subsurface soils at the site. The soil gas investigation previously conducted shall be used as a basis. Definition shall be conducted on a chemical and a physical basis. Additionally, as stated in the Work Plan, the first sample taken at each boring location shall be taken at the surface thereby providing information concerning surface contamination, as well.

3.3.1.1.4 (Task 2.4) Test Pit Investigations. The A-E shall perform test pit investigations at the site for the purpose of better defining subsurface conditions, fill materials, etc.

3.3.1.1.4 (Task 2.4) Surface Water and Sediment Sampling. The A-E shall define surface water and sediment sampling at the site.

3.3.1.1.5 (Task 2.5) Groundwater Investigations. The A-E shall define groundwater contamination at the site. Then A-E shall also characterize the aquifer with respect to groundwater levels, hydraulic conductivities and vertical connections.

3.3.1.1.7 (Task 2.7) Ecological Investigation. The A-E shall define the effects of contamination on plants and animals found at the site.

3.3.1.1.8 (Task 2.8) Chemical Analysis. The A-E shall perform chemical analysis of samples collected in the field.

3.3.1.1.9 (Task 2.9) Surveying. Each new sampling point shall be located, using the established control, according to the requirements for surveying laid out in the Work Plan.

3.3.1.2 (Task 3) Alleged Paint Disposal Area (SEAD-71).

3.3.1.2.1 (Task 3.1) Geophysical Investigations. The A-E shall perform geophysical investigations at the site for the purpose of identifying potential burial locations and to provide better characterization of any suspected anomaly sources.

3.3.1.2.2 (Task 3.2) Soil Investigation. The A-E shall define contamination in the subsurface soils at the site. Definition shall be conducted on a chemical and a physical basis.

3.3.1.2.3 (Task 3.3) Test Pit Investigations. The A-E shall perform test pit investigations at the site for the purpose of better defining subsurface conditions, fill materials, etc.

3.3.1.2.4 (Task 3.4) Surface Soil Investigations. The A-E shall define surface soil contamination at the site.

3.3.1.2.5 (Task 3.5) Groundwater Investigations. The A-E shall define groundwater contamination at the site. The A-E shall also characterize the aquifer with respect to groundwater levels and hydraulic conductivities.

3.3.1.2.6 (Task 3.6) Ecological Investigation. The A-E shall define the effects of contamination on plants and animals found at the site.

3.3.1.2.7 (Task 3.7) Chemical Analysis. The A-E shall perform chemical analysis of samples collected in the field.

3.3.1.2.8 (Task 3.8) Surveying. Each new sampling point shall be located, using the established control, according to the requirements for surveying laid out in the Work Plan.

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3.3.2 Optional Field Investigations. If the Contracting Officer decides that additional field investigations are required, the A-E shall perform additional investigations as outlined below. The optional tasks may be exercised in any order and exercising of all options may or may not be required.

3.3.2.1 Fill Area west of Building 135.

3.3.2.1.1 (Task 4.1) Geophysical Investigations. The A-E shall perform additional geophysical investigations at the site for the purpose of identifying potential burial locations and to provide additional characterization of any suspected anomaly sources.

3.3.2.1.2 (Task 4.2) Soil Gas Investigations. The A-E shall further define contamination in the soil gas. Contamination shall be plotted on a map to show its distribution in the vadose zone.

3.3.2.1.3 (Task 4.3) Soil Investigation. The A-E shall further define contamination in the subsurface soils at the site. Definition shall be conducted on a chemical and a physical basis. Additionally, as stated in the Work Plan, the first sample taken at each boring location shall be taken at the surface thereby providing information concerning surface contamination, as well.

3.3.2.1.4 (Task 4.4) Test Pit Investigations. The A-E shall perform additional test pit investigations at the site for the purpose of better defining subsurface conditions, fill materials, etc.

3.3.2.1.5 (Task 4.5) Surface Water and Sediment Sampling. The A-E shall further define surface water and sediment sampling at the site.

3.3.2.1.6 (Task 4.6) Groundwater Investigations. The A-E shall further define groundwater contamination at the site. Then A-E shall also characterize the aquifer with respect to groundwater levels, hydraulic conductivities and vertical connections.

3.3.2.1.7 (Task 4.7) Ecological Investigation. The A-E shall further define the effects of contamination on plants and animals found at the site.

3.3.2.1.8 (Task 4.8) Chemical Analysis. The A-E shall perform chemical analysis on the additional samples collected in the field.

3.3.2.1.9 (Task 4.9) Surveying. Each additional sampling point shall be located, using the established control, according to the requirements for surveying laid out in the Work Plan.

3.3.2.2 (Task 5) Alleged Paint Disposal Area (SEAD-71).

3.3.2.2.1 (Task 5.1) Geophysical Investigations. The A-E shall perform additional geophysical investigations at the site for the purpose of identifying potential burial locations and to provide better characterization of any suspected anomaly sources.

3.3.2.2.2 (Task 5.2) Soil Investigation. The A-E shall further define contamination in the subsurface soils at the site. Definition shall be conducted on a chemical and a physical basis.

3.3.2.2.3 (Task 5.3) Test Pit Investigations. The A-E shall perform additional test pit investigations at the site for the purpose of better defining subsurface conditions, fill materials, etc.

3.3.2.2.4 (Task 5.4) Surface Soil Investigations. The A-E shall further define surface soil contamination at the site.

3.3.2.2.5 (Task 5.5) Groundwater Investigations. The A-E shall further define groundwater contamination at the site. The A-E shall also characterize the aquifer with respect to groundwater levels and hydraulic conductivities.

3.3.2.2.6 (Task 5.6) Ecological Investigation. The A-E shall further define the effects of contamination on plants and animals found at the site.

3.3.2.2.7 (Task 5.7) Chemical Analysis. The A-E shall perform chemical analysis on the additional samples collected in the field.

3.3.2.2.8 (Task 5.8) Surveying. Each additional sampling point shall be located, using the established control, according to the requirements for surveying laid out in the Work Plan.

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3.3.3 (Task 6) Monthly Field Activity Reports. During field work, the A-E shall submit a Monthly Field Activity Report, not later than the tenth day of the month, according to the distribution in paragraph 4.7.2 and in the quantities shown in 4.7.3, "Letter Reports". These monthly Field Activity Reports shall address the following:

o A summary of work completed in the field, i.e., sampling events or well installation. Upon request, copies of trip reports and/or field logs shall be provided.

o Anticipated or actual delay of a scheduled field activity, to include basis and any effect on subsequent events or scheduled activities.

— o Discovery or indication of significant additional contamination or any new family of hazardous substances at an AOC other than that previously recognized or expected for the AOC location.

o Quantum increase in concentration of hazardous substances of any media beyond that previously recognized or expected for that AOC location.

o Determination of any specific or potential increase of danger to the public, the environment, or to individuals assigned to work at the Site. Such a determination shall be reported to the EPA and NYSDEC as soon as discovered.

o Copies of all Quality Assured Data and sampling and test results and all other laboratory deliverables received by the Army during the month, if any.

3.3.4 (Task 7) Quarterly Reports. Over the length of the contract, the A-E shall submit Quarterly Reports, not later than the tenth day of the month following the close of the quarter, according to the distribution in paragraph 4.7.2 and in the quantities shown in 4.7.3, "Letter Reports". These Quarterly Reports shall address the following:

o Minutes of all formal Project Manager, Technical Review Committee (TRC), or other formal meetings held during the preceding period, at which the A-E is in attendance.

o Status report on all milestones met on schedule during the period, report and explanation for any milestones not met during the preceding period and assessment of milestones schedule for the next reporting period.

o Outside inspection reports, audits, or other administrative information developed during the preceding period, including notice of any outside inspections or audits scheduled during the next reporting period.

o Permit status as applicable.

o Personnel staffing status or update.

o Community relations activity update.

3.3.5 (Task 8) Field Sampling Letter Reports. At the completion of the field sampling round, a letter report characterizing the site shall be furnished to the distribution shown in paragraph 4.7.2 in the quantities given in paragraph 4.7.3. This letter report shall, at a minimum, list the locations and quantities of contaminants at the site.

— 3.3.6 (Task 9) Contaminant Fate and Transport. The potential routes of migration (i.e., air, groundwater, etc.) shall be determined for the site. Contaminant persistence shall be evaluated through a review of the physical, chemical, and/or biological factors of importance for the media of interest. A discussion of contaminant migration shall include factors affecting migration for the media of importance (e.g., sorption onto soils, solubility in water, movement of groundwater, etc.).

3.3.7 (Task 10) Baseline Risk Assessment. The work required in this Section corresponds to EPA Task 6 in Appendix B of the RI/FS Guidance Manual. Using the information gathered from the record search, the field work and data analyses, the A-E shall prepare and submit a quantitative Risk Assessment. The Risk Assessment shall provide an evaluation of the potential threat to human health, the environment, and ecology in the absence of any remedial action and provide the basis for determining whether or not remedial action is necessary. The Risk Assessment Report shall be prepared using the guidance presented in the EPA's Interim Final "Risk Assessment Guidance for Superfund" and "Superfund Exposure Assessment Manual" and shall, as a minimum, contain a baseline risk assessment, an exposure assessment, and a standards analysis. The Risk Assessment shall be submitted with the Phase I RI and FS Reports. The A-E shall provide information including, but not necessarily limited to, the following:

3.3.7.1 Identification of Contaminants of Concern. Using the information gathered from field work, record searches, and consultations with appropriate local, State and Federal Officials, the A-E shall identify the contaminants which are of concern. The A-E shall provide a summary of each identified contaminant describing why it was selected, and the effects of its chronic and acute toxicity to humans and the environment.

3.3.7.2 Exposure Assessment. The A-E shall identify actual or potential exposure paths and routes, characterize potentially exposed populations, and estimate expected exposure levels and chemical intakes. Water well and Spring surveys have already been performed.

3.3.7.3 Toxicity Assessment. The A-E shall weigh available evidence regarding the potential for contaminants to cause adverse effects in exposed individuals and estimate the relationship between the extent of exposure and corresponding adverse effects. The relationship shall be determined from field data, ARAR's, toxicological data, and the EPA Integrated Risk Information System (IRIS). The A-E shall make a comparison of acceptable levels of contamination with actual levels identified during the exposure assessment. The comparison shall be based upon available ARAR's, TBCs and other toxicological data, where existing.

3.3.7.4 Risk Characterization. The A-E shall, based upon other components of the Risk Assessment, characterize the risk associated with the site. The A-E shall consider the carcinogenic risk, noncarcinogenic risk and the environmental risk. The characterization shall include a summary of each projected exposure route for contaminants of concern and the distribution of risk across various sectors of the population. Such factors as weight-of evidence associated with toxicity information, the estimated uncertainty of the component parts, and the assumptions contained within the estimates shall be discussed.

3.3.7.5 Applicable or Relevant and Appropriate Requirements (ARAR's) to be Considered (TBC) Requirements. The A-E shall develop and propose contaminant and location specific "Applicable or Relevant and Appropriate Requirements" (ARAR's) and To Be Considered (TBC) Requirements which, after review and possible modification as directed by the Contracting Officer, shall be utilized to evaluate subsequent proposed remedial actions. Location specific ARAR's (i.e., clean up levels) and activity-specific ARAR's shall be developed. ARAR's and TBC's shall be prepared using guidance presented in the RI/FS Guidance Manual.

3.3.8 (Task 11) RI Report. At the conclusion of field work, the A-E shall submit Preliminary Draft RI report to the distribution in Section 4.7.2 in the quantities shown in paragraph 4.7.3.

3.4 Feasibility Studies.

3.4.1 (Task 12) Treatability Study Requirements Assessment. The work required in this Section corresponds to EPA Task 7 in Appendix B of the RI/FS Guidance Manual. The A-E shall assess existing data on technologies identified as Remedial Action Alternatives to determine data needs required to undertake treatability investigations following completion of alternatives development. The A-E shall recommend if specific Treatability Studies are required or if the existing situation is well enough understood and described in scientific, engineering and other technical literature such that site specific treatability studies do not appear to be necessary. The A-E shall develop a Conceptual Treatability Study Plan. Actual implementation of the Treatability Study Plan is not part of this SOW. The Treatability Study shall be submitted with the RI/FS Report.

