U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

00660

32

DRAFT FINAL

SEAD-25 and SEAD-26
PROJECT SCOPING PLAN FOR PERFORMING A CERCLA REMEDIAL INVESTIGATION/ FEASIBILITY STUDY (RI/FS) AT THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25) AND FIRE TRAINING PIT AND AREA (SEAD-26)

JULY 1995

REVISED DRAFT SEAD-25 AND SEAD-26
PROJECT SCOPING PLAN FOR PERFORMING
A CERCLA REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)
AT THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25)
AND FIRE TRAINING PIT AND AREA (SEAD-26)

Comment #11 ES has partially addressed the original comment by providing a schedule for the collection of water level data. However, the schedule provided includes the collection of data prior to completing well development. Based on the fined-grained materials that are expected to be encountered during the investigation, we believe that these data may not be representative of static conditions. Also, the remaining scheduled water level measurements may not necessarily monitor the effects of seasonal variations. To account for seasonal variations monitoring should be conducted during the expected seasonal high and seasonal low water table conditions.

Response #11 Water level measurements will be conducted three times, once during well development, and during two rounds of sampling. The measurements obtained at the time of well development will not be used to construct groundwater elevation contour maps. Those measurements will be used in the calculations involved with well development. The two measurements performed at the time of groundwater sampling will be used to construct groundwater elevation contour maps. The text on pages 4-8 and 4-17 of the scoping plan has been revised to clarify this point.

Comment #12 The response to this comment was to eliminate the emissions flux testing. The intent of the comment was to use the results of the soil sampling to locate the emissions flux testing in the areas of highest soil contamination, and not to eliminate the testing. We recommend that the testing be conducted after the results of the soil sampling have been obtained.

Comment #13 Emissions flux testing should be conducted, and the previously requested information should be provided.

Responses #12&13 The emissions flux testing was deleted from the field investigation program at SEAD-25 following a re-evaluation of the need to perform emissions monitoring. Although the data would reflect actual site conditions, the level of effort involved and the increased number of sampling points that would be required would outweigh the value of the data, especially since modelling has provided reasonable estimates of emissions at other sites. Emissions from the soil will be determined using the computer model EMSOFT (Exposure Model for Soil-Organic Fate and Transport). If, in the future, the need should arise for a site specific determination of emissions, flux chamber monitoring will be conducted as part of the performance of any focused feasibility studies. The text on page 4-12a has been revised to indicate that emissions of volatile organics will be calculated using the EMSOFT model.

Comment #16	The additional monitoring well has been added as requested, however, the response should read "...labelled MW26-11/SB26-11..." and not "...MW26-10/SB26-10...".
Response #16	Agreed. The additional monitoring well has been labelled MW26-11/SB26-11.

D#13\CERCLA

PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AT SEAD-25 and SEAD-26
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

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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 Realignment and Closure Act
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
EPA	Environmental Protection Agency
ESI	Expanded Site Inspections
FS	Feasibility Study
ft	Feet
ft/ft	Feet per foot

LIST OF ACRONYMS
(CONT.)

ft/sec	Feet per second
ft/yr	Feet per year
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
GC	Gas chromatograph
gpm	Gallons per minute
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
OB	Open Burning
OD	Open Detonation
OVM	Organic Vapor Meter

LIST OF ACRONYMS
(CONT.)

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
RAGS	EPA Risk Assessment Guidance for Superfund
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

LIST OF ACRONYMS
(CONT.)

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

This Project Scoping Plan was prepared by Parsons Engineering Science, Inc. (Parsons ES) to outline the work proposed for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation/Feasibility Studies (RI/FSs) at SEAD-25 and SEAD-26 at the Seneca Army Depot Activity (SEDA) in Romulus, New York. This Plan is based on the results and recommendations presented in the draft report, issued in June 1994, on the Expanded Site Investigation (ESI) conducted at these Areas of Concern titled, "Expanded Site Inspection, Seven High Priority SWMUs, SEAD 4,16,17,24,25,26, and 45". The purpose of this project is to determine the nature and extent of environmental impacts, and evaluate and select appropriate remedial actions. These actions will comply with ARARs and take into account the risks to human health and the environment.

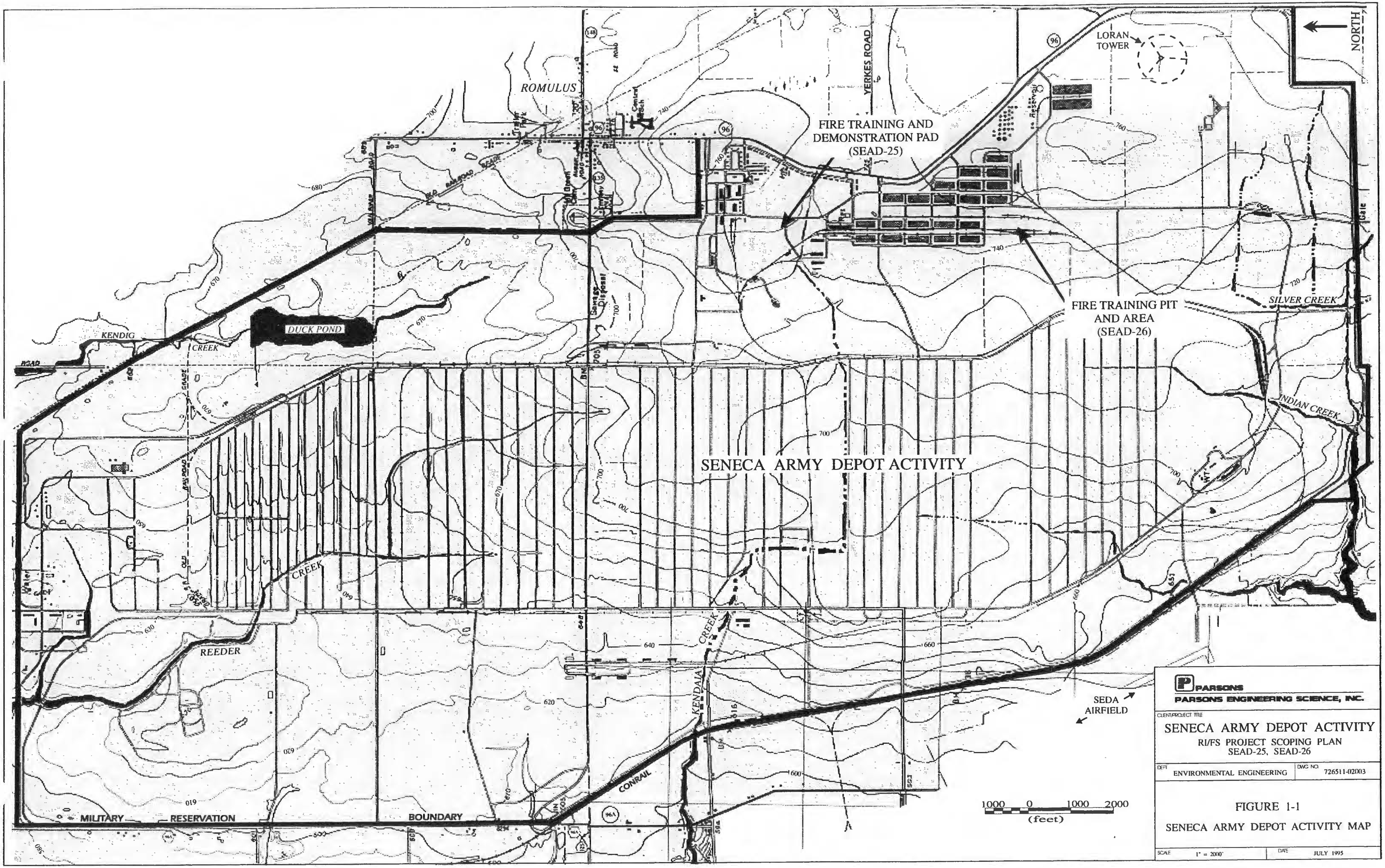
This work will be performed as part of the United States Army Corps of Engineers (USACOE) remedial response activities under CERCLA. It will follow the requirements of the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency, Region II (EPA), and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

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 and discusses the results of previous investigations. Section 3.0 discusses scoping of the RI/FS including the conceptual site model, 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 F are included with this report.

1.3 BACKGROUND

SEAD-25 and SEAD-26 are two fire training areas at SEDA in Romulus, NY (Figure 1-1).



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25, SEAD-26

DEPT	DWG NO.
ENVIRONMENTAL ENGINEERING	726511-02003

FIGURE 1-1

SENECA ARMY DEPOT ACTIVITY MAP

SCALE	DATE
1" = 2000'	JULY 1995

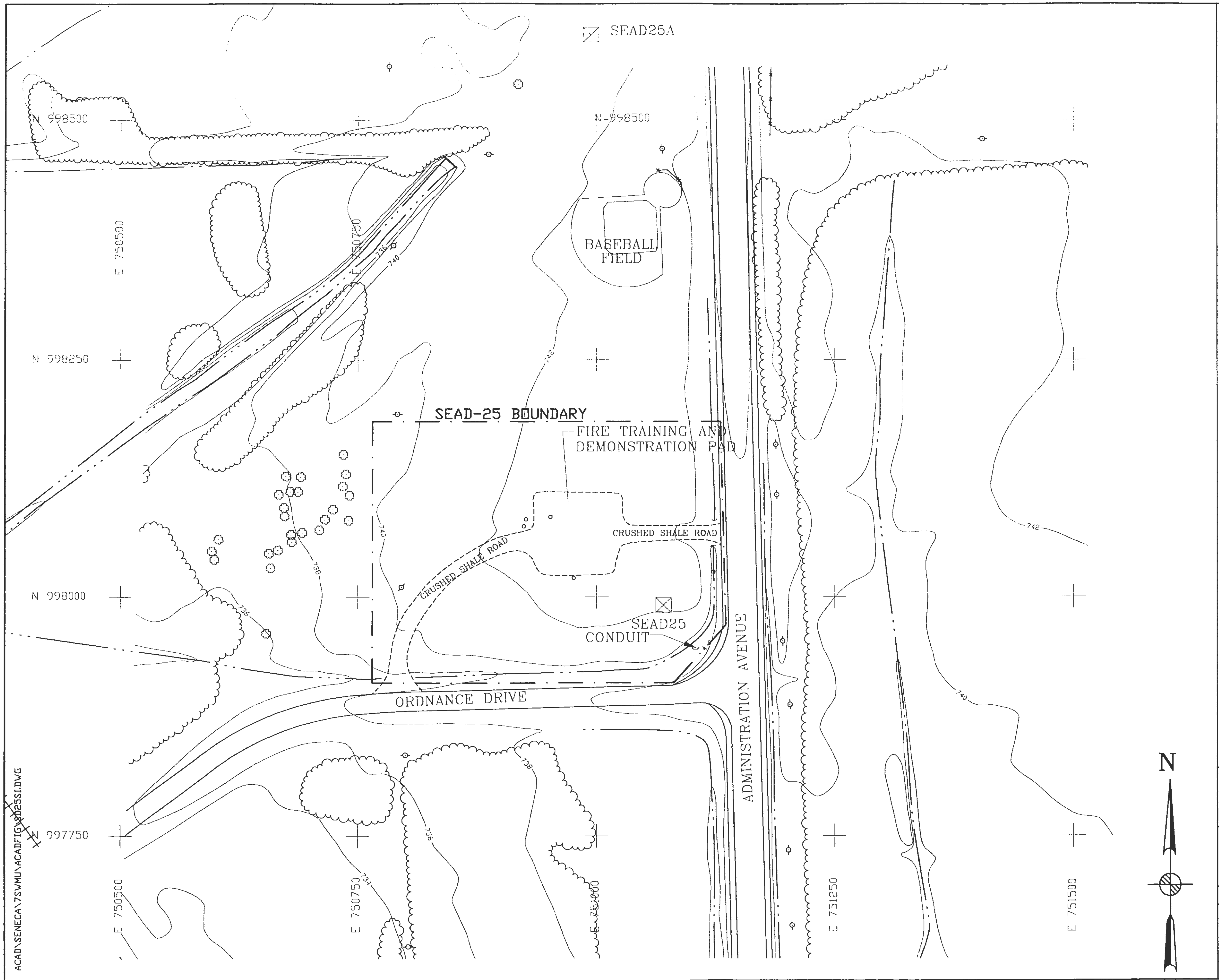
R:\GRAPHICS\SENECA\BASEMAP\FINBASE.CDR(CVM)

SEAD-25 is referred to as the Fire Training and Demonstration Pad and SEAD-26 as the Fire Training Pit and Area, though similar activities were performed at both areas.

The Fire Training and Demonstration Pad (SEAD-25) is located in the eastern portion of SEDA (Figure 1-2). It is characterized by a small (100 feet by 100 feet) sparsely vegetated square pad, the surface of which is mostly composed of crushed shale; most of the vegetation on the pad appears to be stressed.

The Fire Training Pit and Area (SEAD-26) is located in the southeastern portion of SEAD-26. It is characterized by an elevated grass-covered, 1,400-foot long rectangular pad that contains a fire training tower, a storage trailer, a circular burning pond, and several disposal areas (Figure 1-3).

In accordance with the decision process outlined in the IAG, ESIs were performed at SEAD-25 and SEAD-26 in 1993. Soil and groundwater samples were collected from both sites and surface water and sediment were obtained from SEAD-26 to determine if contaminants were present. The ESI report indicated a release of volatile organic compounds and semivolatile organic compounds that have primarily impacted subsurface soils and groundwater. Based on these results, the ESI report recommended that RI/FSs be performed at SEAD-25 and SEAD-26.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

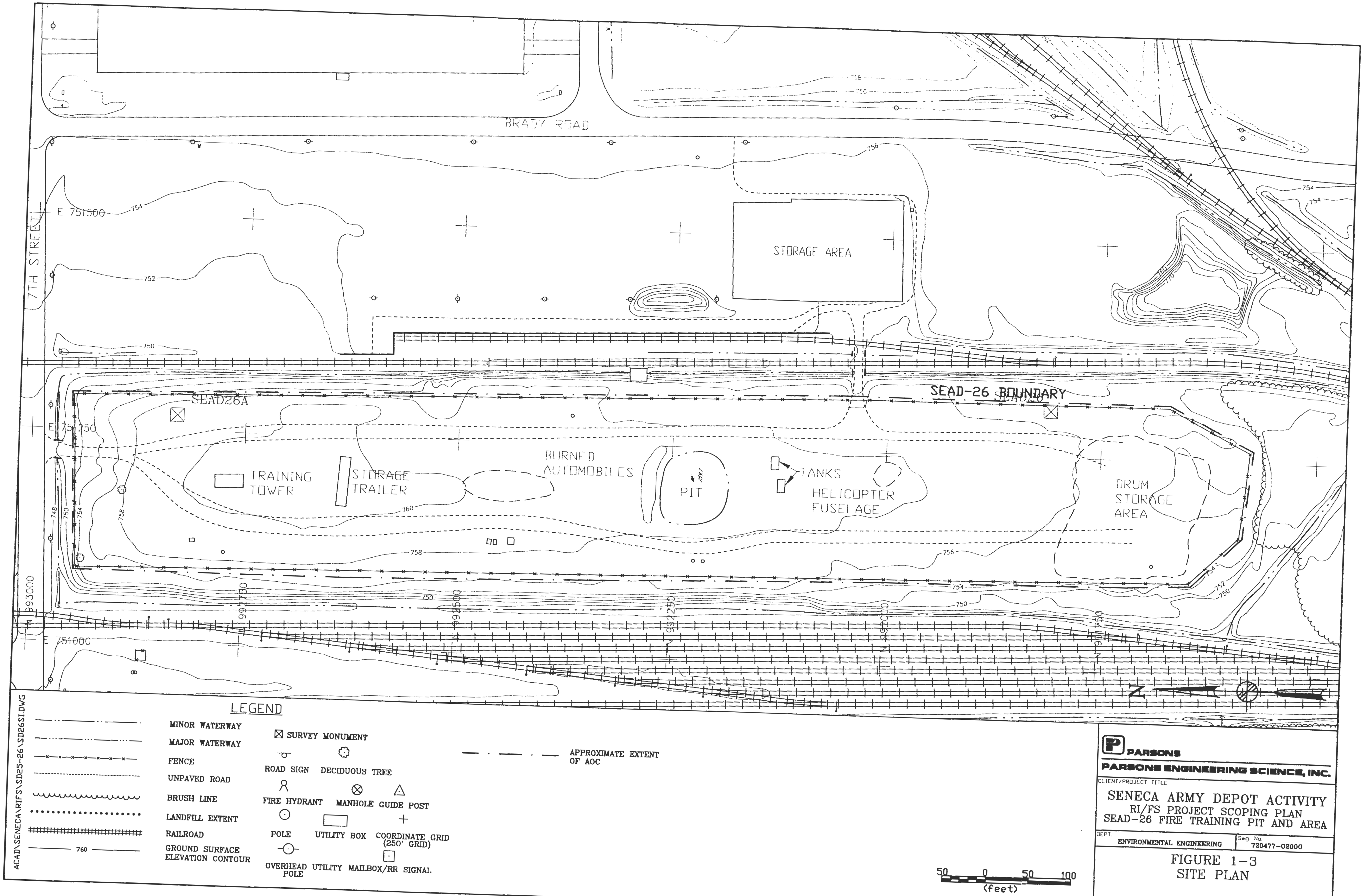
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	726511-02003

FIGURE 1-2
SITE PLAN

SCALE	DATE	REV
1" = 100'	JULY 1995	C



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1-3
SITE PLAN

SCALE	DATE	REV
1" = 100'	JULY 1995	A

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

2.4 RESULTS OF PREVIOUS INVESTIGATIONS

2.4.1 SEAD-25, FIRE TRAINING AND DEMONSTRATION PAD

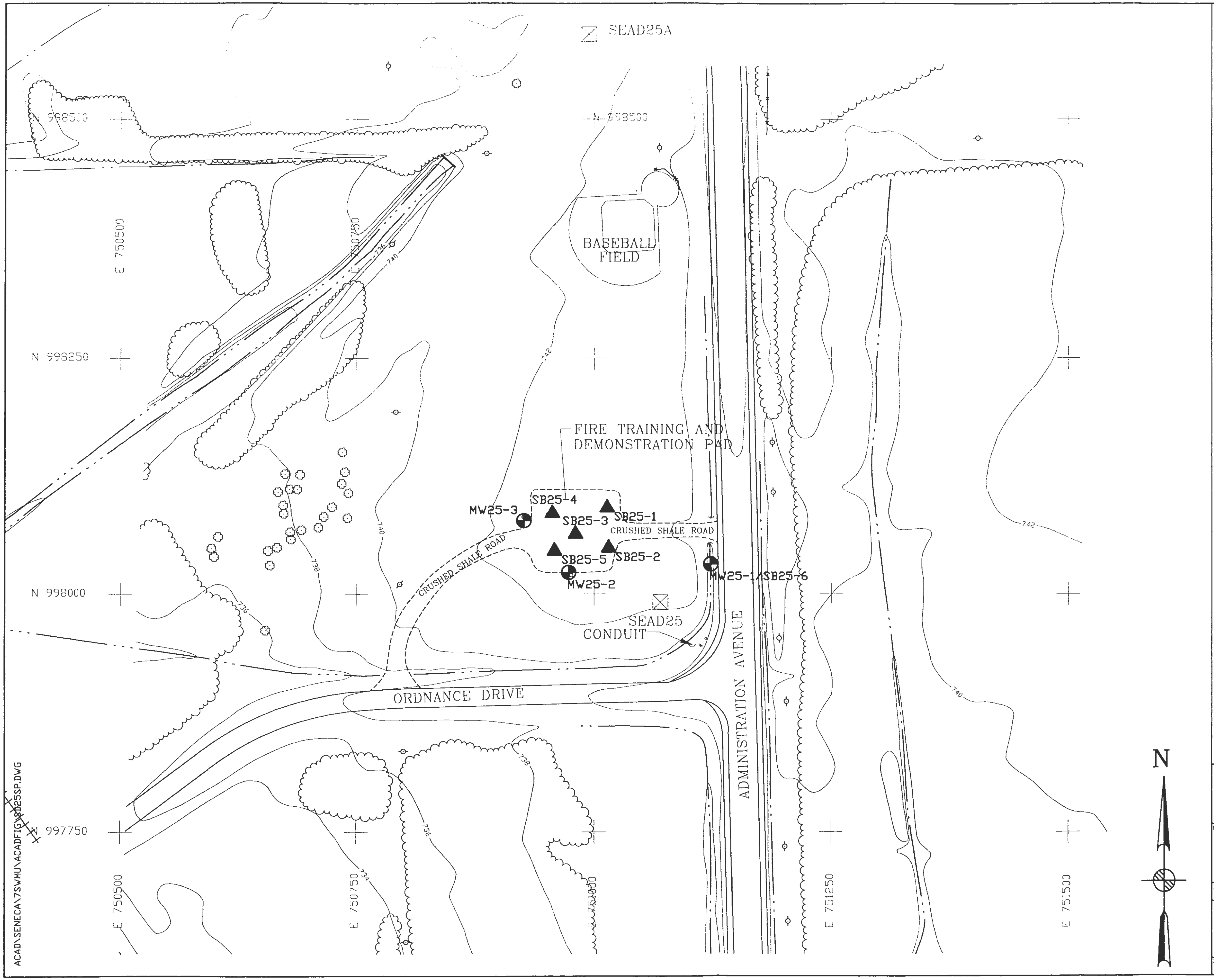
2.4.1.1 Introduction

Soil and groundwater were sampled as part of the ESI conducted at SEAD-25 in 1993 (Figure 2-1). The results of the investigation were detailed in a draft final Parsons ES report titled "Expanded Site Inspection, Seven High Priority SWMU's, SEAD 4, 16, 24, 25, 26, and 45" which was issued in May 1995.