3.4.2 <u>(Task 13) Feasibility Study</u>. The work required in this Section corresponds to EPA Task 9 in Appendix B of the RI/FS Guidance Manual. The primary objective of this phase of the FS is to develop an appropriate range of waste management options that protect human health and the environment.

3.4.2.1 <u>Remedial Action Objectives.</u> The A-E shall develop remedial action objectives which protect human health and the environment and then describe general response action which shall satisfy the remedial action objectives.

3.4.2.2 <u>Alternative Remedial Actions.</u> The A-E shall describe all available technologies that could be reasonably used as remedial actions at SEDA. The A-E shall then screen the list to remove any potential Remedial Actions which are clearly illogical, inadequate, unfeasible, or otherwise ill-suited to the site. Remedial actions presented past the initial screening shall consist of only those representing proven technologies adequate to address site conditions. A detailed evaluation including the strengths and weaknesses of each technology shall be performed. The initial screening shall be based upon effectiveness, implementability and cost. Where appropriate, the A-E may combine feasible remedial actions. The "no action" alternative shall be described in detail as part of this task. Additional data needed shall also be described.

3.4.3 <u>(Task 14) FS Report</u>. The work required in this Section corresponds to EPA Tasks 8 and 11 in Appendix B of the RI/FS Guidance Manual. At the completion of the preceding tasks, the A-E shall prepare the Remedial Investigation/Feasibility Study Report, fully documenting all work performed. The report shall be prepared according to the requirements of this SOW and the referenced guidance documents.

3.5 <u>(Task 15) Post FS Support</u>. Following approval of the RI and FS reports by the regulators, the A-E shall be responsible for the preparation of the Proposed Remedial Action Plan (PRAP) and the Record of Decision (ROD). Both documents shall be prepared in accordance with the existing EPA guidance documents.

3.6 (Task 16) Project Management. The A-E shall, during the life of this Delivery Order (DO), manage the DO in accordance with Appendix A of the basic contract SOW. The A-E shall perform all project management associated with this DO as a part of this task including, but not limited to, preparing and submitting a master network schedule, cost and manpower plan, monthly progress reports, monthly individual performance reportand cost/schedule variance report, work task proposals and a pogram plan in accordance with Section 4.5 of Appendix A to the basic contract SOW.

4.0 SUBMITTALS AND PRESENTATIONS

4.1 Format and Content. The RI/FS Report shall present all data, analyses, and recommendations and shall be prepared in accordance with the suggested Format as presented in the RI/FS Guidance Manual. All drawings shall be of engineering quality in drafted form with sufficient details to show interrelations of major features on the installation site map. When drawings are required, data may be combined to reduce the number of drawings. The report shall consist of 8-½ x 11" pages with drawings folded, if necessary, to this size. A decimal paragraphing system shall be used, with each section and paragraph of the reports having a unique decimal designation. The report covers shall consist of vinyl 3-ring binders and shall hold pages firmly while allowing easy removal, addition, or replacement of pages. A report title page shall identify the A-E, the Corps of Engineers, Huntsville Division, and the data. The A-E identification shall not dominate the title page. Each page of draft and draft-final reports shall be stamped "DRAFT" and "DRAFT-FINAL", respectively. Each report shall identify the members and title of the A-E's staff which had significant, specific input into the report's preparation or review. Submittals shall include incorporation of all previous review comments accepted by the A-E as well as a section describing the disposition of each comment. Disposition of comments submitted with the final report shall be separate from the report document. All final submittals shall be sealed by the registered Professional Engineer-In-Charge.

—4.2 Presentations. The A-E shall make presentations of work performed according to the schedule in paragraph 4.6. Each presentation shall consist of a summary of the work accomplished and anticipated followed by an open discussion among those present. The A-E shall provide a minimum of two persons at the meetings which are expected to last one day each.

4.3 Conference Minutes. The A-E shall be responsible for taking notes and preparing the minutes of all conferences, presentations, and review meetings. Conference notes shall be prepared in typed form and the original furnished to the Contracting Officer (within five (5) working days after date of conference) for concurrence and inclusion in the next monthly report. This report shall include the following items as a minimum:

a. The date and place the conference was held with a list of attendees. The roster of attendees shall include name, organization, and telephone number;

b. Written comments presented by attendees shall be attached to each report with the conference action noted. Conference action as determined by the Government's Project Manager shall be "A" for an approved comment, "D" for a disapproved comment, "W" for a comment that has been withdrawn, and "E" for a comment that has an exception noted;

c. Comments made during the conference and decisions affecting criteria changes must be recorded in the basic conference notes. Any augmentation of written comments should be documented by the conference notes.

4.4 Confirmation Notices. The A-E shall be required to provide a record of all discussions, verbal directions, telephone conversations, etc., participated in by the A-E and/or representatives on matters relative to this contract and the work. These records, entitled "Confirmation Notices", shall be numbered sequentially and shall fully identify participating personnel, subject discussed, and any conclusions reached. The A-E shall forward to the Contracting Officer as soon as possible (not more than five (5) work days), a reproducible copy of said confirmation notices. Distribution of said confirmation notices shall be made by the Government.

4.5 Progress Reports and Charts. The A-E shall submit progress reports to the Contracting Officer with each request for payment. The progress reports shall indicate work performed and problems incurred during the payment period.

Upon award of this delivery order, the A-E shall, within 15 days, prepare a progress chart to show the proposed schedule for completion of the project. The progress chart shall be prepared in reproducible form and submitted to the Contracting Officer for approval. The actual progress shall be updated and submitted by the 15th of each month and may be included with the request for payment.

4.6 Proposed Schedule. The proposed schedule for the RI/FS and the Post FS work is given below. All work and services under Appendix A, Annex ?, shall be completed by 31 December 1999.

Milestone	Date
Notice To Proceed	6 Sep 96
Initiation of Field Work	10 Oct 96
Preliminary-Draft RI Report	15 Mar 97
Comments to A-E	31 Mar 97
Draft RI Report	30 Apr 97 *
Comments to A-E	31 May 97 *
Draft-Final RI Report(s)	15 Jul 97 *
Final RI (Assumes No Disputes)	15 Aug 97 *
Preliminary-Draft FS Report	15 Aug 97 *
Comments to A-E	30 Aug 97 *
Draft FS Report	30 Sep 97 *
Comments to A-E	31 Oct 97 *
Draft-Final FS Report	15 Dec 97 *
Final FS (Assumes No Disputes)	30 Jan 97 *
Draft Proposed Remedial Action Plan (PRAP)	TBD
Public Comment Period	TBD
Draft-Final PRAP	TBD
Final PRAP	TBD
Draft Record of Decisi	TBD
Comments Due to A-E	TBD
Draft-Final ROD	TBD
Final ROD (No disputes)	TBD

Meetings/Presentations	TBD

Note: Those dates with an asterisk are subject to change if regulatory review of the draft RI Report requires additional investigations, ie. any options are required to be exercised.

4.7 Submittals.

4.7.1 General Submittal Requirements.

4.7.1.1 Distribution. The A-E is responsible for reproduction and distribution of all documents. The A-E shall furnish copies of submittals to each addressee listed in paragraph 4.7.2 in the quantities listed in the document submittal list. Submittals are due at each of the addresses not later than the close of business on the dates shown in paragraph 4.6.

4.7.1.2 Partial Submittals. Partial submittals will not be accepted unless prior approval is given.

4.7.1.3 Cover Letters. A cover letter shall accompany each document and indicate the project, project phase, the date comments are due, to whom comments are submitted, the date and location of the review conference, etc., as appropriate. (Note that, depending on the recipient, not all letters shall contain the same information.) The contents of the cover letters should be coordinated with CEHND-PM prior to the submittal date. The cover letter shall not be bound into the document.

4.7.1.4 Supporting Data and Calculations. The tabulation of criteria, data, circulations, etc., which are performed but not included in detail in the report shall be assembled as appendices. Criteria information provided by CEHND need not be reiterated, although it should be referenced as appropriate. Persons performing and checking calculations are required to place their full names on the first sheet of all supporting calculations, etc., and initial the following sheets. These may not be the same individual. Each sheet should be dated. A copy of this statement of work shall be included as Appendix A in the Draft RI/FS report only.

4.7.1.5 Reproducibles. One camera-ready, unbound copy of each submittal shall be provided to the Contracting Officer in addition to the submittals required in the document and submittal list.

4.7.2 Addresses.

Commander
U.S. Army Engineering and Support Center, Huntsville
ATTN: CEHND-PM-MD (Ms. Richards)
4820 University Square
Huntsville, AL 35816

Commander
USACHPPM (PROV)
ATTN: MCHB-ME-R (Mr. Hoddinott)
Building E1677
Aberdeen Proving Ground, MD
21010-5422

Commander
Seneca Army Depot Activity
ATTN: BEC (Mr. Absolom)
Romulus, New York
14541

Commander
U.S. Army Environmental Center,
ATTN: Messrs. Kleiser/Buck
Aberdeen Proving Ground, MD
21010-5401

Commander
U.S. Army Corps of Engineers,
New York District
ATTN: Mr. Battaglia
Romulus, New York, 14541

4.7.3 Document and Submittal List

Letter Reports

	Monthly Field Activity	Quarterly	Field Sampling
CEHND-PM	2	2	1
AEC	1	1	1
SEDA BEC	5	4	4
CENAN	2	2	2
USACHPPM	1	1	7
TOTAL	11	10	15

RI and FS Report

	Preliminary Draft	Draft	Draft-Final	Final
CEHND-PM	3	3	3	3
AEC	1	1	1	1
SEDA BEC	5	18	23	23
CENAN	1	1	1	1
USACHPPM	8	8	8	8
TOTAL	18	31	36	36

5.0 SAFETY REQUIREMENTS

5.1 Site activities in conjunction with this project may pose unique safety, chemical, and/or biological exposure hazards which require specialized expertise to effectively address and eliminate. The A-E shall conduct the RI/FS activities according to the requirements presented in the Workplan.

5.2 Prior to commencement of RI/FS field activities, the A-E shall submit for review an amendment to the Workplan SHERP which is to contain the following:

5.2.1 A discussion of the A-E's organization structure, to include lines of authority of the A-E and all subcontractors, shall be provided along with an organization chart showing the lines of authority for safety and health from site level to corporate management. Each person assigned specific safety and health responsibilities shall be identified and pertinent qualifications and experience shall be described.

5.2.2 Documentation of compliance with training and medical surveillance requirements for affected employees shall be provided. A format for such documentation is provided in the Workplan SHERP.

6.0 QUALITY ASSURANCE PROJECT PLAN REQUIREMENTS

The A-E shall perform all sampling and analysis activities according to the requirements presented in the Work Plan.

7.0 SOIL BORING AND MONITORING WELL REQUIREMENTS

All drilling, installation and sampling activities shall be performed according to the requirements presented in the Work Plan.

8.0 SURVEY REQUIREMENTS

All surveying shall be completed according to the requirements presented in the Work Plan.

9.0 SECURITY REQUIREMENTS

9.1 Security Regulations. The following requirements must be followed by the A-E at Seneca Army Depot to facilitate entry and exit of A-E employees and to maintain security.

9.1.1 Personnel Registration.

9.1.1.1 A list of all A-E employees, subcontractors and suppliers indicating firm name and address will be furnished through POC/COR to the Counterintelligence Division, Building 710, 72 hours prior to commencement of work.

9.1.1.2 A confirmation of employment SDSSE-SC Form 268 will be executed by the A-E concerning each employee, to include all subcontractors and their personnel. No forms will be transferred to another file if the A-E has other on-going contracts at SEDA. The A-E will provide a list of personnel who are authorized to sign Form 268 for the firm. A sample of each signature is required. Counterintelligence Division must be notified, in writing, of any changes to this list. All completed forms will be provided through COR/POC to the Counterintelligence Division 72 hours prior to commencement of work. Failure to complete Form 268 correctly will result in employee's denial of access to Seneca. The Counterintelligence Division must be notified, in writing through POC/COR to Counterintelligence, at least 72 hours prior to requesting any action. The chain of command for all A-E actions will be through POC/COR to Counterintelligence Division. There will be no exceptions.