A total of 17 soil samples were collected from six soil borings at SEAD-25. Three monitoring wells were also installed and sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-25.

2.4.1.2 Soil

The analytical results for the 6 surface and 11 subsurface soil samples collected as part of the SEAD-25 investigation are presented in Table 2-1. The sample locations were shown in



ACAD\SENECA\7SWMU\ACADFIG\SD25SP.DWG

LEGEND

—·—·—	MINOR WATERWAY
—··—··—	MAJOR WATERWAY
—x—x—x—	FENCE
·········	UNPAVED ROAD
﹏﹏﹏	BRUSH LINE
• • • • • •	LANDFILL EXTENT
++++++++	RAILROAD
—— 760 ——	GROUND SURFACE ELEVATION CONTOUR

ROAD SIGN
DECIDUOUS TREE
△ GUIDE POST
FIRE HYDRANT
⊗ MANHOLE
\+ COORDINATE GRID (250' GRID)
⊙ POLE
▭ UTILITY BOX
⊡ MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
☒ SURVEY MONUMENT

◐ **EXISTING MONITORING WELL**
▲ **EXISTING SOIL BORING**

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	726511-02003

FIGURE 2-1
LOCATION OF ESI
SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	JULY 1995	C

TABLE 2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-6 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059	SOIL SEAD-25 4-5 12/03/93 SB25-3.3 206061
VOLATILE ORGANICS															
Methylene Chloride	ug/kg	390	11.8%	100	2	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U	11 U
Acetone	ug/kg	2800	52.9%	200	3	11 U	11 U	11 U	11 U	11 U	39	24	52 U	40	11 U
1,2-Dichloroethene (total)	ug/kg	310	5.9%	300(d)	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	52 U	12 U	11 U
Chloroform	ug/kg	9	11.8%	300	0	11 U	11 U	11 U	2 J	11 U	19 U	11 U	52 U	12 U	11 U
2-Butanone	ug/kg	10	17.6%	300	0	11 U	11 U	11 U	11 U	11 U	10 J	11 U	52 U	8 J	11 U
1,1,1-Trichloroethane	ug/kg	170	5.9%	800	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	170	12 U	11 U
Trichloroethene	ug/kg	280	11.8%	700	0	11 U	11 U	11 U	11 U	11 U	19 U	11 U	38 J	12 U	11 U
Benzene	ug/kg	100	11.8%	60	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	100	12 U	4 J
Toluene	ug/kg	4500	29.4%	1500	1	11 U	11 U	11 U	11 U	11 U	19 U	11 U	840	4 J	30
Ethylbenzene	ug/kg	17000	35.3%	5500	1	11 U	11 U	11 U	11 U	11 U	19 U	6 J	370	12 U	28
Xylene (total)	ug/kg	30000	58.8%	1200	5	11 U	11 U	11 U	11 U	11 U	19 U	37	4100 J	49	320
HERBICIDES															
Dicamba	ug/kg	6.4	5.9%	NA	NA	5.4 U	5.5 U	5.5 U	5.4 U	5.5 U	5.4 U	5.5 U	5.3 U	6 U	5.9 U
MCPP	ug/kg	5400	5.9%	NA	NA	5700 U	5400 U	5500 U	5400	5500 U	5400 U	5500 U	5300 U	6000 U	5900 U
SEMIVOLATILE ORGANICS															
Naphthalene	ug/kg	4300	47.1%	13000	0	720 U	360 U	500 U	350 U	500 U	390 J	250 J	1100 J	400 U	130 J
2-Methylnaphthalene	ug/kg	8900	64.7%	36400	0	55 J	360 U	500 U	40 J	51 J	5100	2800 J	4700 J	400 U	410
Acenaphthylene	ug/kg	32	5.9%	41000	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Acenaphthene	ug/kg	300	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	300 J	220 J	6900 U	400 U	390 U
Fluorene	ug/kg	1900	47.1%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	620 J	910 J	400 U	69 J
N-Nitrosodiphenylamine	ug/kg	1500	17.6%	50000 *	0	720 U	360 U	500 U	350 U	500 U	960 J	870 J	1500 J	400 U	390 U
Phenanthrene	ug/kg	4600	70.6%	50000 *	0	720 U	360 U	500 U	350 U	65 J	1400 J	1200 J	2500 J	400 U	200 J
Anthracene	ug/kg	42	5.9%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Carbazole	ug/kg	26	5.9%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Fluoranthene	ug/kg	570	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	38 J
Pyrene	ug/kg	950	23.5%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	380 J	400 U	57 J
Benzo(a)anthracene	ug/kg	230	11.8%	220	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	27 J
Chrysene	ug/kg	350	11 8%	400	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	34 J
bis(2-Ethylhexyl)phthalate	ug/kg	480	35 3%	50000 *	0	160 J	63 J	90 J	25 J	49 J	3600 U	3600 U	480 J	30 J	390 U
Benzo(b)fluoranthene	ug/kg	240	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Benzo(k)fluoranthene	ug/kg	260	5.9%	1100	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Benzo(a)pyrene	ug/kg	250	5.9%	61	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg	170	5.9%	3200	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Dibenz(a,h)anthracene	ug/kg	72	5.9%	14	1	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	390 U
Benzo(g,h,i)perylene	ug/kg	200	11.8%	50000 *	0	720 U	360 U	500 U	350 U	500 U	3600 U	3600 U	6900 U	400 U	38 J

TABLE 2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-1.1 206050	SOIL SEAD-25 4-6 12/03/93 SB25-1.3 206051	SOIL SEAD-25 6-8 12/03/93 SB25-1.4 206052	SOIL SEAD-25 0-2 12/03/93 SB25-2.1 206053	SOIL SEAD-25 0-2 12/03/93 SB25-2.4 206057 SB25-2.1DUP	SOIL SEAD-25 2-4 12/03/93 SB25-2.2 206055	SOIL SEAD-25 4-8 12/03/93 SB25-2.3 206056	SOIL SEAD-25 0-2 12/03/93 SB25-3.1 206058	SOIL SEAD-25 2-4 12/03/93 SB25-3.2 206059	SOIL SEAD-25 4-5 12/03/93 SB25-3.3 206061
PESTICIDES/PCB															
Heptachlor epoxide	ug/kg	2.9	11.8%	20	0	1.8 UJ	1.8 U	1.6 U	1.8 U	1.8 U	1.8 U	1.9 U	2.8 J	2 U	2 U
Endosulfan I	ug/kg	2.5	5.9%	900	0	1.8 UJ	1.8 U	1.8 U	1.6 U	1.8 U	1.8 U	1.9 U	2.5 J	2 U	2 U
4,4'-DDE	ug/kg	4.8	11.8%	2100	0	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	4.3	4 U	3.9 U
Endrin	ug/kg	3.4	11.8%	100	0	3.6 UJ	3.8 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U	3.9 U
4,4'-DDT	ug/kg	4.3	11.8%	2100	0	3.6 UJ	3.8 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.4 J	4 U	3.9 U
Endrin aldehyde	ug/kg	3.7	5.9%	NA	NA	3.6 UJ	3.6 U	3.6 U	3.5 U	3.6 U	3.6 U	3.6 U	3.7 J	4 U	3.9 U
alpha-Chlordane	ug/kg	2.5	11.8%	540	0	1.8 UJ	1.8 U	1.8 U	1.6 U	1.8 U	1.8 U	1.9 U	1.8 U	2 U	2 U
Aroclor-1254	ug/kg	130	17.6%	1000(a)	0	38 UJ	36 U	36 U	35 U	36 U	36 U	36 U	35 U	40 U	39 U
METALS															
Aluminum	mg/kg	23600	100.0%	15523	4	9720	10800	8730	9370	7330	9140	8640	8160	18600	6310
Antimony	mg/kg	2.5	5.9%	5	0	9.9 UJ	9.1 UJ	7.1 UJ	7.6 UJ	8.7 UJ	7.6 UJ	6.6 UJ	9.2 UJ	12 UJ	4.1 U
Arsenic	mg/kg	12.2	100.0%	7.5	6	4.7	3.8	4.7	4.1	5.4	3.5	3.4	2.4	5	8.3
Barium	mg/kg	160	100.0%	300	0	25 J	62.4	55.5	36.7	32.7 J	57.1	60.3	82.3	111	64.7
Beryllium	mg/kg	1.1	100.0%	1	1	0.45 J	0.52 J	0.38 J	0.49 J	0.48 J	0.43 J	0.36 J	0.42 J	0.65 J	0.28 J
Cadmium	mg/kg	0.73	22.2%	1	0	0.62 U	0.57 U	0.44 U	0.48 U	0.64 J	0.47 U	0.73	0.58 U	0.75 U	0.4 U
Calcium	mg/kg	195000	100.0%	120725	5	53800	87300	59100	112000	192000	70800	81800	195000	2760	141000
Chromium	mg/kg	30.4	100.0%	24	4	16	17.6	14.6	15.4	11.5	14.5	15.8	11.9	25.2	12
Cobalt	mg/kg	16.8	100.0%	30	0	9.7	9.8	6.7	10.5	9.8	8.2	7.2	6.3 J	15.6	6.8 J
Copper	mg/kg	35.7	100.0%	25	3	17	15.6	15.6	14.7	14.4	21.6	23.3	16.3	7.6	14.2 J
Iron	mg/kg	54600	100.0%	28986	4	20400	22100	21100	19100	14400	18700	16800	11900	54600	15400
Lead	mg/kg	291	100.0%	30	6	21.7 J	7.1 J	11.5 J	26.8 J	42.6 J	13.7 J	14.2 J	291 J	15.8 J	51
Magnesium	mg/kg	22800	100.0%	12308	7	6350	19600	12300	8590	12300	12800	21000	11300	3980	10000
Manganese	mg/kg	776	100.0%	759	1	394	469	435	450	444	464	407	384	622	529 J
Mercury	mg/kg	0.96	58.3%	0.1	1	0.06 J R	0.05 J R	0.07 J R	0.06 J R	0.03 J	0.03 J	0.05 J R	0.03 J	0.08 J R	0.03 U
Nickel	mg/kg	47.8	100.0%	37	3	27.1	27.1	23.6	46.4	23	35.3	23.7	17.5	21.7	18.6
Potassium	mg/kg	3250	100.0%	1546	5	844 J	1230	877	916	1370	979	1230	1420	1730	769 J
Selenium	mg/kg	2.3	52.9%	2	1	0.24 UJ	0.23 UJ	0.19 UJ	0.17 UJ	0.21 UJ	0.12 UJ	0.16 UJ	0.15 UJ	0.2 UJ	2.3 J
Sodium	mg/kg	269	100.0%	114	12	108 J	156 J	126 J	128 J	181 J	128 J	157 J	180 J	55 J	130 J
Thallium	mg/kg	0.79	41.2%	0.3	6	0.28 U	0.25 U	0.2 U	0.16 U	1.2 U	0.13 U	0.2 U	0.81 U	0.21 U	0.5 J
Vanadium	mg/kg	40.8	100.0%	150	0	12.2	18	13.2	12.4	11.5	14.8	14	10.1	39.8	11
Zinc	mg/kg	210	100.0%	90	3	44.4	47.7	57.9	35.4	97.9	56.7	94.8	74.7	43.7	78.4 J
OTHER ANALYSES															
Nitrate/Nitrite-Nitrogen	mg/kg	0.2	82.4%	NA	NA	0.2	0.01	0.05	0.02	0.09	0.01	0.02	0.04	0.01 U	0.04
Total Solids	%W/W	94.7	100.0%			91.6	91.6	92.4	92.9	92.5	92.2	91	94.7	83.3	83.6
Total Petroleum Hydrocarbons	mg/kg	27000	100.0%	NA	NA	1240	68	98	1600	1270	3000	1920	14800	112	410

TABLE 2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206065	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 206067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
VOLATILE ORGANICS													
Methylene Chloride	ug/kg	390	11.8%	100	2	1400 U	11 U	11 U	390 J	6800 U	160 J	11 U	11 U
Acetone	ug/kg	2800	52.9%	200	3	1800	38	19	2800	6800 U	760 J	11 U	7 J
1,2-Dichloroethene (total)	ug/kg	310	5.9%	300(d)	1	1400 U	11 U	11 U	310 J	6800 U	1200 U	11 U	11 U
Chloroform	ug/kg	9	11.8%	300	0	1400 U	9 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
2-Butanone	ug/kg	10	17.6%	300	0	1400 U	6 J	11 U	1300 U	6800 U	1200 U	11 U	11 U
1,1,1-Trichloroethane	ug/kg	170	5.9%	800	0	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
Trichloroethene	ug/kg	280	11.8%	700	0	1400 U	11 U	11 U	280 J	6800 U	1200 U	11 U	11 U
Benzene	ug/kg	100	11.8%	60	1	1400 U	11 U	11 U	1300 U	6800 U	1200 U	11 U	11 U
Toluene	ug/kg	4500	29.4%	1500	1	1400 U	11 U	11 U	820 J	4500 J	1200 U	11 U	11 U
Ethylbenzene	ug/kg	17000	35.3%	5500	1	1400 U	11 U	11 U	990 J	17000	1200	11 U	11 U
Xylene (total)	ug/kg	30000	58.8%	1200	5	2900	50	110	14000	130000	9000	11 U	11 U
HERBICIDES													
Dicamba	ug/kg	6.4	5.9%	NA	NA	5.9 U	5.6 U	5.4 U	6.4	5.7 U	5.5 U	5.6 U	5.4 U
MCPP	ug/kg	5400	5.9%	NA	NA	5900 U	5600 U	5400 U	5300 U	5700 U	5500 U	5600 U	5400 U
SEMIVOLATILE ORGANICS													
Naphthalene	ug/kg	4300	47.1%	13000	0	770 J	1500 U	810 U	1500 J	330 J	4300 J	360 U	360 U
2-Methylnaphthalene	ug/kg	8900	64.7%	36400	0	2600 J	1500 U	68 J	8900 J	550	7100 J	360 U	360 U
Acenaphthylene	ug/kg	32	5.9%	41000	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	32 J	360 U
Acenaphthene	ug/kg	300	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
Fluorene	ug/kg	1900	47.1%	50000 *	0	1500 J	170 J	95 J	1900 J	510 U	11000 U	28 J	360 U
N-Nitrosodiphenylamine	ug/kg	1500	17.6%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
Phenanthrene	ug/kg	4600	70.6%	50000 *	0	2700 J	350 J	180 J	4600 J	67 J	1000 J	370	360 U
Anthracene	ug/kg	42	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	42 J	360 U
Carbazole	ug/kg	26	5.9%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	26 J	360 U
Fluoranthene	ug/kg	570	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	570	360 U
Pyrene	ug/kg	950	23.5%	50000 *	0	12000 U	1500 U	810 U	950 J	510 U	11000 U	560	360 U
Benzo(a)anthracene	ug/kg	230	11.8%	220	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	230 J	360 U
Chrysene	ug/kg	350	11.8%	400	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	350 J	360 U
bis(2-Ethylhexyl)phthalate	ug/kg	480	35.3%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	360 U	360 U
Benzo(b)fluoranthene	ug/kg	240	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	240 J	360 U
Benzo(k)fluoranthene	ug/kg	260	5.9%	1100	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	260 J	360 U
Benzo(a)pyrene	ug/kg	250	5.9%	61	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	250 J	360 U
Indeno(1,2,3-cd)pyrene	ug/kg	170	5.9%	3200	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	170 J	360 U
Dibenz(a,h)anthracene	ug/kg	72	5.9%	14	1	12000 U	1500 U	810 U	11000 U	510 U	11000 U	72 J	360 U
Benzo(g,h,i)perylene	ug/kg	200	11.8%	50000 *	0	12000 U	1500 U	810 U	11000 U	510 U	11000 U	200 J	360 U

TABLE 2-1

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-25 0-2 12/03/93 SB25-4.1 206062	SOIL SEAD-25 2-4 12/03/93 SB25-4.2 206063	SOIL SEAD-25 4-6 12/03/93 SB25-4.3 206064	SOIL SEAD-25 0-2 12/03/93 SB25-5.1 206065	SOIL SEAD-25 2-4 12/03/93 SB25-5.2 206066	SOIL SEAD-25 4-6 12/03/93 SB25-5.3 206067	SOIL SEAD-25 0-2 12/03/93 SB25-6.1 206068	SOIL SEAD-25 2-4 12/03/93 SB25-6.2 206069
PESTICIDES/PCB													
Heptachlor epoxide	ug/kg	2.9	11.8%	20	0	2 UJ	1.9 U	2.2 U	2.9 J	1.9 UJ	1.9 U	1.9 U	1.8 U
Endosulfan I	ug/kg	2.5	5.9%	900	0	2 UJ	1.9 U	2.2 U	1.8 UJ	1.9 UJ	1.9 U	1.9 U	1.8 U
4,4'-DDE	ug/kg	4.8	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	4.8 J	3.7 UJ	3.6 U	3.7 U	3.6 U
Endrin	ug/kg	3.4	11.8%	100	0	3.9 UJ	3.7 U	4.3 U	2.1 J	3.7 UJ	3.6 U	3.7 U	3.6 U
4,4'-DDT	ug/kg	4.3	11.8%	2100	0	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	4.3	3.6 U
Endrin aldehyde	ug/kg	3.7	5.9%	NA	NA	3.9 UJ	3.7 U	4.3 U	3.5 UJ	3.7 UJ	3.6 U	3.7 U	3.6 U
alpha-Chlordane	ug/kg	2.5	11.6%	540	0	2 UJ	1.9 U	2.2 U	2.5 J	1.9 UJ	1.9 U	1.9 U	1.8 U
Aroclor-1254	ug/kg	130	17.6%	1000(a)	0	33 NJ	37 U	43 U	130 J	37 UJ	36 U	37 U	36 U
METALS													
Aluminum	mg/kg	23600	100.0%	15523	4	19700	16600	7590	13200	23600	11600	10600	7070
Antimony	mg/kg	2.5	5.9%	5	0	4.2 U	4.5 U	4.8 U	2.5 J	3.8 U	4 U	4.2 U	3 U
Arsenic	mg/kg	12.2	100.0%	7.5	6	12.2	7.4	9.1	5.1	8.3	8	8.3	4.8
Barium	mg/kg	160	100.0%	300	0	57.4	86.1	46.1	61.8	160	81.1	59.1	35
Beryllium	mg/kg	1.1	100.0%	1	1	0.86 J	0.82 J	0.76 J	0.57 J	1.1	0.54 J	0.48 J	0.35 J
Cadmium	mg/kg	0.73	22.2%	1	0	0.41 U R	0.43 U R	0.44 U R	0.24 U R	0.37 U R	0.39 U R	0.41 U R	0.29 U R
Calcium	mg/kg	195000	100.0%	120725	5	5330	17800	128000	42600	5120	74200	82500	122000
Chromium	mg/kg	30.4	100.0%	24	4	28.4	26.8	15.8	21.1	30.4	17.5	16.9	11.3
Cobalt	mg/kg	16.6	100.0%	30	0	11.5	16.8	5.6 J	10.6	14	9.5	11.2	6.6 J
Copper	mg/kg	35.7	100.0%	25	3	35.7 J	28.3 J	11.4 J	17.6 J	34 J	22 J	20.2 J	12 J
Iron	mg/kg	54600	100.0%	28986	4	38100	35200	14000	24400	31100	20700	21400	15800
Lead	mg/kg	291	100.0%	30	6	66.4	16.4	156	77.2	18	15.6	9.5	13.8
Magnesium	mg/kg	22800	100.0%	12308	7	5210	8550	21800	6590	6950	17800	19600	22800
Manganese	mg/kg	776	100.0%	759	1	281 J	776 J	344 J	433 J	697 J	423 J	722 J	610 J
Mercury	mg/kg	0.96	58.3%	0.1	1	0.04 J	0.04 J	0.04 U	0.03 U	0.96	0.04 U	0.03 J	0.04 U
Nickel	mg/kg	47.8	100.0%	37	3	34.4	47.8	14.2	30.8	45.2	29.1	26.8	18
Potassium	mg/kg	3250	100.0%	1548	5	1430	1410	1980	1790	3250	2090	1480	1060
Selenium	mg/kg	2.3	52.9%	2	1	0.92 J	0.85 J	1.5 J	1 J	0.67 J	0.66 J	0.97 J	0.63 J
Sodium	mg/kg	269	100.0%	114	12	55.2 J	81.3 J	176 J	97.4 J	98.1 J	162 J	269 J	186 J
Thallium	mg/kg	0.79	41.2%	0.3	6	0.51 J	0.48 J	0.79 J	0.55 J	0.62 J	0.23 J	0.24 UJ	0.21 UJ
Vanadium	mg/kg	40.8	100.0%	150	0	34.1	27.5	14.8	17.5	40.8	20.5	18.5	12
Zinc	mg/kg	210	100.0%	90	3	72.9 J	210 J	67 J	51.9 J	60.5 J	76.6 J	71.6 J	40.6 J
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/kg	0.2	82.4%	NA	NA	0.01 U	0.01 U	0.01	0.01 U	0.01	0.02	0.17	0.01 U
Total Solids	%W/W	94.7	100.0%			85.2	89.7	93	94.3	87.5	91.5	90	91.6
Total Petroleum Hydrocarbons	mg/kg	27000	100.0%	NA	NA	5800	770	800	740	27000	2100	99	112