9.1.1.3 Camera permits require written notice from the POC/COR prior to access. Open camera permits will not be issued. The following information is required:

(a) Camera make, model and serial number.

(b) Contract name and name of individual responsible for the camera.

(c) Dates camera will be used.

(d) Where it will be used.

(e) What will be photographed and why.

9.1.1.4 If a rental, leased or privately owned vehicle is required in place of a company vehicle, the following information is needed:

(a) Name of individual driving.

(b) Year, make, model, color and license plate of the vehicle.

(c) Typed letter on company letterhead indicating that the company assumes responsibility for rental, leased or privately owned vehicles.

9.1.1.5 All access media will be destroyed upon expiration data of contract. If an extension is required, a list of employee names and new expiration data must be furnished to the Counterintelligence Division. Contract extensions must be made prior to the contract expiration data or new Form 268s will be required for each individual that requires an extension.

9.1.2 <u>Traffic Regulations</u>.

9.1.2.1 Traffic laws, State of New York, apply with emphasis on the following regulations.

9.1.2.2 Speed Limit: Controlled Area as posted

Ammo Area - 5 mph

Limited/Exclusion Area - 25 mph

9.1.2.3 All of the above are subject to change with road conditions or as otherwise posted.

9.1.3 <u>Parking</u>. A-E vehicles (trucks, rigs, etc.) will be parked in areas designated by the director of Law Enforcement and Security. Usually parking will be permitted within close proximity to the work site. Do not park within 30 feet of a depot fence, as these are clear zones.

9.1.4 <u>Gates</u>.

9.1.4.1 Post 1, Main Gate - NY Highway 96, Romulus, New York is open for personnel entrance and exit 24 hours daily, 7 days a week.

9.1.4.2 3, entrance to North Depot Troop Area, Located at end of access road from Route 96-A is open 7 days a week for personnel and vehicle entrance and exit.

9.1.5 Security Regulations

9.1.5.1 Prohibited Property.

9.1.5.1.1 Cameras, binoculars, weapons and intoxicating beverages will not be introduced to the installation, except by written permission of the Director/Deputy Director of Law Enforcement and Security.

9.1.5.1.2 Matches or other spark producing devices will not be introduced into the Limited/Exclusion or Ammo Area' except when the processor of such items is covered by a properly validated match or flame producing device permit.

9.1.5.1.3 All vehicles and personal parcels, lunch pails, etc. are subject to routine security inspections at any time while on depot property.

9.1.5.1.4 All building materials, equipment and machinery must be cleared by the Director of Engineering and Housing who will issue a property pass for outgoing equipment and materials.

9.1.6 A-E Employee Circulation

9.1.6.1 A-E employees are cleared for entrance to the location of contract work only. Sight-seeing tours or wandering from the work site is NOT AUTHORIZED.

9.1.6.2 Written notification will be provided to the Counterintelligence Division (Ext. 30202) at least 72 hours prior to overtime work or prior to working on non-operating days.

9.1.6.3 Security Police (Ext. 30448/30366) will be notified at least two hours in advance of any installation or movement of slow moving heavy equipment that may interfere with normal traffic flow, parking or security.

9.1.7 Unions. Representatives will be referred to the depot Industrial Labor Relations Officer (Ext. 41377).

9.1.8 Offenses. (Violations of law or regulations.)

9.1.8.1 Minor. Offenses committed by an A-E personnel which are minor in nature will be reported by the Director of Law Enforcement and Security to the Contracting Officer who in turn will report such incidents to the A-E for appropriate disciplinary action.

9.1.8.2 Major. Serious offenses committed while on the installation will be reported to the FBI. Violators may be subject to trial in Federal Court.

9.1.9 Explosive Laden Vehicles.

9.1.9.1 Vehicles such as vans, cargo trucks, etc., carrying explosives will display placards or signs stating "EXPLOSIVES."

9.1.9.2 Explosive ladened vehicles will not be passed.

9.1.9.3 When an explosive laden vehicle is approaching, pull over to the side and stop.

9.1.9.4 When catching up with an explosive laden vehicle, slow down and allow that vehicle to remain at least 100 feet ahead.

9.1.9.5 When approaching an intersection where an explosive laden vehicle is crossing - STOP - do not enter the intersection until such time as the explosive carrier has passed through and cleared the intersection.

9.1.9.6 When passing a vehicle that is parked and displaying "Explosive" signs, slow down to 10 miles per hour and take every precaution to allow more than ample clearance.

9.1.10 Clearing Post. All A-E employees are required to return all identification badges and passes on the last day of employment on the depot. The A-E is responsible for the completion of all turn-ins by his employees and informing the Counterintelligence Division and the depot organization administering the contract, for termination of any employee's access to the depot.

~~10.0 MANAGEMENT OF FUNDS~~

~~The matrix in Table establishes the funding allocation structure by task for this delivery order. Funds fir this delivery order will be managed at the level specified in this matrix. No transfer of funds by the A-E between tasks will be allowed without the prior approval of the Contracting Officer or the Contracting Officer's Representative.~~

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11.0 PUBLIC AFFAIRS

The A-E shall not publicly disclose any data generated or reviewed under this contract. The A-E shall refer all requests for site information to the SEDA Public Affairs Office and requests for contract information shall be forwarded to the Contracting Officer, Huntsville Division. Reports and data generated under this contract shall become the property of the Department of Defense and distribution to any other source by the A-E, unless authorized by the Contracting Officer, is prohibited. The A-E shall notify the Contracting Officer and Installation Public Affairs Office prior to any contacts with regulatory agencies.

12.0 REFERENCES

GENERAL

12.1 Interim Final, "Guidance for or Conducting Remedial Investigations/Feasibility studies Under CERCLA", U.S. EPA, Office of Solid Waste and Emergency Response, October 1988.

12.2 "Federal Facility Agreement under CERCLA Section 120 in the matter of Seneca Army Depot, Romulus, New York", Docket No. II-CERCLA-FFA-00202, USEPA, U.S. Department of the Army, and the New York State Department of Environmental Conservation, November 1990.

12.3 "Workplan for Remedial Investigation/Feasibility Studies at the Ash Landfill, Seneca Army Depot, Romulus, New York", Environmental Science and Engineering, 1991.

SPECIFIC

12.4 Draft-Final, "Expanded Site Inspection, Eight Moderately Low Priority AOC's; SEAD-5, 9, 12 (A and B), (43, 56 and 69), 44 (A and B), 50, 58 and 59.", Engineering Science, Inc., December 1995.

12.5 Draft-Final, "Expanded Site Inspection, Seven Low Priority AOC's; SEAD-60, 62, 63, 64 (A,B,C and D), 67, 70 and 71.", Engineering Science, Inc., April, 1996.

12.6 Final, "Generic Work Plan for RI/FS", Engineering Science, Inc., August 1995.

12.7 Preliminary-Draft, "Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at the Fill Area West of Building 135, Seneca Army Depot Activity, Engineering Science, Inc., July 1995.

12.8 Preliminary-Draft, "Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at the Alleged Paint Disposal Area, Seneca Army Depot Activity, Engineering Science, Inc., July 1995.

APPENDIX G

SUBSURFACE INVESTIGATIONS

- Boring Logs
- Test Pit Logs
- Monitoring Well Installation Diagrams

BORING LOGS

LOG OF BORING NO. SB59-1

PROJECT:	EIGHT MODERATELY LOW PRIORITY AOCs
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY
ASSOCIATED UNIT/AREA:	SEAD-59
PROJECT NO:	720519-01000
DATE STARTED:	02/20/94
DATE COMPLETED:	02/20/94
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS
DRILLING METHOD:	HOLLOW STEM AUGER
SAMPLING METHOD:	3" SPLIT SPOONS

DEPTH TO WATER (ft):	10.0
BORING LOCATION (N/E):	998982.1 750170.2
REFERENCE COORDINATE SYSTEM:	New York State Plane
GROUND SURFACE ELEVATION (ft):	NA
DATUM:	NAD 1983
INSPECTOR:	FO,KK
CHECKED BY:	KK

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	19 15 14 10	2.00	1.5	0	NA	0.2		Black, fine to medium SHALE fragments, some Silt, saturated.	GM
						1.5		Grey-brown SILT, some fine to coarse Gravel, little Clay, pieces of concrete, asphalt, and wood present, dry to moist (saturated top 0.2').	GM
						2.0		No Recovery	-
.02	7 12 19 19	2.00	1.4	0	NA	3.1		Brown SILT, trace Clay, trace Shale fragments.	ML
						3.4		Dark grey SILT, little Clay, little fine to medium Shale fragments, trace cinders and black burnt material, moist to wet.	ML
						4.0		No Recovery	-
.03	10 7 7 6	2.00	0.3	0	NA	4.3		Brown-grey SILT, trace Clay fine to medium Shale fragments, soft, wet.	ML
						6.0		No Recovery	-
.04	9 10 10 15	2.00	0.8	0	NA	6.8		Grey SILT + CLAY, little wood shavings, little fine Gravel, soft to medium stiff, wet.	ML-CL
						8.0		No Recovery	-
.05	9 8 6 7	2.00	0.6	0	NA	8.3		Dark brown SILT + wood shavings, trace fine Sand, trace Gravel, wet.	ML
						8.6		Brown-red-green CLAY, trace wood shavings, moist to wet.	CL
						10.0		No Recovery	-

NOTES: The following samples were collected for chemical analysis: (SB59-1.00), (SB59-1.04), (SB59-1.06), (SB59-1.04-MRD), (SB59-1.08-DUP).

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LOG OF BORING SB59-1

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT NO: **720519-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **NA**
INSPECTOR: **FO,KK**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.06	6 18 40 25	2.00	0.9	0	NA	10.5		Light grey-brown SILT + CLAY, little fine to medium Shale, trace wood shavings, saturated.	ML-CL
						10.9		Black SHALE.	-
						11		No Recovery	-
.07	100/.4	0.40	0	0	NA	12			

BORING TERMINATED AT 12.5'
AUGER REFUSAL

NOTES: The following samples were collected for chemical analysis: (SB59-1.00), (SB59-1.04), (SB59-1.06), (SB59-1.04-MRD), (SB59-1.08-DUP).

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LOG OF BORING SB59-1

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LOG OF BORING NO. MW59-1

PROJECT:	EIGHT MODERATELY LOW PRIORITY AOCs	DEPTH TO WATER (ft):	4.0
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	BORING LOCATION (N/E):	998909.7 749948.8
ASSOCIATED UNIT/AREA:	SEAD-59	REFERENCE COORDINATE SYSTEM:	New York State Plane
PROJECT NO:	720519-01000	GROUND SURFACE ELEVATION (ft):	733.4
DATE STARTED:	03/18/94	DATUM:	NAD 1983
DATE COMPLETED:	03/19/94	INSPECTOR:	FO,KK,KS
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	CHECKED BY:	KK
DRILLING METHOD:	HOLLOW STEM AUGER		
SAMPLING METHOD:	3" SPLIT SPOONS		

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	3 22 8 13	2.00	1.5	0	BGD	0.6		Light brown SILT, trace Organics, trace Clay, soft, moist.	ML
						1.1		Light brown SILT, little(+) Clay, trace fine Shale fragments, trace Organics, soft, wet(+).	ML
						1.5		Light brown SILT, some mottled grey Clay, little medium angular Gravel, trace fine Shale fragments and subrounded Gravel, soft, wet(+).	ML-CL
						2.0		No Recovery	-
.02	23 30 40 43	2.00	0.5	0	BGD	2.5		Light brown SILT, some mottled grey Clay, trace medium Gravel, trace Organics, soft, wet(+).	ML-CL
						4.0		No Recovery	-
.03	18 12 7 3	2.00	0.4	0	BGD	4.1		Olive grey SILT + fine to medium SHALE fragments, soft, saturated.	GM
						4.3		SHALE COBBLE.	-
						4.5		Light reddish brown SILT + CLAY, some fine to medium Shale fragments, soft, saturated.	ML-CL
						6.0		No Recovery	-
.04	20 100/.15	0.65	0.6	0	BGD	6.2		Grey, coarse sand-sized SHALE fragments + olive grey SILT, little fine to medium Shale fragments, loose, saturated.	GM
						6.6		SHALE COBBLES, Quartz-rich Cobbles, little Sand, loose, saturated.	GP
						8.0		No Recovery	-
.05	31 100/.4	0.90	0.9	0	BGD	8.2		Grey, medium sand-sized SHALE fragments + olive grey SILT, loose, saturated.	GM
						8.6		Fractured grey SHALE, massive, slightly weathered, little olive grey Silt, loose, saturated.	GM
						8.9		Olive grey SILT + CLAY, some fine to medium Shale fragments, trace medium sand-sized Shale fragments, soft, saturated.	ML-CL
						10		No Recovery	-

NOTES: No samples were collected for chemical analysis.

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LOG OF BORING MW59-1

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT NO: **720519-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **733.4**
INSPECTOR: **FO,KK,KS**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
NA	100/.1	0.10	0	0	NA			No Recovery	
								BORING TERMINATED AT 10.1' SPOON REFUSAL	

NOTES: No samples were collected for chemical analysis.

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LOG OF BORING MW59-1

LOG OF BORING NO. MW59-2

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-59**
PROJECT NO: **720519-01000**
DATE STARTED: **03/06/94**
DATE COMPLETED: **03/06/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **6.3**
BORING LOCATION (N/E): **999036.1 749874.0**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **734.3**
DATUM: **NAD 1983**
INSPECTOR: **FO,KK**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	DESCRIPTION	USCS
.01	10 4 4 5	2.00	1.6	0	BGD	0.5	Olive grey SILT + Fine grey SHALE fragments, trace fine Sand, trace Organics, loose, dry to moist.	GM
						1.6	Light brown-yellow orange mottling SILT, little Clay, trace fine Gravel, stiff, slightly moist.	ML
						2.0	No Recovery	-
.02	13 15 18 20	2.00	2.0	0	BGD	4.0	Light brown grey SILT, some grey Clay, little fine to coarse Shale fragments and Gravel, stiff, dry to slightly moist.	ML-CL
.03	7 14 12 8	2.00	1.5	0	BGD	4.2	Olive grey SILT, some fine Shale fragments, moist.	GM
						5.5	Light brown SILT, little tan and grey Clay, little fine to medium Shale fragments, trace fine Gravel, stiff, dry to slightly moist.	ML
						6.0	No Recovery	-
.04	10 11 11 18	2.00	1.8	0	BGD	6.3	Light brown SILT, little Clay, trace fine Gravel and Shale fragments, soft, wet.	ML
						6.6	AA, saturated.	ML
						6.8	Light brown SILT, little very fine Sand, trace Clay, trace fine Gravel and Shale fragments, saturated.	ML
						7.4	Olive grey SILT, some medium to coarse Shale fragments, little very fine Sand, trace Clay, loose, saturated.	GM
						7.8	Light brown SILT, some very fine Sand, little fine to medium Shale fragments, soft, saturated.	ML
						8.0	No Recovery	-
.05	12 31 23 33	2.00	1.7	0	BGD	8.5	Light brown very fine SAND, some Silt, little fine to medium Shale fragments, soft, saturated.	SM
						9.2	Light brown very fine SAND, some Silt, some very fine Sand, little very fine to coarse Shale fragments, soft, wet with saturated zones.	SM
						9.7	Light brown SILT, little very fine Sand, little fine to medium Shale fragments, medium stiff, wet.	ML
						10.0		-

NOTES: No samples were collected for chemical analysis.

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LOG OF BORING MW59-2

PROJECT:	**EIGHT MODERATELY LOW PRIORITY AOCs**	GROUND SURFACE ELEVATION:	**734.3**
PROJECT NO:	**720519-01000**	INSPECTOR:	**FO,KK**
PROJECT LOCATION:	**SENECA ARMY DEPOT, ROMULUS NY**	CHECKED BY:	**KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.06	55	1.40	1.4	0	24	10.2		No Recovery	ML
	30					10.5		Olive grey SILT, little fine to medium Shale fragments, loose, soft, saturated.	GP
	100/.4					10.8		Competent, massive grey SHALE fragments, loose, saturated.	ML
						11.0		AA, (10-10.2').	GP
						11 11.2		AA, (10.2-10.5').	ML
								AA, (10-10.2').	ML
								Olive grey SILT, trace fine Shale fragments, trace Clay, stiff, wet to moist.	
								BORING TERMINATED AT 11.4' AUGER REFUSAL	

NOTES: No samples were collected for chemical analysis.

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LOG OF BORING MW59-2

LOG OF BORING NO. MW59-3

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-59**
PROJECT NO: **720519-01000**
DATE STARTED: **03/18/94**
DATE COMPLETED: **03/18/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **5.4**
BORING LOCATION (N/E): **999030.0 750345.9**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **737.7**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	DESCRIPTION	USCS
.01	15 30 24 30	2.00	1.7	0	BGD	0.3	Brown SILT + GRAVEL, trace Shale, loose, wet.	GM
						0.7	Dark grey, highly fractured SHALE, little Silt.	GM
						0.9	Tan very fine SAND + SILT, loose, dry.	ML
						1.4	Grey-brown SILT + SLAG, loose, moist.	ML
						1.7	Burnt wood.	PT
						2.0	No Recovery	-
.02	37 23 15 18	2.00	1.5	0	BGD	2.3	Grey-yellow-brown CLAY, little(-) Silt, trace fine to medium Shale fragments, medium dense, wet.	CL
						2.7	Grey fractured SHALE, saturated at 2.5'.	GP
						2.9	AA, (2-2.3').	CL
						3.5	Grey-brown SILT, trace fine Shale fragments, black ash-like film at 2.9', loose, moist.	ML
						4.0	No Recovery	-
.03	7 10 12 11	2.00	1.4	0	BGD	5.4	Grey-orange-tan CLAY, little Silt, trace very fine Sand, trace fine Gravel and fine Shale fragments, saturated at 5.4'.	CL
						6.0	No Recovery	-
.04	10 53 84 17	2.00	1.4	0	BGD	6.4	Orange-grey-tan CLAY, little Silt, little fine to coarse Shale fragments, trace very fine Sand, medium dense, wet.	CL
						6.6	Light brown very fine SAND, little Silt, trace medium Shale fragments, saturated.	SM
						7.4	Grey weathered + fractured SHALE, saturated.	-
						8.0	No Recovery	-
.05	113/.5	0.50	0.3	0	BGD	8.3	Grey fractured SHALE, saturated.	-
							No Recovery	-

BORING TERMINATED AT 8.75'
AUGER REFUSAL

NOTES: No samples were collected for chemical analysis.

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LOG OF BORING MW59-3

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LOG OF BORING NO. MW59-3A

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA:
PROJECT NO: **720519-01000**
DATE STARTED: **03/17/94**
DATE COMPLETED: **03/17/94**
DRILLING CONTRACTOR:
DRILLING METHOD:
SAMPLING METHOD:

DEPTH TO WATER (ft):
BORING LOCATION (N/E): **999026.3 750264.3**
REFERENCE COORDINATE SYSTEM:
GROUND SURFACE ELEVATION (ft): **NA**
DATUM: **NAD 1983**
INSPECTOR:
CHECKED BY:

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	10 14 10 13	2.00	1.5	0	BGD	0.2		Brown SILT, trace very fine Sand, trace Organics, moist	
						0.4		Asphalt	
						1.2		Light brown SILT, trace Clay, trace fine Gravel, loose, moist	
						1.5		AA, trace wood	
						2.0		No Recovery	
.02	11 10 11 10	2.00	1.7	0	BGD	3.4		Brown-gray-green SILT, trace fine Gravel and Shale fragments, loose, moist	
						3.7		Wood	
						4.0		No Recovery	
.03	7 9 11 14	2.00	1.7	0	BGD	5.4		Olive gray SILT, some Clay, trace organic material, trace fine Shale fragments,dense, moist	
						5.7		Olive gray fine SAND, saturated	
						6.0		No Recovery	
.04	21 21 20 21	2.00	2.0	0	BGD	6.3		AA (4.0-5.4')	
						7.5		Tan and yellow SILT, some very fine Sand, trace fine Gravel and Shale fragments, moderately dense, wet	
						8		Tan and yellow very fine GRAVEL, SAND and SILT, trace fine Shale fragments and Gravel, loose, saturated.	
								BORING TERMINATED AT 8.0'	

NOTES: Encountered fill material. Monitoring well should be placed upgradient of fill, so MW59-3 was drilled and installed 50' east of MW59-3A. MW59-3A was grouted.

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LOG OF BORING MW59-3A

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LOG OF BORING NO. SB59-3

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-59**
PROJECT NO: **720519-01000**
DATE STARTED: **05/25/94**
DATE COMPLETED: **05/25/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **7.6**
BORING LOCATION (N/E): **998937.3 750131.8**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **NA**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	10 10 12 18	2.00	2.0	0	BGD	1 2.0		Gray-brown SILT, little fine to medium Shale fragments, trace very fine Sand, trace- Organics, wet. AA, no organic material, trace loose asphalt, dry. Gray-brown SILT, little Clay, trace Organics, trace fine Shale fragments. Gray SILT and very fine SAND, little Shale fragments, trace wood, medium stiff, dry.	ML
.02	8 12 18 20	2.00	1.7	0	BGD	2 3 3.7		Tan and orange CLAY, little Silt, trace very fine Sand, trace- Organics, very stiff, damp. Gray and tan SILT, some very fine Sand, trace Clay, trace fine weathered Shale fragments, stiff, damp.	ML-CL
						4.0		No Recovery	-
.03	14 16 28 30	2.00	1.4	0	BGD	4 5 5.4		Light brown-gray SILT, trace very fine Sand, trace- fine to medium weathered Shale fragments, medium stiff, moist. Shale Cobble	ML
						6.0		No Recovery	-
.04	26 62 70 75	2.00	2.0	0	BGD	6 7 7.8		Light brown SILT, trace very fine Sand, trace medium Gravel, trace fine to medium weathered Shale fragments, stiff, dry to damp. Shale Cobble Light brown very fine SAND and SILT,, trace fine Shale fragments, loose, wet. AA, saturated	ML
						8.2		Very fine GRAVEL and coarse SAND, trace Silt, trace very fine Sand, saturated.	-
.05	40 41 100/.1	1.10	1.1	0	BGD	8 8.8		Fractured SHALE, wet. Light brown SILT and very fine SAND, trace fine Shale fragments,loose, wet to saturated.	ML
						9 9.1		Fractured weathered SHALE, wet.	-
								No Recovery	-
								BORING TERMINATED AT 9.5' AUGER REFUSAL	

NOTES: The following samples were collected for chemical analysis: (SB59-3-00), (SB59-3-02), (SB59-3-04).

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LOG OF BORING SB59-3

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LOG OF BORING NO. SB59-4

PROJECT:	EIGHT MODERATELY LOW PRIORITY AOCs	DEPTH TO WATER (ft):	19.1
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	BORING LOCATION (N/E):	998947.0 750105.0
ASSOCIATED UNIT/AREA:	SEAD-59	REFERENCE COORDINATE SYSTEM:	New York State Plane
PROJECT NO:	720519-01000	GROUND SURFACE ELEVATION (ft):	NA
DATE STARTED:	05/25/94	DATUM:	NAD 1983
DATE COMPLETED:	05/25/94	INSPECTOR:	FO
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	CHECKED BY:	KK
DRILLING METHOD:	HOLLOW STEM AUGER		
SAMPLING METHOD:	3" SPLIT SPOONS		

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	8 12 22 10	2.00	2.0	0	BGD	1		Gray-brown SILT and very fine Sand, little fine to medium Shale fragments, little- Organics, loose, moist. AA, medium stiff, dry. Asphalt Gray-brown SILT, little fine to medium Shale fragments, trace very fine Sand, trace Cobbles, medium stiff, damp.	ML
.02	21 22 10 8	2.00	1.2	0	BGD	2 3 3.2		Light brown SILT, trace very fine Sand, trace fine to medium Shale fragments, trace Cobbles, medium stiff, moist. Fractured shale Cobble, saturated. Light brown SILT,, some Clay, trace very fine Sand, medium stiff, wet.	
						4.0		No Recovery	-
.03	5 5 8 9	2.00	1.6	0	BGD	4 5 5.6		Olive gray-brown SILT, little Clay, trace very fine Sand, trace fine to medium Shale, moist, medium stiff. AA, trace Asphalt	ML
						6.0		No Recovery	-
.04	13 8 9 11	2.00	1.4	0	BGD	6 7 7.4		Shale Cobble AA (4.0-5.6') AA, trace Organics	ML
						8.0		No Recovery	-
.05	8 6 2 3	2.00	1.5	0	BGD	8 9 9.5		AA (4.0-5.6'), trace Organics Black slag and burnt material, little fine Shale fragments, trace nails, very loose, damp. Off-white powdery material, little reddish brown hard material, wet to saturated Dark brown SILT, trace+ very fine Sand, trace Organics (loamy), dry.	ML
						10 10.0		No Recovery	-

NOTES: The following samples were collected for chemical analysis: (SB59-4-00), (SB59-4-05), (SB59-4-10).