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) The TAGM for 1,2-Dichloroethene (trans) was used for 1,2-Dichloroehtene(total) since it was the only value available.
e) U = Compound was not detected.
f) J = the reported value is an estimated concentration.
g) R = the data was rejected in the data validating process.
h) UJ = the compound was not detected; the associated reporting limit is approximate.
i) TAGM values are based on an assumed Total Organic Carbon content of 1 percent.

Figure 2-1. The following sections describe the nature and extent of contamination in SEAD-25 soils.

Volatile Organic Compounds

Surface Soils

A variety of volatile organic compounds were identified in the soil samples collected at SEAD-25. Ten different volatile organic compounds were detected, 5 of which were present in concentrations exceeding TAGM values. The petroleum derived BTEX (benzene, toluene, ethylbenzene and xylenes) compounds were the most prevalent VOCs, with xylene being detected in 50% of the surface soil samples. Several chlorinated compounds were present as well, including trichloroethane, 1,1,1-trichloroethane, and 1,2-dichloroethene, though the maximum frequency of detection for these compounds was 33.3%. The chlorinated compounds were detected in borings SB25-3 and SB25-5, with the highest concentrations (280J μg/kg of trichloroethane and 310J μg/kg of 1,2-dichloroethene) being detected in the soil boring sample SB25-5.1. The only TAGM exceedance of the chlorinated compounds was for 1,2-dichloroethene. The 310 μg/kg concentration, identified in the sample SB25-5.1, exceeded the TAGM concentration of 300 μg/kg. The suspected laboratory contaminants acetone, methylene chloride and chloroform were also detected in the surface soil samples collected at the site.

Subsurface Soils

Eight VOCs were detected in the subsurface soil samples. Five VOCs were detected at concentrations which exceeded TAGM values. In particular, the BTEX compounds toluene, ethylbenzene, and xylene (total) were detected at concentrations significantly above TAGM values in subsurface soil sample SB25-5.2. Methylene chloride and acetone were also detected above TAGM values only in subsurface soil sample SB25-5.3.

The BTEX compounds are the primary constituents of concern at this site. The maximum concentrations of toluene (4500J μg/kg), ethylbenzene (17,000 μg/kg), and xylene (130,000 μg/kg) all occurred in the soil boring sample SB25-5.2, which was collected in the southwest corner of the site from a depth of 2 to 4 feet. High concentrations of these compounds were also detected in the 0- to 2-foot and 4- to 6-foot samples from the same boring, and in the samples collected from SB25-3, which is located in the center of the site. Little or no BTEX was detected in the soil samples collected from soil borings SB25-1, SB25-2, and SB25-6, which were located on the east side of the site, closer to Administrative Ave. Each of the

BTEX compounds exceeded the TAGM values in at least one sample (either surface and subsurface samples), with xylene exceeding its TAGM value in 2 subsurface and 3 surface soil samples.

Semivolatile Organic Compounds

Surface Soils

A total of 19 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-25. In general, the concentrations of semivolatile compounds were low, with only 3 results exceeding a TAGM value. All of these were from sample SB26-6.1, the 0- to 2-foot sample collected from boring SB26-6. This soil boring was located at the east end of the site, in the drainage ditch along Administrative Ave.

With the exception of bis(2-ethylhexyl)phthalate, all of the semivolatile organic compounds detected were PAHs, which were likely derived from petroleum products. The PAHs were more widespread than the volatiles, and the highest concentrations were found in the surface soil samples collected from the soil borings SB25-3 and SB25-5, which corresponds well with the volatiles data. The PAHs found in the surface soil samples collected from the soil boring SB25-6 were somewhat anomalous, since there were no BTEX compounds present in this sample. The PAHs in this sample may have resulted from runoff from the road, and not from the site.

Subsurface Soils

Twelve SVO compounds were detected in the subsurface soil samples. None were found at concentrations which exceeded TAGM values. The highest concentrations of SVOs in subsurface soils were found in the samples collected from soil borings SB25-2, SB25-3, and SB25-5.

The occurrence of SVOs in the subsurface soil samples collected from soil borings SB25-3 and SB25-5 correlate well with the reported concentrations of BTEX compounds in the same samples. The occurrence of SVO compounds in the subsurface soil samples from soil boring SB25-2 is somewhat anomalous since only low concentrations of VOCs were detected in the same sample and the surface soil sample collected from soil boring SB25-2 had only low concentrations of one VOC and two SVO compounds.

Pesticides and PCBs

Surface Soils

Seven pesticides and 1 PCB compound were found in the surface soil samples collected at SEAD-25. The frequency of detection of these compounds was generally low, and ranged from 5.9% for endrin aldehyde and endosulfan I, to 17.6% for Aroclor-1254, a PCB. Almost all of the pesticide and PCB compounds were detected in the surface soil samples SB25-3.1 and SB25-5.1, which were the samples which also had the highest levels of volatile and semivolatile organic compounds. None of the pesticide or PCB compounds were present in concentrations exceeding their respective TAGM values.

Subsurface Soils

No pesticides or PCBs were detected in the subsurface soil samples analyzed.

Herbicides

Surface Soils

Two herbicide compounds were detected in the surface soil samples collected from the site. Each compound, Dicamba and MCPP, was detected in only 1 sample. Dicamba was detected in the surface soil sample SB25-5.1 at a concentration of 6.4 μg/kg. MCPP was detected in the surface soil sample SB25-2.1 at a concentration of 5400 μg/kg. Neither of these compounds have TAGMs in soil.

Subsurface Soils

No herbicides were detected in the subsurface soil samples analyzed.

Metals

Surface Soils

A variety of samples were found to contain various metals at concentrations that exceed their associated TAGM values. Of the 24 metals reported, 13 of these were found in one or more samples at concentrations above the TAGM values. Few of the TAGM exceedances were significant. Most of the concentrations exceeded the TAGM only slightly, and in only a few samples. The primary exception was lead. Lead concentrations in samples SB25-3.1 (291J mg/kg), and SB25-5.1 (77.2 mg/kg) exceeded the TAGM value of 30 μg/kg. The lead in these samples corresponds with the presence of BTEX and PAHs in the same samples.

Subsurface Soils

Twenty-four metals were detected in the subsurface soil sample analyzed. Seventeen of the 24 metals had reported concentration which exceeded TAGM values in at least one subsurface soil sample. in general, the elevated concentrations of metals exceeded their respective TAGM values in only a few samples and most of the concentrations exceeded the TAGM only slightly. The primary exception was lead in subsurface soil sample SB25-4.3 which had a reported concentration of 156 μg/kg, well above the TAGM of 30 μg/kg.

Indicator Compounds

Surface Soils

The surface soil samples at the site were analyzed for nitrate/nitrite nitrogen and total petroleum hydrocarbons (TPH). Nitrate/nitrite nitrogen concentrations ranged from 0.02 mg/kg to 0.2 mg/kg. TPH was detected in all of the surface soil samples. The concentrations of TPH ranged from 99 mg/kg in sample SB25-6.1 to 14,000 mg/kg in sample SB25-3.1. The TPH concentration in sample SB25-6.1 was relatively low (99 mg/kg) in comparison to the concentrations detected in the other surface soil samples, which further supports the contention that the PAHs in this sample may have derived from runoff from the road, and not from site activities.

Subsurface Soils

Nitrate/nitrite nitrogen and TPH were detected in the subsurface soil samples. Nitrate/nitrite nitrogen was found at concentrations ranging from 0.01 to 0.05 mg/kg in 8 of the 11 subsurface soil samples analyzed. TPH was detected in all 11 subsurface soil samples at concentrations ranging from 68 mg/kg (in sample SB25-1.3) to 27,000 mg/kg (in sample SB25-5.2). In general the elevated concentrations of TPH were found in the samples collected from soil borings SB25-2, SB25-3, SB25-4 and SB25-5, the same samples which had elevated concentrations of VOCs and/or SVOs.

2.4.1.3 Groundwater

Three monitoring wells were installed and sampled as part of the SEAD-25 investigation. The summary chemical analyses are presented in Table 2-2. The locations of the wells are shown in Figure 2-1. The following sections describe the nature and extent of groundwater contamination identified at SEAD-25.

Volatile Organic Compounds

Eleven volatile organic compounds were detected in the groundwater samples collected at SEAD-25. All of these were detected in the groundwater samples collected from monitoring wells MW25-2 and MW25-3. These monitoring wells are located on the west and south sides of the site, respectively. The majority of the compounds were detected in the groundwater sample collected from monitoring well MW25-2, which is located on the south side of the site, near SB25-5, which was the soil boring which contained the highest concentrations of volatile constituents.

As with the soil samples, both BTEX and chlorinated compounds were detected in the groundwater. BTEX is a primary concern, as benzene, toluene, ethylbenzene, and xylene were found at concentrations exceeding the NYSDEC Class GA groundwater standard in the groundwater samples collected from monitoring wells MW25-2 and MW25-3. The maximum concentrations, 780 μg/L of benzene, 560 μg/L of toluene, 110 μg/L of ethylbenzene, and 2500 μg/L of xylene were all found in sample MW25-2.

The bulk of the chlorinated compounds were also detected in sample MW25-2. Chloroform (17 μg/L), 1,2-dichloroethene (25 μg/L), 1,1,1-trichloroethane (36 μg/L), and trichloroethane (10 μg/L) were all found at concentrations exceeding their respective NYSDEC Class GA groundwater standards. Tetrachloroethane, 1,1-dichloroethane, and 1,1-dichloroethene were also detected, but at lower concentrations. The only chlorinated compounds detected in sample MW25-3 were 1,1-dichloroethene, 1,1-dichloroethane, and tetrachloroethane. None of the chlorinated compounds detected in MW25-3 exceeded the NYSDEC Class GA groundwater standards.

Semivolatile Organic Compounds

Seven semivolatile organic compounds were detected in the groundwater samples from SEAD-25. All seven were detected in sample MW25-2, and not in MW25-1 or MW25-3. Of the seven compounds, only naphthalene, at 86 μg/L, exceeded the NYSDEC Class GA

TABLE 2-2

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-25 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-25 02/06/94 MW25-1 210541	WATER SEAD-25 02/06/94 MW25-4 210543 MW25-1DUP	WATER SEAD-25 02/05/94 MW25-2 210480	WATER SEAD-25 11/15/93 MW25-3 204633, 204658
VOLATILE ORGANICS										
1,1-Dichloroethene	ug/L	1	33.3%	NA	7	0	10 U	10 U	1 J	10 U
1,1-Dichloroethane	ug/L	8	66.7%	NA	NA	NA	10 U	10 U	8 J	3 J
1,2-Dichloroethene (total)	ug/L	25	66.7%	5	170(h)	1	10 U	10 U	25	2 J
Chloroform	ug/L	17	33.3%	7	100	1	10 U	10 U	17	10 U
1,1,1-Trichloroethane	ug/L	36	33.3%	5	200	1	10 U	10 U	36	10 U
Trichloroethene	ug/L	10	33.3%	5	5	1	10 U	10 U	10	10 U
Benzene	ug/L	780	66.7%	0.7	5	2	10 U	10 U	780	30
Tetrachloroethene	ug/L	1	33.3%	5	5	0	10 U	10 U	1 J	10 U
Toluene	ug/L	560	66.7%	5	1000	2	10 U	10 U	560	8 J
Ethylbenzene	ug/L	110	66.7%	5	700	2	10 U	10 U	110	18
Xylene (total)	ug/L	2500	66.7%	5	10000	2	10 U	10 U	2500	82
MTBE	ug/L		0.0%		NA	NA	ND	ND	Not Analyzed	ND
SEMIVOLATILE ORGANICS										
Phenol	ug/L	56	33.3%	NA	NA	NA	10 U	10 U	56	11 U
2-Methylphenol	ug/L	23	33.3%	NA	NA	NA	10 U	10 U	23 J	11 U
4-Methylphenol	ug/L	42	33.3%	NA	NA	NA	10 U	10 U	42	11 U
2,4-Dimethylphenol	ug/L	86	33.3%	NA	NA	NA	10 U	10 U	86	11 U
Naphthalene	ug/L	86	33.3%	10	NA	1	10 U	10 U	86	11 U
2-Methylnaphthalene	ug/L	37	33.3%	NA	NA	NA	10 U	10 U	37	11 U
Fluorene	ug/L	1	33.3%	50	NA	0	10 U	10 U	1 J	11 U
METALS										
Aluminum	ug/L	2260	100.0%	NA	NA	NA	894 J	1870 J	53.3 J	2260
Antimony	ug/L	36.3	66.6%	3	6	3	24.9 J	36.3 J	22.4 J	52.7 U
Arsenic	ug/L	3.8	33.3%	25	50	0	1.4 U	1.4 U	3.8 J	1 U
Barium	ug/L	121	100.0%	1000	2000	0	115 J	121 J	74.1 J	54 J
Beryllium	ug/L	0.31	33.3%	3	4	0	0.4 U	0.4 U	0.4 U	0.31 J
Calcium	ug/L	145000	100.0%	NA	NA	NA	142000	145000	143000	119000
Chromium	ug/L	5	66.7%	50	100	0	2.8 J	2.6 U	2.6 U	5 J
Cobalt	ug/L	7.9	33.3%	NA	NA	NA	4.4 U	4.4 U	4.4 U	7.9 J
Copper	ug/L	4.4	33.3%	200	1300(i)	0	3.1 U	3.1 U	3.1 U	4.4 J
Iron	ug/L	4150	100.0%	300	NA	4	1300 J	3200 J	3730	4150
Lead	ug/L	NA	100.0%	25	15(j)	0	3	2.7 J	2 J	3
Magnesium	ug/L	48000	100.0%	35000	NA	1	26100	26900	48000	22000
Manganese	ug/L	2440	100.0%	300	NA	2	213	241	1330	2440
Mercury	ug/L	0.05	33.3%	2	2	0	0.05 J	0.05 J	0.04 U	0.07 UJ
Nickel	ug/L	11.5	100.0%	NA	100	0	4.4 J	6.8 J	4.7 J	11.5 J
Potassium	ug/L	9950	100.0%	NA	NA	NA	906 U	1010 J	9950	4170 J
Selenium	ug/L	0.73	33.3%	10	50	0	0.73 J	0.7 U	0.7 U	0.8 U
Sodium	ug/L	NA	100.0%	20000	NA	2	52900	54100	13100	11500
Vanadium	ug/L	5.4	33.3%	NA	NA	NA	3.7 U	3.7 U	3.7 U	5.4 J
Zinc	ug/L	31.3	100.0%	300	NA	0	12.4 J	20.2	31.3	20
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	0.17	66.7%	10	10	0	0.16	0.17	0.01 U	0.07
Total Petroleum Hydrocarbons	mg/L	2	66.7%	NA	NA	NA	0.4 U	0.4 U	2	1.6
pH	standard units	7.52	NA				7.01		7.08	7.52
Specific Conductivity	umhos/cm	600	NA				600		600	510
Turbidity	NTU	56.4	NA				56.4		3.6	2.2

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process
g) ND = not detected
h) The MCL standard listed is the sum of cis-1,2- and trans-2,2-dichloroethylene MCL standards which are 70 and 100 ug/L, respectively.
i) The value listed is an Action Level for copper, and not an MCL Standard.
j) The value listed is an Action Level for lead at the tap, and not an MCL Standard.

groundwater standard. Most of the compounds detected have no standard. The concentrations of the compounds with no standard were similar to that of naphthalene. This groundwater sample also had the highest concentrations of volatile organics.

Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples collected at SEAD-25.

Herbicides

No herbicides were found in the three groundwater samples collected at SEAD-25.

Metals

The four metals iron, magnesium, manganese, and sodium were found in one or more of the groundwater samples analyzed at concentrations above the criteria value. None of these metals are derived from petroleum products, and their presence is likely attributable to natural conditions.

Indicator Compounds

None of the 4 groundwater samples analyzed had nitrate/nitrite nitrogen concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 0.16 mg/L in the sample MW25-1. TPH was also detected in the samples MW25-2 and MW25-3. The concentrations were similar, 2 mg/L in MW25-2 and 1.6 mg/L in MW25-3. These were the two wells which also contained volatile and semivolatile organic compounds.

2.4.1.4 Tentatively Identified Compounds

Surface Soils

Four surface soil samples had tentatively identified compound (TIC) concentrations greater than 50 mg/kg. Surface soil samples SB25-1.1, SB25-3.1, SB25-4.1 and SB25-5.1 had Total TIC concentrations ranging from 60.8 to 919.5 mg/kg. The TICs included decanes and cosanes. The occurrence of elevated TIC concentrations in these samples correlates to the elevated occurrence of VOCs and SVOs in the same samples.

Subsurface Soils

Five subsurface soil samples had TIC concentrations greater than 50 mg/kg. Subsurface soil samples SB25-2.2, SB25-2.3, SB25-2.4, SB25-5.2, and SB25-5.3 had total TIC concentrations ranging from 51.2 to 207.0 mg/kg. The TICs included pentanes, hexanes, decanes, cosanes, benzene, and naphthalenes. The occurrence of these elevated TIC concentrations in these samples correlates to the occurrence of SVOs in the subsurface soil samples collected from soil boring SB25-2 and SB25-5.

2.4.2 SEAD-26, FIRE TRAINING PIT AND AREA

2.4.2.1 Introduction

Soil, groundwater, surface water, and sediment were sampled as part of the ESI conducted at SEAD-26 in 1993 (Figure 2-2). The results of the investigation were detailed in a draft final Parsons ES report titled "Expanded Site Inspection, Seven High Priority SWMU's, SEAD 4, 16, 24, 25, 26, and 45" which was issued in May 1995.

A total of 20 surface soil and 15 subsurface soil samples were collected at SEAD-26. In addition, 1 surface water and 1 sediment sample were collected from the fire training pit. Finally, 4 monitoring wells were installed and sampled as part of the SEAD-26 investigation. The following sections describe the nature and extent of contamination identified at SEAD-26.