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Seneca Army Depot
Romulus, New York

LOG OF BORING SB59-4

Sheet 1 of 2

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT NO: **720519-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **NA**
INSPECTOR: **FO**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.06	5 8 11 11	2.00	1.7	0	BGD	10.5		AA (9.3-9.5')	ML
						11 11.7		Gray, tan, and yellow SILT and CLAY, trace very fine Sand. trace Organics, trace fine to medium Shale fragments, stiff, damp.	ML-CL
						12.0		No Recovery	-
.07	12 18 26 21	2.00	1.8	0	BGD	12 13 13.8		Gray-brown SILT, some+ very fine Sand, trace Clay, trace fine to medium Shale fragments, trace Shale Cobbles, stiff, moist.	ML
						14.0		No Recovery	-
.08	36 33 52 50	2.00	1.8	0	BGD	14 14.3		Brown-pink fractured Shale.	-
						15 15.8		Light brown very fine SAND and SILT, trace fine to medium Shale fragments, loose, moist.	ML
						16.0		No Recovery	-
.09	28 26 25 100/.4	1.90	2.0	0	BGD	16 17 17.3		AA (14.3-15.8') Light brown to tan SILT, trace fine to medium Shale fragments, stiff, damp.	ML
						17.7		Light brown decomposed weathered SHALE, very stiff, damp.	-
.10	50 30 20 20	2.00	1.7	0	BGD	18 19 19.7		AA (16.8-17.3') Gray to light brown very fine Sand, some- Silt, trace fine to medium Shale fragments, loose, moist to wet. AA, some- iron-stained fractured Shale, saturated.	ML
						20.0		No Recovery	-
.11	100/.1	0.10	.1	0	BGD	20 20.1		Very fine SAND and SILT.	ML
								No Recovery	-

BORING TERMINATED AT 20.5'
AUGER REFUSAL

NOTES: The following samples were collected for chemical analysis: (SB59-4-00), (SB59-4-05), (SB59-4-10).

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UNITED STATES ARMY
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Seneca Army Depot
Romulus, New York

LOG OF BORING SB59-4

LOG OF BORING NO. SB59-5

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-59**
PROJECT NO: **720519-01000**
DATE STARTED: **05/25/94**
DATE COMPLETED: **05/26/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **13.5**
BORING LOCATION (N/E): **999005.3 750070.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **NA**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	4 7 9 10	2.00	1.8	0	BGD			Gray-brown SILT, little very fine Sand, little Organics, trace+ fine gray Shale fragments, loose, dry AA, some fine to medium Shale fragments, trace Organics	ML
						1.8		AA, trace wood	
						2.0		No Recovery	-
.02	10 18 15 16	2.00	1.9	0	BGD			Gray-brown SILT, little very fine Sand, trace medium Shale fragments, moist. Shale Cobble Fine Sand, little fine to medium Shale and Gravel fragments, trace Silt, loose Light brown SILT, some very fine Sand, little fine to medium Shale, trace Cobbles, medium stiff, moist.	ML
						3.9			
.03	11 12 12 15	2.00	1.7	0	BGD	4.0		Light brown SILT and very fine SAND, trace fine to medium Shale, trace Cobbles, medium stiff, moist. Brown very fine Sand, some+ Silt, trace fine Shale, medium stiff, damp. Olive gray-brown SILT and CLAY, trace fine weathered Shale fragments, trace Organics, stiff, damp. AA (4.6-5.0)	ML-CL
						5.7		Black ash/slag/burnt material, some Gravel.	-
						6.0		No Recovery	-
.04	5 8 6 5	2.00	1.6	0	BGD			AA (5.6-5.7')	
						7.0		Wood, wet Brown SILT, trace Organics, trace fine Shale fragments, loose, moist.	ML
						7.6		No Recovery	-
.05	6 8 10 10	2.00	1.8	0	BGD	8.0		Tan, gray and yellow SILT and CLAY, trace very fine SAND, trace fine to medium weathered SHale fragments, very stiff, damp.	ML-CL
						9.8		Gray very fine SAND, some+ Silt, trace fine Shale fragments, wet.	

NOTES: The following samples were collected for chemical analysis: (SB59-5-00), (SB59-5-03), (SB59-5-06).

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT NO: **720519-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **NA**
INSPECTOR: **FO**
CHECKED BY: **KK**

Sample Number	Blow Counts (# Blows per 6")	Sample Advance	Sample Recovery	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	DESCRIPTION	USCS
.06	12 16 16 18	2.00	1.7	0	BGD	10.0	Light brown very fine SAND and SILT, trace fine Shale fragments, trace fine to medium Gravel, wet. Light gray-brown SILT, some very fine Sand, trace fine to medium Gravel, medium stiff, moist. Olive green weathered, micaceous sandstone Shale Cobble	ML
						11.7	No Recovery	-
.07	12 15 21 30	2.00	1.6	0	BGD	12.0	Light brown SILT and very fine SAND, trace fine Shale fragments, trace Cobbles, trace medium to coarse Gravel	ML
						13.5	Weathered SHALE, saturated	-
						13.7	No Recovery	-
.08	45 42 32 55	2.00	1.7	0	BGD	14.0	Light brown very fine SAND, little Silt, little fine Shale fragments, little medium Gravel, Saturated	ML
						15.5	Fractured weathered SHALE	
						15.7	No Recovery	-
.09	100/.4	0.40	.3	0	BGD	16.0	Dark gray fractured weathered SHALE, saturated.	-
						16.3		

BORING TERMINATED AT 16.4 '
SPOON REFUSAL

NOTES: The following samples were collected for chemical analysis: (SB59-5-00), (SB59-5-03), (SB59-5-06).

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LOG OF BORING SB59-5

Sheet 2 of 2

LOG OF BORING NO. MW71-1

PROJECT:	**SEVEN LOW PRIORITY AOCs**	DEPTH TO WATER (ft):	**6.0**
PROJECT LOCATION:	**SENECA ARMY DEPOT, ROMULUS NY**	BORING LOCATION (N/E):	**999297.5 750894.8**
ASSOCIATED UNIT/AREA:	**SEAD-71**	REFERENCE COORDINATE SYSTEM:	**New York State Plane**
PROJECT NO:	**720518-01000**	GROUND SURFACE ELEVATION (ft):	**747.1**
DATE STARTED:	**03/14/94**	DATUM:	**NAD 1983**
DATE COMPLETED:	**03/14/94**	INSPECTOR:	**FO,KK,MB**
DRILLING CONTRACTOR:	**EMPIRE SOILS INVESTIGATIONS**	CHECKED BY:	**FO**
DRILLING METHOD:	**HOLLOW STEM AUGER**		
SAMPLING METHOD:	**3" SPLIT SPOONS**		

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	17 22 17 28	2.00	1.6	0	BGD	0.4		Black fine to medium Gravel and Asphalt, loose, saturated.	-
						1.0		Olive gray SILT, some very fine to course Shale fragments, trace Clay medium stiff, wet.	ML
						1.6		Olive gray SILT, some very fine to coarse Shale fragments, grading downward from trace Clay to some Clay, medium loose, moist.	ML
						2.0		No Recovery	-
.02	17 12 7 8	2.00	1.8	0	BGD	2.5		Olive gray CLAY, some very fine to coarse Shale fragments, little silt, medium stiff, moist.	CL
						3.8		AA, some Clay, soft, wet. Orange, gray, and yellow mottling.	CL
						4.0		No Recovery	-
.03	4 5 8 9	2.00	1.8	0	BGD	5.8		Dark brown to olive gray CLAY, iron staining , little very fine to fine shale fragments, little silt, soft. moist.	CL
						6.0		No Recovery	-
.04	9 20 14 35	2.00	2.0	0	BGD	6.5		Light brown to Olive gray CLAY, little Silt, trace very fine Shale fragments, soft, moist, little saturated zones.	CL
						7.1		AA, little coarse weathered shale fragments, soft, moist.	CL
						7.4		Olive gray with yellowish orange mottled CLAY, little Silt, little very fine Sand, trace fine Shale fragments, soft, saturated.	CL
						7.9		AA, moist, little saturated zones throughout.	CL
						8.0		Gray fractured, weathered SHALE, loose, saturated.	
.05	36 34 100/.3	1.30	1.3	0	BGD	8.3		Olive gray CLAY and SILT, some fine to coarse Shale fragments, soft, saturated.	CL
						9.3		Gray fractured and weathered SHALE, trace Silt, loose, saturated.	-
								No Recovery	
						10		BORING TERMINATED AT 9.4'	

NOTES: Bottom of overburden at 8.3'. No samples were collected for chemical analysis.

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT NO: **720518-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **747.1**
INSPECTOR: **FO,KK,MB**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
								AUGER REFUSAL	

NOTES: Bottom of overburden at 8.3'. No samples were collected for chemical analysis.

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LOG OF BORING MW71-1

Sheet 2 of 2

Sheet 1 of 1

LOG OF BORING NO. MW71-2

PROJECT:	SEVEN LOW PRIORITY AOCs	DEPTH TO WATER (ft):	2.0
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	BORING LOCATION (N/E):	999309.2 750986.4
ASSOCIATED UNIT/AREA:	SEAD-71	REFERENCE COORDINATE SYSTEM:	New York State Plane
PROJECT NO:	720518-01000	GROUND SURFACE ELEVATION (ft):	747.3
DATE STARTED:	03/22/94	DATUM:	NAD 1983
DATE COMPLETED:	03/22/94	INSPECTOR:	KK,MB
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	CHECKED BY:	FO
DRILLING METHOD:	HOLLOW STEM AUGER		
SAMPLING METHOD:	3" SPLIT SPOONS		

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	38 15 10 8	2.00	1.2	0	BGD	0.3		Gravel, Asphalt, loose, saturated.	-
						0.5		Medium to coarse gray SHALE fragments, little olive gray Silt, loose, saturated.	GM
						1.2		Gray-brown CLAY, some fine to coarse gray shale fragments, stiff, moist, some mottling.	CL
						2.0		No Recovery	-
.02	6 7 8 8	2.00	1.4	0	BGD	2.3		Fine to coarse SHALE and Gravel fragments and very fine Shale fragments, little Silt, loose, saturated.	GM
						2.7		Gray-green CLAY, trace fine to medium Shale fragments and Gravel, stiff, wet to saturated, some mottling.	CL
						2.9		AA, medium stiff to soft.	CL
						3.4		AA, little Silt, trace(-) organic, medium stiff.	CL
						4.0		No Recovery	-
.03	3 4 7 5	2.00	1.3	0	BGD	4.3		Olive gray CLAY, some Silt, some very fine to medium gray Shale fragments, loose, saturated.	CL
						5.3		Olive gray CLAY, some Silt, little fine to medium gray Shale fragments, trace very fine Sand, soft, saturated.	CL
						6.0		No Recovery	-
.04	3 100/.3	0.60	0.6	0	BGD	6.3		Olive gray to light brown SILT and very fine SAND, little(-) Clay, little(-) fine Sand, little(-) fine to medium gray Shale fragments and Gravel, very soft, saturated.	ML
						6.5		Gray, finely laminated, fractured, weathered SHALE, loose, moist from 6.3'-6.4" dry from 6.4'-6.5'	-
								Gray weathered and fractured SHALE, loose, dry.	-
								BORING TERMINATED AT 6.8' AUGER REFUSAL	

NOTES: Bottom of overburden at 6.3'. No samples were collected for chemical analysis.