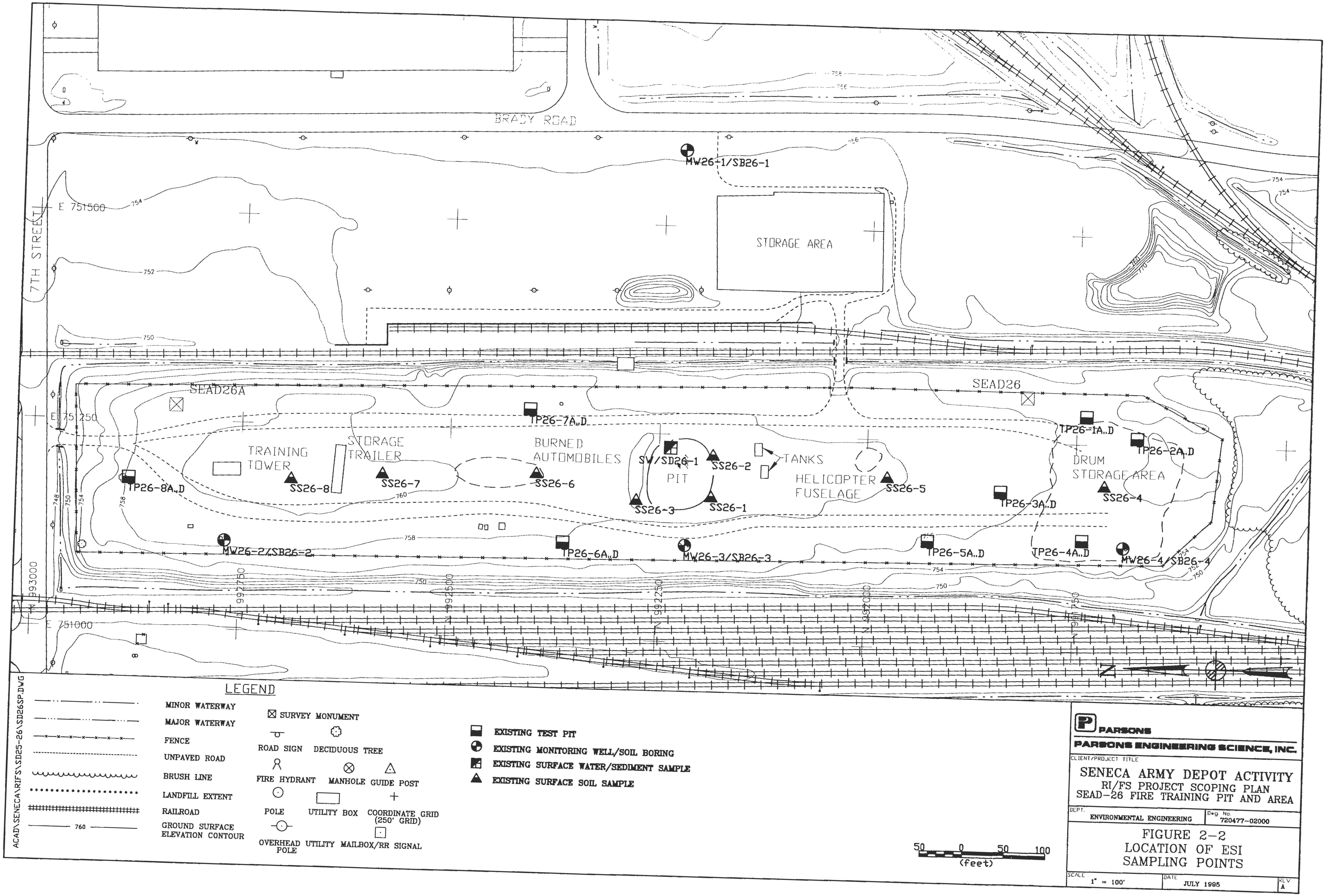
2.4.2.2 Soil

The analytical results for the 9 surface and 28 subsurface soil samples collected as part of the SEAD-26 investigation are presented in Table 2-3. The sample locations are shown in Figure 2-2. The following sections describe the nature and extent of contamination in SEAD-26 soils.

Volatile Organic Compounds

Surface Soils

The four volatile organic compounds methylene chloride, acetone, chloroform, and toluene were detected in the surface soil samples collected at SEAD-26. All of these constituents,



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000

FIGURE 2-2
LOCATION OF ESI SAMPLING POINTS

SCALE 1" = 100'
DATE JULY 1995
REV A

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-1 202245	SOIL SEAD-26 0-0.2 10/25/93 SS26-2 202246	SOIL SEAD-26 0-0.2 10/25/93 SS26-3 202247	SOIL SEAD-26 0-0.2 10/25/93 SS26-9 202255 SS26-3DUP	SOIL SEAD-26 0-0.2 10/25/93 SS26-4 202249	SOIL SEAD-26 0-0.2 10/25/93 SS26-5 202251	SOIL SEAD-26 0-0.2 10/25/93 SS26-6 202252	SOIL SEAD-26 0-0.2 10/25/93 SS26-7 202253
VOLATILE ORGANICS													
Methylene Chloride	ug/kg	11	11.4%	100	0	11 J	7 J	11 UJ	11 UJ	10 U	6 J	10 U	5 J
Acetone	ug/kg	78	5.7%	200	0	10 J	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
Chloroform	ug/kg	6	2.9%	300	0	11 UJ	12 UJ	6 J	11 UJ	10 U	10 U	10 U	11 U
2-Butanone	ug/kg	19	2.9%	300	0	11 UJ	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
Toluene	ug/kg	3	2.9%	1500	0	11 UJ	12 UJ	11 UJ	11 UJ	10 U	10 U	10 U	11 U
MTBE	ug/kg	0	0.0%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HERBICIDES													
2,4-D	ug/kg	260	2.9%	500	0	55 U	260	56 U	57 U	54 U	52 U	51 U	53 U
2,4,5-T	ug/kg	220	8.6%	1900	0	15	220	11	5.7 U	5.4 U	5.2 U	5.1 U	5.3 U
Dicamba	ug/kg	9.1	8.7%	NA	NA	5.5 U	17 U	5.6 U	5.7 U	5.4 U	5.2 U	5.1 U	5.3 U
MCPA	ug/kg	29000	11.4%	NA	NA	5500 U	17000 U	5600 U	5700 U	5400 U	5200 U	5100 U	5300 U
MCPP	ug/kg	7600	2.9%	NA	NA	5500 U	17000 U	5600 U	5700 U	5400 U	5200 U	5100 U	5300 U
NITROAROMATICS													
HMX	ug/kg	120	23.1%	NA	NA	130 U	99 J	110 J	130 UJ	130 U	130 UJ	120 J	130 UJ
2,4-Dinitrotoluene	ug/kg	420	23.1%	NA	NA	290 J	330 J	420 J	400 J	130 U	130 UJ	130 UJ	130 UJ
SEMIVOLATILE ORGANICS													
Naphthalene	ug/kg	24	2.9%	13000	0	19000 U	4000 U	45000 U	38000 U	450 U	24 J	1100 U	350 U
2-Methylnaphthalene	ug/kg	590	8.6%	36400	0	19000 U	590 J	45000 U	38000 U	41 J	26 J	1100 U	350 U
Acenaphthene	ug/kg	820	11.4%	41000	0	19000 U	4000 U	45000 U	38000 U	180 J	340 U	150 J	350 U
Dibenzofuran	ug/kg	240	5.7%	6200	0	19000 U	4000 U	45000 U	38000 U	62 J	340 U	1100 U	350 U
Fluorene	ug/kg	600	14.3%	50000 *	0	19000 U	4000 U	45000 U	38000 U	130 J	340 U	130 J	350 U
Phenanthrene	ug/kg	7300	42.9%	50000 *	0	19000 U	4000 U	45000 U	38000 U	1600	340 U	2700	350 U
Anthracene	ug/kg	1400	20.0%	50000 *	0	19000 U	4000 U	45000 U	38000 U	240 J	340 U	480 J	350 U
Carbazole	ug/kg	1100	11.4%	50000 *	0	19000 U	4000 U	45000 U	38000 U	230 J	340 U	570 J	350 U
Di-n-butylphthalate	ug/kg	6200	2.9%	8100	0	19000 U	4000 U	6200 J	38000 U	450 U	340 U	1100 U	350 U
Fluoranthene	ug/kg	45000	60.0%	50000 *	0	19000 U	4000 U	45000 U	38000 U	2300	340 U	7000	26 J
Pyrene	ug/kg	8500	71.4%	50000 *	0	1700 J	720 J	2500 J	3400 J	1900	19 J	6200	26 J
Butylbenzylphthalate	ug/kg	210	2.9%	50000 *	0	19000 U	4000 U	45000 U	38000 U	450 U	340 U	210 J	350 U
Benzo(a)anthracene	ug/kg	4500	48.6%	220	4	19000 U	4000 U	45000 U	38000 U	750	340 U	3700	18 J
Chrysene	ug/kg	4400	54.3%	400	3	19000 U	4000 U	45000 U	38000 U	940	31 J	4300	28 J
bis(2-Ethylhexyl)phthalate	ug/kg	930	17.1%	50000 *	0	19000 U	4000 U	45000 U	38000 U	450 U	340 U	1100 U	48 J
Benzo(b)fluoranthene	ug/kg	4800	48.6%	1100	2	19000 U	4000 U	45000 U	38000 U	780	90 J	4000	350 U
Benzo(k)fluoranthene	ug/kg	3500	48.6%	1100	2	19000 U	4000 U	45000 U	38000 U	690	39 J	3500	350 U
Benzo(a)pyrene	ug/kg	3900	51.4%	61	8	19000 U	4000 U	45000 U	38000 U	720	46 J	3400	350 U
Indeno(1,2,3-cd)pyrene	ug/kg	2600	31.4%	3200	0	19000 U	4000 U	45000 U	38000 U	390 J	44 J	1500	350 U
Dibenz(a,h)anthracene	ug/kg	1100	11.4%	14	4	19000 U	4000 U	45000 U	38000 U	450 U	340 U	750 J	350 U
Benzo(g,h,i)perylene	ug/kg	910	31.4%	50000 *	0	19000 U	4000 U	45000 U	38000 U	250 J	42 J	900 J	350 U