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Seneca Army Depot
Romulus, New York

LOG OF BORING MW71-2

Sheet 1 of 1

LOG OF BORING NO. MW71-3

PROJECT:	**SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION:	**SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA:	**SEAD-71**
PROJECT NO:	**720518-01000**
DATE STARTED:	**03/22/94**
DATE COMPLETED:	**03/22/94**
DRILLING CONTRACTOR:	**EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD:	**HOLLOW STEM AUGER**
SAMPLING METHOD:	**3" SPLIT SPOONS**

DEPTH TO WATER (ft):	**4.5**
BORING LOCATION (N/E):	**999229.9 750868.8**
REFERENCE COORDINATE SYSTEM:	**New York State Plane**
GROUND SURFACE ELEVATION (ft):	**744.5**
DATUM:	**NAD 1983**
INSPECTOR:	**KK**
CHECKED BY:	**FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	DESCRIPTION	USCS
.01	2 3 5 5	2.00	1.3	0	BGD	0.2	Dark brown SILT, little very fine gray Shale fragments, little organic, soft, saturated.	ML
						0.5	AA, medium stiff, wet.	ML
						0.6	Gray SHALE COBBLE	-
							Brown SILT, little Clay, trace very fine Shale fragments, medium stiff, moist.	ML
						1.3	No Recovery	-
.02	5 7 7 9	2.00	1.7	0	BGD	2.0	Light brown SILT, little very fine Sand, trace Clay, trace fine Gravel and gray Shale fragments, medium stiff.	ML
						2.4	Light brown SILT, some very fine little(-) fine Gravel and gray Shale fragments, trace fine Sand, trace Clay, trace organic, medium stiff, moist.	ML
						2.8	Light brown SILT, little Clay, trace fine gray Shale fragments and fine Gravel, trace organic, trace iron staining, medium stiff, moist.	ML
						3.2	Light brown SILT, little Clay, trace very fine Sand, trace organic, trace iron staining, moist.	ML
						3.7	No Recovery	-
.03	7 40 100/.2	1.20	1.2	0	BGD	4.0	Light brown SILT and gray CLAY with iron staining, trace fine gray shale fragments and Gravel, trace organic, stiff, wet to saturated.	ML
						4.5	AA, Gray fractured + weathered Shale fragments, medium stiff, moist.	GM-GC
						4.7	Gray fractured + weathered SHALE fragments, little Clay and Silt, loose, moist to saturated.	GM-GC
						5.2	No Recovery	-

BORING TERMINATED AT 6.5'
AUGER REFUSAL

NOTES: Bottom of overburden at 4.7'. No samples were collected for chemical analysis.

TEST PIT LOGS

PAGE 1 OF 1

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	**CLIENT:** USACOE	**TEST PIT #:** TP59-1

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720519
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/8/94
COMPLETION DATE: 6/8/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
10'	5'	2'6"	BACKHOE

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	0930 Am / 6/8/94
VICTOREEN-190	pancake	10-15 μR/Hr	0930 Am / 6/8/94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:
QA/QC Rinsate Sample Number:
COMMENTS:

SCALE (FT)	VOC./ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Fine Shale Gravel	
1 2	590 ppm/ BKgD	TP59-1-1	2'		5" Industrial waste with some Silt Fill.	Anomalies: Yellow Trash Can Fencing, Sign, multiple paint cans (2 gal) -- 3 Removed during excavation. sampled @ 1030Am
3 4 5					2' 0" Excavation Halted at 2' Due to paint cans.	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #: TP59-1

TEST PIT REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: USACOE	TEST PIT #: TP59-2

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720519
EST. GROUND ELEV.
INSPECTOR: BH/MB
CONTRACTOR: ES/UKB
START DATE: 2/20/94
COMPLETION DATE: 2/20/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
	2'	7'	BACKHOE

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	2/20/94
VICTOREEN-190	pancake	μR/H	2/20/94
LEL		0 %	2/20/94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
1	0ppm BKGD 0%				ASPHALT on Shale	
2 3	0ppm BKGD 0%				1.0' GRAVEL with pieces of Brick, Concrete and Shale	
4 5	0ppm BKGD 0%				3.0' SILT and GRAVEL	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS   TEST PIT #: TP59-2

PAGE 2 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	CLIENT:	TEST PIT #: TP59-2

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE	
OVM	10.0 eV PID	0 ppm	1700 h	2/20/94
Victoreen 190	Pancake	[illegible]/hr	1700 h	2/20/94
LEL		0 %	1700 h	2/20/94

DATE START: 02/20/94
DATE FINISH:
INSPECTOR: BH/MB
CONTRACTOR: ES/UKB

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
6	0 ppm BKGD 0%				5.5' GRAVEL with wood chips, steel, Large Cinders, plastic water pipe	Slight Petroleum ODOR From Pile
7					7.0' BASE of PIT	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

TEST PIT #: TP59-2

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TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	CLIENT: USACOE	TEST PIT #: TP 59-3

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720519
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/8/94
COMPLETION DATE: 6/8/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
8'	5'	3'	BACKHOE

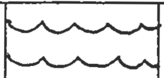
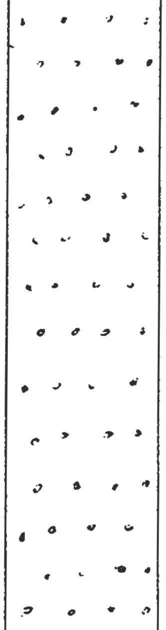
MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	1115 Am / 6 / 8 / 94
VICTOREEN-190	pancake	10-15 µR/Hr	1115 Am / 6 / 8 / 94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Top Soil	
1 2 3	0ppm BKGD	TP59-3-1	3'		4" Olive Gray Silt	Anomalies: Fencing, Crushed Bucket, (3) 55 gal Drums (Full) Uncovered at 3' sampled at 1205 pm
4 5					3' Excavation Halted due to presence of 3 55gal Drums.	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #: TP59-3

PAGE 1 OF 2

TEST PIT REPORT

ENGINEERING-SCIENCE, INC.

CLIENT: USACOE

TEST PIT #: TP59-4

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 72051
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/8/94
COMPLETION DATE: 6/8/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
16'	4' 7"	5' 10"	BACKHOE

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	1310 pm / 6 / 8 / 94
VICTOREEN-190	pancake	10-15 μR/Hr	1310 pm / 6 / 8 / 94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Top Soil	
1	0ppm BKGD				Light Gray Silt with Fine shale Gravel	Anomalies: 3 RCP Sections (Filled w/ Dirt)
	132ppm BKGD	TP59-4-1	2'		1' 5" Stained Black Silt Layer (Diesel)	Sampled @ 1330 pm
2	0ppm BKGD				1' 9" Light Gray Silt	
3 4 5					2' 8" Olive Gray Silt	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

TEST PIT #: TP59-4

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.
CLIENT:
TEST PIT #: TP59-4

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

DATE START:
DATE FINISH:
INSPECTOR: JWC/ABS
CONTRACTOR:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
					5' 10" BASE of PiT WeAThered BedRock	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

TEST PIT #: TP59-4

TEST PIT REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: USACOE	TEST PIT #: TP59-5

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720519
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/8/94
COMPLETION DATE: 6/8/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
10'	2'6"	5'	BACKHOE

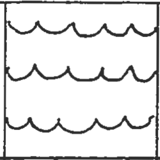
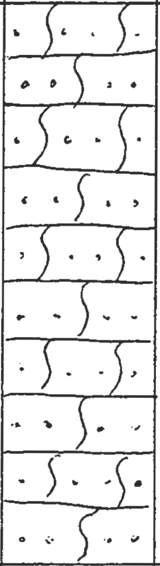
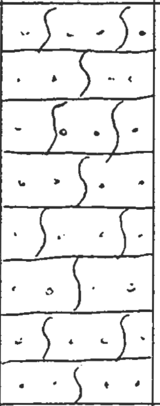
MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	0815 Am / 6 / 8 / 94
VICTOREEN-190	pancake	10-15 μR/Hr	0815 Am / 6 / 8 / 94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC./RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Top Soil	Surface Anomaly Fence Debris
1 2 3	0ppm BKGD	TP59-5-1	2.5'		8" Yellow Orange and Light Gray Silt with Shale Clasts	Sampled @ 0825
4	0ppm BKGD				3' 0" Light Gray Silt with shale clasts	
5					▽ Weathered Shale @ 4' 8" BASE of PIT @ 5'	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #: TP59-5

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	CLIENT: USACOE	TEST PIT #: TP71-1

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720518
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/7/94
COMPLETION DATE: 6/7/94
CHECKED BY:
DATE CHECKED:

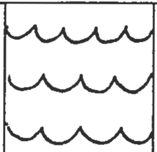
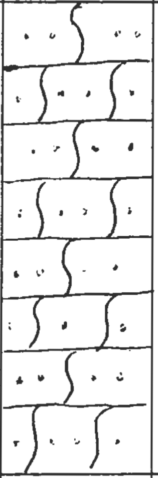
TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
15'	6'	5'6"	BACKHOE

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	
VICTOREEN-190	pancake	10-15 μR/Hr	

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:
QA/QC Rinsate Sample Number:
COMMENTS:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Top Soil	
1	0ppm BKGD				8" Silt in Construction Debris	chain Link Fence, sheet metal, 20 gallon Drum, ASPHALT SLABS
2	0ppm BKGD	TP71-1-1	2'		16" Light Angular Black Fine Debris (Creosote Appearance)	Sampled @ 1350 pm Crushed Drums
3 4	0ppm BKGD	TP71-1-2 TP71-1-3	3' 3'		2'0" Olive Gray Silt with Few shale clasts	Sampled @ 1405 pm Sampled @ 1410 pm
5	0ppm BKGD	TP71-1-4	4'		4'0" Olive Gray silt and Coarse shale gravel	Sampled @ 1420 pm

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS   TEST PIT #: TP71-1

PAGE 2 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC. | **CLIENT:** | **TEST PIT #:** TP71-1

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/ DATE

DATE START:
DATE FINISH:
INSPECTOR: JWC/ABS
CONTRACTOR:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
					∇	
					5'6"	
					BASE OF PIT	
					Weathered Shale	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS   TEST PIT #: TP71-1

PAGE 1 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC. | **CLIENT:** USACOE | **TEST PIT #:** TP71-2

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720518
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/7/94
COMPLETION DATE: 6/7/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
9'	3'	5' 8"	BACKHOE

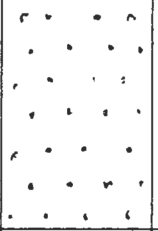
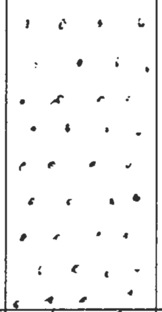
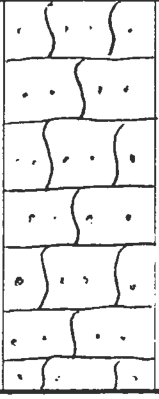
MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	1540 Am / 6/7/94
VICTOREEN-190	pancake	10-15 μR/Hr	1540 Am / 6/7/94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm BKGD				Top Soil	
1	0ppm BKGD	TP71-2-1	1'		3" STAined SilT (DARK gray) and Fine Shale Gravel	SAmpled @ 1545 pm
2	0ppm BKGD	TP71-2-2 TP71-2-4	2' 2'		1'0" Olive Gray SilT	SAmpled @ 1550 pm SAmpled @ 1615 pm
3	0ppm BKGD	TP71-2-3	3'		2'0" Light Brown SilT	SAmpled @ 1605 pm
4 5	0ppm BKGD				3'4" Olive Gray SilT with Shale ClAsTs	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS   TEST PIT #: TP71-2

PAGE 2 OF 2

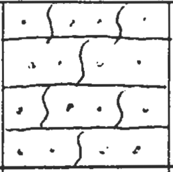
TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	**CLIENT:**	**TEST PIT #:** TP71-2

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

DATE START:
DATE FINISH:
INSPECTOR: JWC/ABS
CONTRACTOR:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
						
					5' 8" weathered shale Base of pit	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

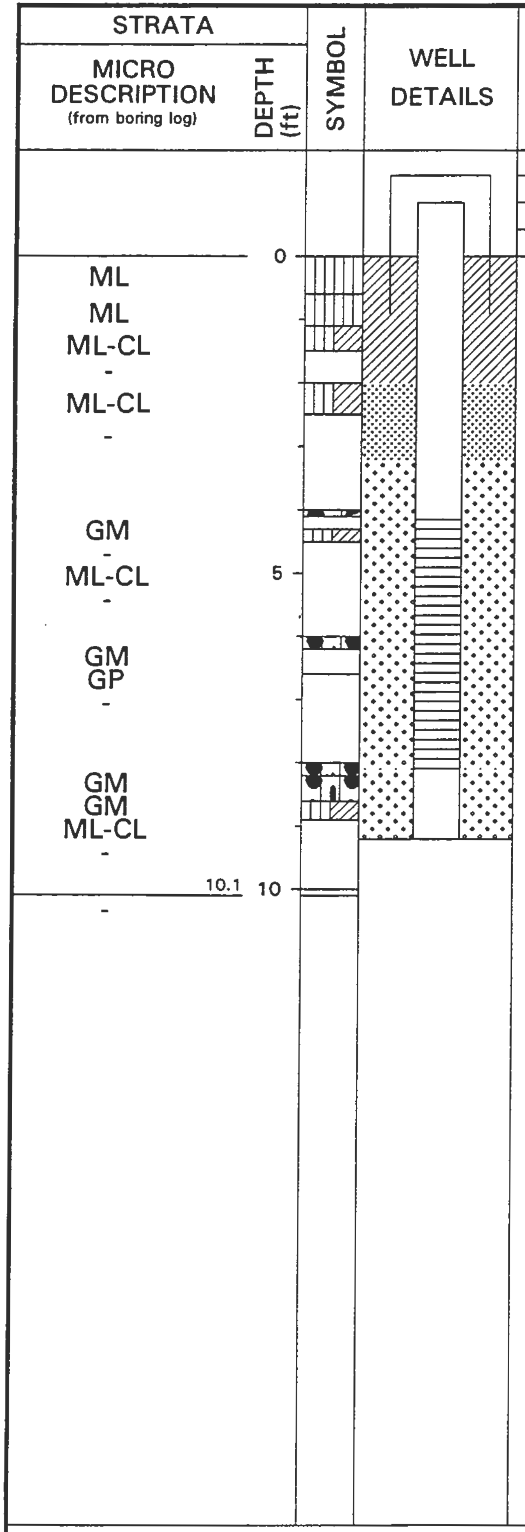
TEST PIT #: TP71-2

MONITORING WELL INSTALLATION DIAGRAMS

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW59-1

PROJECT:	EIGHT MODERATELY LOW PRIORITY AOCs	WELL LOCATION (N/E):	998909.7 749948.8
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	REFERENCE COORDINATE SYSTEM:	New York State Plane
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	GROUND SURFACE ELEVATION (ft):	733.4
DRILLING METHOD:	HOLLOW STEM AUGER	DATUM:	NAD 1983
WELL INSTALLATION STARTED:	03/18/94	GEOLOGIST:	F. O'LOUGHLIN
WELL INSTALLATION COMPLETED:	03/19/94	CHECKED BY:	KK



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	733.4
2.0	TBS	731.4
3.2	TSP	730.2
4.2	TSC	729.2
8.1	BSC	725.3
9.2	POW	724.2

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **RISER**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **3.65**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **3.95**

SURFACE SEAL
Type: **CEMENT**
Interval: **2**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE CHIPS**
Interval: **1.2**

SANDPACK
Type: **#1, #3**
Interval: **6**

WELL DEVELOPMENT DATA
Date: **3/21/94**
Method: **BAIL/PUMP**
Duration: **80 MIN**
Rate: **2.1 L/MIN**

WATER LEVELS

	Date	Time	Depth,TR
▽	3/21	0930	1.72
▼	3/21	1055	3.08
▽			
▼			
▽			
▼			

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.30	5	700	38.9

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁘	SAND	TR	TOP OF WELL RISER
░	SEAL	▥	SILT	GS	GROUND SURFACE
⁙	SANDPACK	▨	CLAY	TG	TOP OF GROUT
		☒	NO RECOVERY	TBS	TOP BENTONITE SEAL
				TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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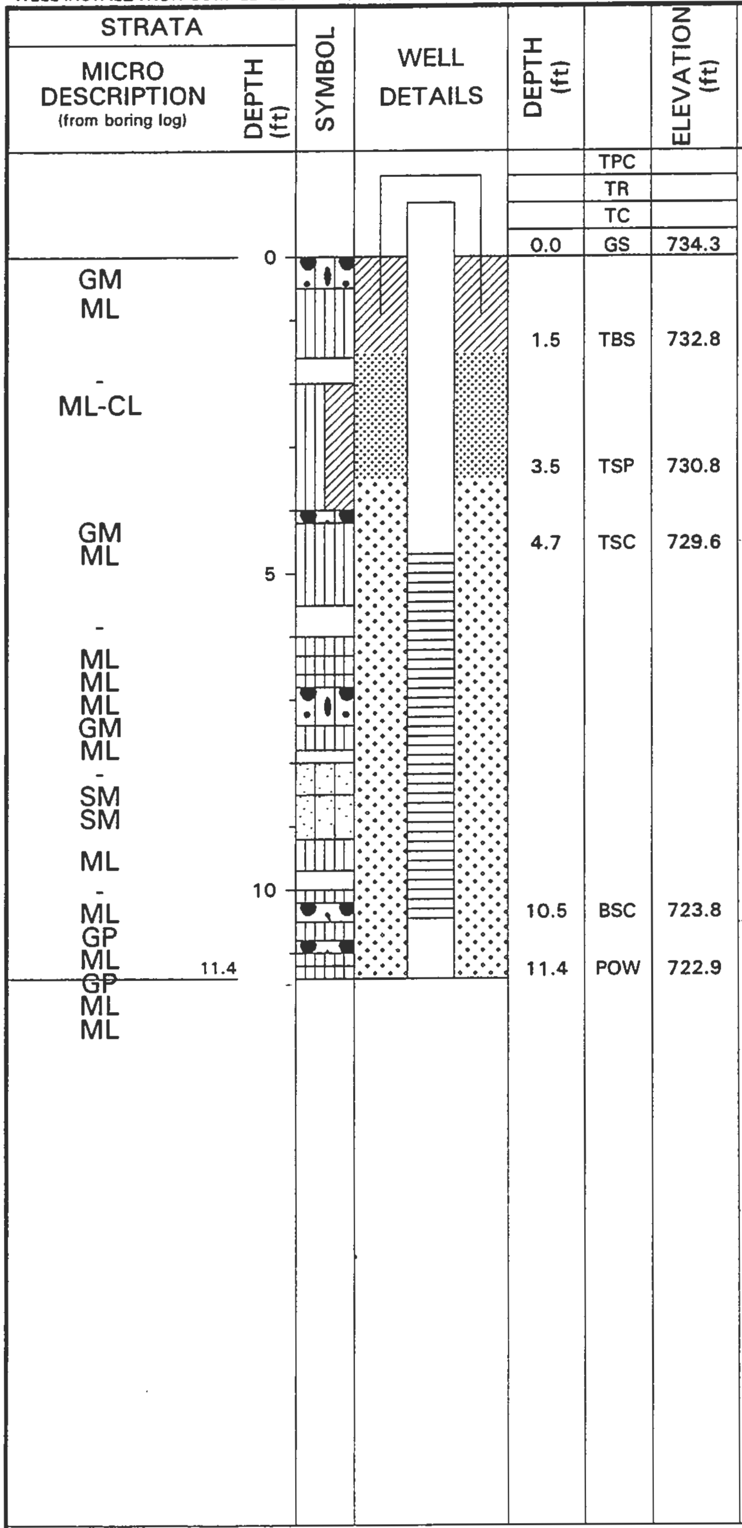
COMPLETION REPORT OF
WELL No. MW59-1

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW59-2

PROJECT:	**EIGHT MODERATELY LOW PRIORITY AOCs**	WELL LOCATION (N/E):	**999036.1 749874.0**
PROJECT LOCATION:	**SENECA ARMY DEPOT, ROMULUS NY**	REFERENCE COORDINATE SYSTEM:	**New York State Plane**
DRILLING CONTRACTOR:	**EMPIRE SOILS INVESTIGATIONS**	GROUND SURFACE ELEVATION (ft):	**734.3**
DRILLING METHOD:	**HOLLOW STEM AUGER**	DATUM:	**NAD 1983**
WELL INSTALLATION STARTED:	**03/06/94**	GEOLOGIST:	**F. O'LOUGHLIN**
WELL INSTALLATION COMPLETED:	**03/06/94**	CHECKED BY:	**KK**



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	734.3
1.5	TBS	732.8
3.5	TSP	730.8
4.7	TSC	729.6
10.5	BSC	723.8
11.4	POW	722.9

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **RISER**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **6.2**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **4, .9**

SURFACE SEAL
Type: **CEMENT**
Interval: **1.5**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE PELLETS**
Interval: **2**

SANDPACK
Type: **#1, #3**
Interval: **7.9**

WELL DEVELOPMENT DATA
Date: **3/8/94**
Method: **BAIL/PUMP**
Duration: **67 MIN**
Rate: **2.1 L/MIN**

WATER LEVELS

	Date	Time	Depth,TR
▽	3/8	1310	3.40
▼	3/8	1407	3.60
▽			
▽			
▽			
▼			

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.32	6.5	600	2.9

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁘	SAND	TR	TOP OF WELL RISER
░	SEAL	▥	SILT	GS	GROUND SURFACE
⁙	SANDPACK	▨	CLAY	TG	TOP OF GROUT
		☒	NO RECOVERY	TBS	TOP BENTONITE SEAL
				TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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COMPLETION REPORT OF WELL No. MW59-2
Sheet 1 of 1

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW59-3

PROJECT: **EIGHT MODERATELY LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
WELL INSTALLATION STARTED: **03/18/94**
WELL INSTALLATION COMPLETED: **03/18/94**

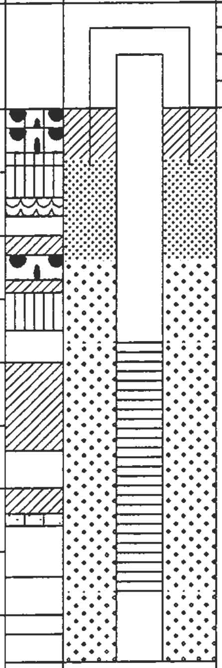
WELL LOCATION (N/E): **999030.0 750345.9**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **737.7**
DATUM: **NAD 1983**
GEOLOGIST: **F. O'LOUGHLIN**
CHECKED BY: **KK**

STRATA

MICRO DESCRIPTION (from boring log) — DEPTH (ft)

0
GM
GM
ML
ML
PT
-
CL
GP
CL
ML
-
CL
5
-
CL
SM
-
-
-
8.8

SYMBOL — WELL DETAILS



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	737.7
0.8	TBS	736.9
2.4	TSP	735.3
3.7	TSC	734.0
7.7	BSC	730.0
8.8	POW	728.9

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **ROADWAY BOX**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **2.85**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **3.95**

SURFACE SEAL
Type: **CEMENT**
Interval: **.8**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE**
Interval: **1.6**

SANDPACK
Type: **#1, #3**
Interval:

WELL DEVELOPMENT DATA
Date: **3/20/94**
Method: **BAIL/PUMP**
Duration: **55 MIN**
Rate: **2 L/MIN**

WATER LEVELS

	Date	Time	Depth,TR
▽	3/20	1140	1.44
▼	3/20	1227	1.70
▼			
▼			
▼			
▼			

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.23	5.5	1100	20.3

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁘	SAND	TR	TOP OF WELL RISER
▒	SEAL	▥	SILT	GS	GROUND SURFACE
⁙	SANDPACK	▨	CLAY	TG	TOP OF GROUT
		☒	NO RECOVERY	TBS	TOP BENTONITE SEAL
				TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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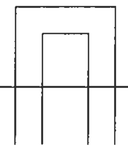
COMPLETION REPORT OF
WELL No. MW59-3
Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW59-3A

PROJECT:	15 SWMU ESIs-8 MODERATELY LOW PRIORITY AOCs		
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS, NEW YORK		
WELL LOCATION (N/E):	999026.3 750264.3	GROUND SURFACE ELEVATION:	NA
DRILLING CONTRACTOR:		DATUM:	NAD 1983
DRILLING METHOD:		GEOLOGIST:	
WELL INSTALLATION STARTED:	03/17/94	CHECKED BY:	
WELL INSTALLATION COMPLETED:	03/17/94	CONSULTANT:	

STRATA MACRO DESCRIPTION (from boring log)	DEPTH (ft.)	SYMBOL	WELL DETAILS	DEPTH (ft.)		ELEVATION (ft.)
					TPC	
					TR	
					TC	
	0			0.0	GS	NA
	8.0					



MW59-3 was backfilled and not completed as a monitoring well

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter:
Type:
Interval:

RISER
Diameter:
Type:
Interval:

SCREEN
Diameter:
Type:
Interval:

SURFACE SEAL
Type:
Interval:

GROUT
Type:
Interval:

SEAL
Type:
Interval:

SANDPACK
Type:
Interval:

WELL DEVELOPMENT DATA
Date:
Method:
Duration:
Rate:
Final Measurements:

WATER LEVELS

	Date	Time	Depth,TR
▽			
▼			
▼			
▼			
▼			
▼			

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▦	GROUT	⁘	SAND	TR	TOP OF WELL RISER
░	SEAL	▥	SILT	GS	GROUND SURFACE
⁙	SANDPACK	▨	CLAY	TBS	TOP BENTONITE SEAL
		☒	NO RECOVERY	TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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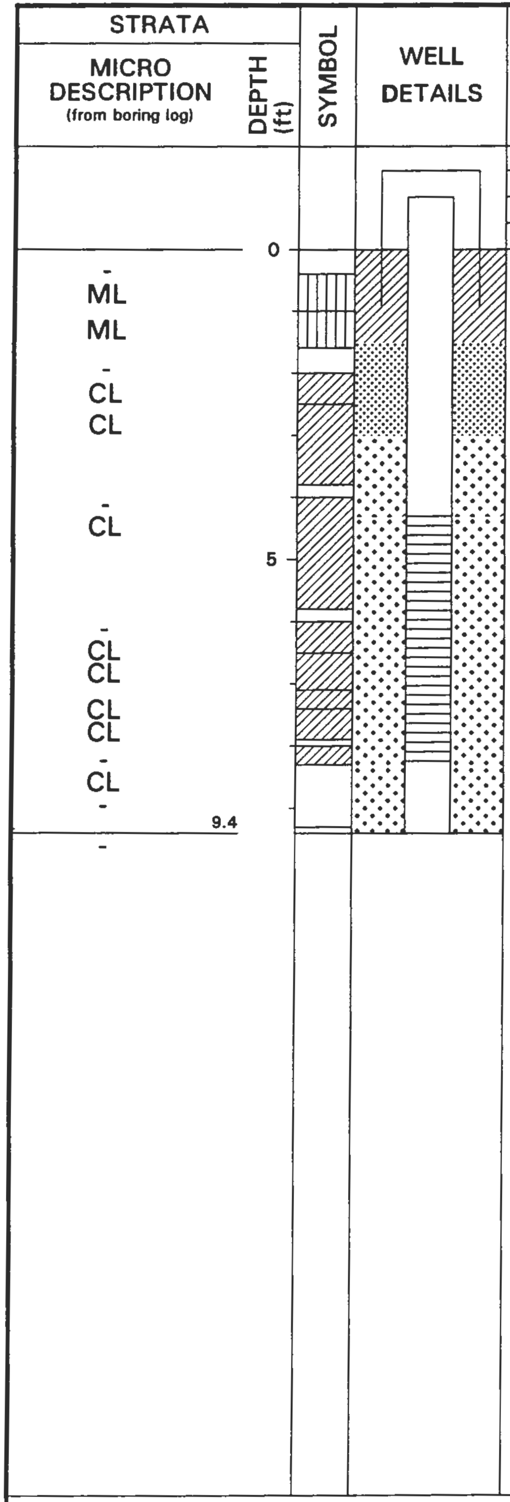
COMPLETION REPORT OF WELL No. MW59-3A

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW71-1

PROJECT:	SEVEN LOW PRIORITY AOCs	WELL LOCATION (N/E):	999297.5 750894.8
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	REFERENCE COORDINATE SYSTEM:	New York State Plane
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	GROUND SURFACE ELEVATION (ft):	747.1
DRILLING METHOD:	HOLLOW STEM AUGER	DATUM:	NAD 1983
WELL INSTALLATION STARTED:	03/14/94	GEOLOGIST:	F. O'LOUHGLIN
WELL INSTALLATION COMPLETED:	03/14/94	CHECKED BY:	FO



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	747.1
1.5	TBS	745.6
3.0	TSP	744.1
4.3	TSC	742.8
8.3	BSC	738.8
9.4	POW	737.7

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: .7
Type: **ROADWAY BOX**
Interval: 1

RISER
Diameter: 2
Type: **SCH. 40-PVC**
Interval: 3.5

SCREEN
Diameter: 2
Type: **SCH. 40-PVC/0.010**
Interval: 4

SURFACE SEAL
Type: **CEMENT**
Interval: 1.5

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE PELLETS**
Interval: 1

SANDPACK
Type: **#1, #3**
Interval: 6.4

WELL DEVELOPMENT DATA
Date: **3/16/94**
Method: **BAIL**
Duration: **85 MIN**
Rate: **1.4 L/MIN**

WATER LEVELS

	Date	Time	Depth,TR
▽	3/16	1530	14.48
▼	3/16	1716	6.00
▽			
▼			
▽			
▼			

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
6.85	5.5	500	22.4

LEGEND

▨	SURFACE SEAL	●	GRAVEL
▩	GROUT	⁘	SAND
▒	SEAL	▥	SILT
⁙	SANDPACK	▨	CLAY
		☒	NO RECOVERY

TPC	TOP OF PROTECTIVE CASING
TR	TOP OF WELL RISER
GS	GROUND SURFACE
TBS	TOP BENTONITE SEAL
TSP	TOP OF SANDPACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
POW	POINT OF WELL

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COMPLETION REPORT OF WELL No. MW71-1

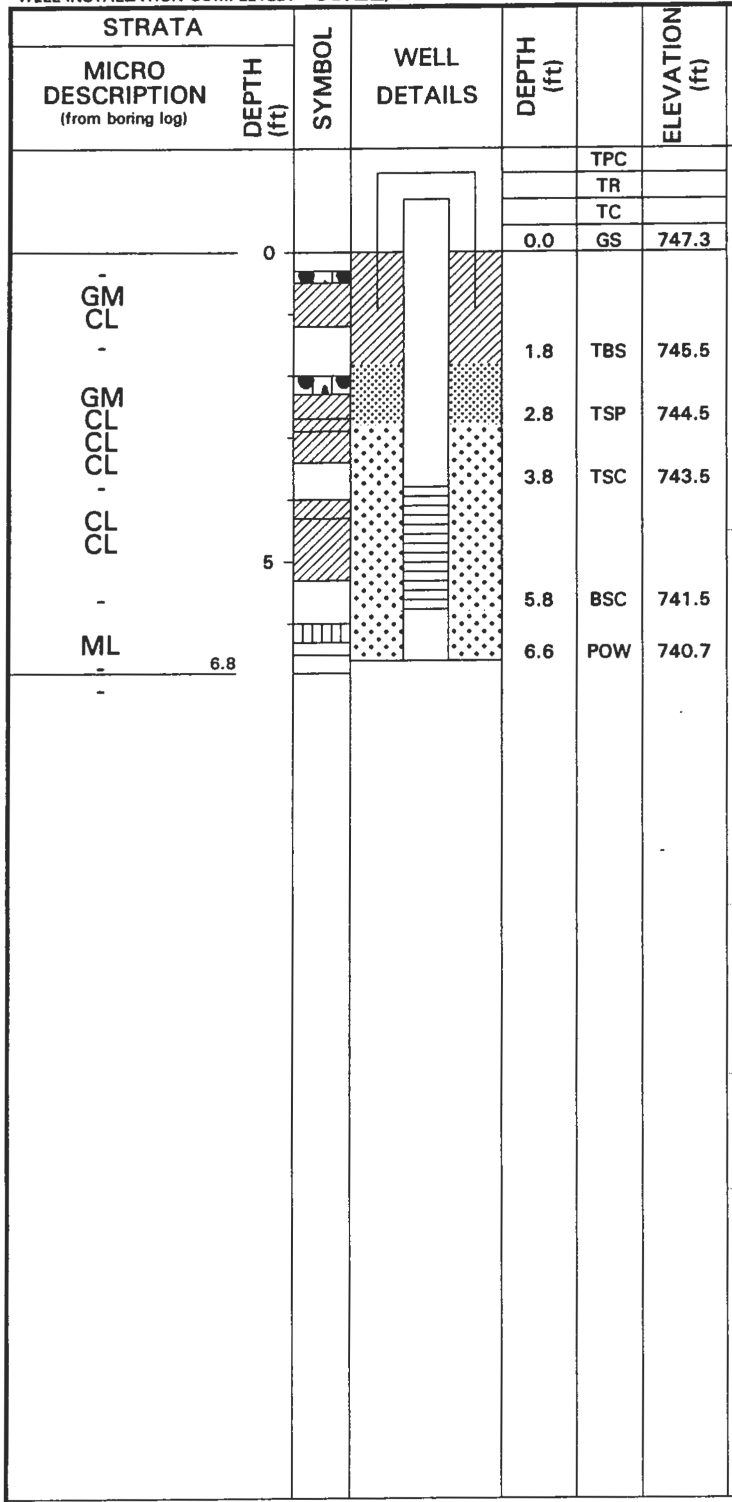
Sheet 1 of 1

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW71-2

PROJECT: SEVEN LOW PRIORITY AOCs
PROJECT LOCATION: SENECA ARMY DEPOT, ROMULUS NY
DRILLING CONTRACTOR: EMPIRE SOILS INVESTIGATIONS
DRILLING METHOD: HOLLOW STEM AUGER
WELL INSTALLATION STARTED: 03/22/94
WELL INSTALLATION COMPLETED: 03/22/94

WELL LOCATION (N/E): 999309.2 750986.4
REFERENCE COORDINATE SYSTEM: New York State Plane
GROUND SURFACE ELEVATION (ft): 747.3
DATUM: NAD 1983
GEOLOGIST: K. KELLY
CHECKED BY: FO



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	747.3
1.8	TBS	745.5
2.8	TSP	744.5
3.8	TSC	743.5
5.8	BSC	741.5
6.6	POW	740.7

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: 8
Type: ROADWAY BOX
Interval: 1

RISER
Diameter: 2
Type: SCH. 40-PVC
Interval: 3.2

SCREEN
Diameter: 2
Type: SCH. 40-PVC/0.010
Interval: 2

SURFACE SEAL
Type: CEMENT
Interval: 1

GROUT
Type: BENTONITE/CEMENT
Interval: 1.3

SEAL
Type: BENTONITE PELLETS
Interval: 1

SANDPACK
Type: #1, #3
Interval: 3.8

WELL DEVELOPMENT DATA
Date: 4/28/94
Method: BAIL/PUMP
Duration: 24 DAYS
Rate: .333 L/MIN

WATER LEVELS

Date	Time	Depth,TR
4/5	1000	4.85
4/28	0845	5.59

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.19	6.8	435	57.6

LEGEND

▨	SURFACE SEAL	●	GRAVEL
▩	GROUT	⁘	SAND
▒	SEAL	▥	SILT
⁙	SANDPACK	▨	CLAY
		☒	NO RECOVERY

TPC	TOP OF PROTECTIVE CASING
TR	TOP OF WELL RISER
GS	GROUND SURFACE
TBS	TOP BENTONITE SEAL
TSP	TOP OF SANDPACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
POW	POINT OF WELL

PARSONS
ENGINEERING-SCIENCE, INC.

UNITED STATES ARMY
CORPS OF ENGINEERS
Seneca Army Depot
Romulus, New York

COMPLETION REPORT OF WELL No. MW71-2

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