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-1 202245	SOIL SEAD-26 0-0.2 10/25/93 SS26-2 202246	SOIL SEAD-26 0-0.2 10/25/93 SS26-3 202247	SOIL SEAD-26 0-0.2 10/25/93 SS26-9 202255 SS26-3DUP	SOIL SEAD-26 0-0.2 10/25/93 SS26-4 202249	SOIL SEAD-26 0-0.2 10/25/93 SS26-5 202251	SOIL SEAD-26 0-0.2 10/25/93 SS26-6 202252	SOIL SEAD-26 0-0.2 10/25/93 SS26-7 202253
PESTICIDES/PCB													
beta-BHC	ug/kg	1.4	2.9%	200	0	9.4 U	9.6 U	3.8 U	9.7 U	1.8 U	1.4 J	3.5 U	1.8 U
Endosulfan I	ug/kg	5.3	2.9%	900	0	9.4 U	9.6 U	5.3 J	9.7 U	1.8 U	1.8 U	3.5 U	1.8 U
Dieldrin	ug/kg	4.2	2.9%	44	0	18 U	19 U	4.2 J	19 U	3.6 U	3.4 U	6.7 U	3.5 U
4,4'-DDE	ug/kg	17	22.9%	2100	0	17 J	14 J	4.4 J	19 U	6 J	3.4 U	6.7 U	3 J
Endosulfan II	ug/kg	60	5.7%	900	0	35 J	60 J	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
4,4'-DDD	ug/kg	22	2.9%	2900	0	22	19 U	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
Endosulfan sulfate	ug/kg	23	5.7%	1000	0	21 J	23 J	7.4 U	19 U	3.8 U	3.4 U	6.7 U	3.5 U
4,4'-DDT	ug/kg	3.5	5.7%	2100	0	18 U	19 U	7.4 U	19 U	3.6 U	3.4 U	6.7 U	3.5 U
Methoxychlor	ug/kg	21	2.9%	10000	0	94 U	96 U	21 J	97 U	18 U	18 U	35 U	18 U
Endrin aldehyde	ug/kg	23	5.7%	NA	NA	18 U	23 J	15 J	17 J	3.8 U	3.4 U	6.7 U	3.5 U
gamma-Chlordane	ug/kg	7.8	5.7%	540	0	5.9 J	7.8 J	3.8 U	9.7 U	1.8 U	1.8 U	3.5 U	1.8 U
METALS													
Aluminum	mg/kg	21000	100.0%	15523	5	1750	1560	2050	1640	10900	5830	2650	5490
Arsenic	mg/kg	13	100.0%	7.5	15	3.3	6.5	6	7.5	9.8	3.8	10.8	4.9
Barium	mg/kg	119	100.0%	300	0	73.9	45.7	18 J	17.3 J	70.1	21.5 J	25.8 J	90.7
Beryllium	mg/kg	0.97	100.0%	1	0	0.25 J	0.2 J	0.24 J	0.22 J	0.48 J	0.22 J	0.23 J	0.33 J
Cadmium	mg/kg	0.56	2.9%	1	0	0.56 J	0.68 U	0.47 U	0.53 U	0.51 U	0.44 U	0.5 U	0.55 U
Calcium	mg/kg	293000	100.0%	120725	11	293000	284000	271000	285000	48100	44200	213000	222000
Chromium	mg/kg	32.4	100.0%	24	4	3.8	3.9	3.9	3.5	17.6	8.9	31.1	10.6
Cobalt	mg/kg	17.5	100.0%	30	0	2.7 J	3.6 J	2.8 J	3.1 J	9.7	4.5 J	5.7 J	6.6 J
Copper	mg/kg	259	100.0%	25	4	12.8	11.8	10.5	11.6	19.3	16.5	259	19
Iron	mg/kg	70200	100.0%	28986	9	3510	5970	3270	3880	22100	11900	70200	13500
Lead	mg/kg	522	100.0%	30	3	6.8	3.4	3.2	3.7	20.8	8.7	522	58.5
Magnesium	mg/kg	120000	100.0%	12308	8	7980	8180	7810	9370	7180	15500	12800	18200
Manganese	mg/kg	1740	45.7%	759	2	213	212	198	241	398	284	536	365
Mercury	mg/kg	0.87	65.7%	0.1	6	0.02 U	0.87	0.04 U	0.38	0.02 J	0.55	0.02 U	0.53
Nickel	mg/kg	46.2	77.1%	37	2	12.2 R	13.4 R	56	14.1 R	30.3 R	14.8 R	20.1 R	19.4 R
Potassium	mg/kg	2090	100.0%	1548	10	1030	849 J	1170	1010	1400	1050	1050	2070
Selenium	mg/kg	0.82	71.4%	2	0	0.23 U	0.24 J	0.23 U	0.35 J	0.19 U	0.21 U	0.19 U	0.14 U
Sodium	mg/kg	247	100.0%	114	16	224 J	236 J	218 J	238 J	125 J	104 J	212 J	241 J
Vanadium	mg/kg	31.1	100.0%	150	0	12.2	8.5 J	10.5	9.2	17.3	12.4	11	14.8
Zinc	mg/kg	201	77.1%	90	7	96.9 R	35.5 R	105 R	31.3 R	75.9 R	51.5 R	164 R	278 R
Cyanide	mg/kg	0.56	5.7%	NA	NA	0.54 U	0.56 U	0.56	0.56 U	0.52 U	0.51 U	0.5 U	0.51 U
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/kg	2.2	100.0%	NA	NA	0.85	0.22	0.05	0.12	0.07	0.14	0.04	0.44
Total Solids	%W/W	97.6				89.6	88.6	88.6	88.4	92.5	96.4	97.6	94.7
Total Petroleum Hydrocarbons	mg/kg	21000	100.0%	NA	NA	76	71	21000	17900	880	117	97	330

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-8 202254	SOIL SEAD-26 0-2 11/17/93 SB26-1.1 204829	SOIL SEAD-26 2-4 11/17/93 SB26-1.2 204830	SOIL SEAD-26 0-2 11/18/93 SB26-2.1 205095	SOIL SEAD-26 0-2 11/18/93 SB26-2.5 205096 SB26-2.1DUP	SOIL SEAD-26 8-10 11/18/93 SB26-2.6 205097	SOIL SEAD-26 10-12 11/18/93 SB26-2.7 205098
VOLATILE ORGANICS												
Methylene Chloride	ug/kg	11	11.4%	100	0	12 U	11 U	11 U	11 U	10 U	12 U	12 U
Acetone	ug/kg	78	5.7%	200	0	11 U	11 U	11 U	25 U	10 U	13 U	12 U
Chloroform	ug/kg	6	2.9%	300	0	11 U	11 U	11 U	11 U	10 U	12 U	12 U
2-Butanone	ug/kg	19	2.9%	300	0	11 U	11 U	11 U	11 U	10 U	12 U	12 U
Toluene	ug/kg	3	2.9%	1500	0	11 U	11 U	11 U	11 U	3 J	12 U	12 U
MTBE	ug/kg	0	0.0%	NA	NA	NA	ND	ND	10 U	10 U	10 U	10 U
HERBICIDES												
2,4-D	ug/kg	260	2.9%	500	0	54 U	55 UJ	57 UJ	55 U	53 U	63 U	59 U
2,4,5-T	ug/kg	220	6.6%	1900	0	5.4 U	5.5 UJ	5.7 UJ	5.5 U	5.3 U	6.3 U	5.9 U
Dicamba	ug/kg	9.1	8.7%	NA	NA	5.4 U	5.5 UJ	5.7 UJ	5.5 U	5.3 U	6.3 U	5.9 U
MCPA	ug/kg	29000	11.4%	NA	NA	5400 U	5500 UJ	5700 UJ	5500 U	5300 U	6300 U	5900 U
MCPP	ug/kg	7600	2.9%	NA	NA	5400 U	5500 UJ	5700 UJ	5500 U	5300 U	6300 U	5900 U
NITROAROMATICS												
HMX	ug/kg	120	23.1%	NA	NA	130 UJ						
2,4-Dinitrotoluene	ug/kg	420	23.1%	NA	NA	130 UJ						
SEMIVOLATILE ORGANICS												
Naphthalene	ug/kg	24	2.9%	13000	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
2-Methylnaphthalene	ug/kg	590	8.6%	36400	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Acenaphthene	ug/kg	620	11.4%	41000	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Dibenzofuran	ug/kg	240	5.7%	6200	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Fluorene	ug/kg	600	14.3%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Phenanthrene	ug/kg	7300	42.9%	50000 *	0	140 J	24 J	380 U	31 J	22 J	410 U	390 U
Anthracene	ug/kg	1400	20.0%	50000 *	0	24 J	360 U	380 U	360 U	350 U	410 U	390 U
Carbazole	ug/kg	1100	11.4%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Di-n-butylphthalate	ug/kg	6200	2.9%	8100	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Fluoranthene	ug/kg	45000	60.0%	50000 *	0	310 J	69 J	380 U	52 J	30 J	410 U	390 U
Pyrene	ug/kg	8500	71.4%	50000 *	0	250 J	56 J	380 U	44 J	48 J	410 U	390 U
Butylbenzylphthalate	ug/kg	210	2.9%	50000 *	0	350 U	360 U	380 U	360 U	350 U	410 U	390 U
Benzo(a)anthracene	ug/kg	4500	48.6%	220	4	130 J	31 J	380 U	360 U	350 U	410 U	390 U
Chrysene	ug/kg	4400	54.3%	400	3	150 J	42 J	380 U	360 U	27 J	410 U	390 U
bis(2-Ethylhexyl)phthalate	ug/kg	930	17.1%	50000 *	0	53 J	360 U	380 U	700	660	410 U	500 U
Benzo(b)fluoranthene	ug/kg	4800	48.6%	1100	2	130 J	36 J	380 U	360 U	350 U	410 U	390 U
Benzo(k)fluoranthene	ug/kg	3500	48.6%	1100	2	130 J	36 J	380 U	360 U	350 U	410 U	390 U
Benzo(a)pyrene	ug/kg	3900	51.4%	61	8	130 J	34 J	380 U	360 U	350 U	410 U	390 U
Indeno(1,2,3-cd)pyrene	ug/kg	2600	31.4%	3200	0	66 J	360 U	380 U	360 U	350 U	410 U	390 U
Dibenz(a,h)anthracene	ug/kg	1100	11.4%	14	4	30 J	360 U	380 U	360 U	350 U	410 U	390 U
Benzo(g,h,i)perylene	ug/kg	910	31.4%	50000 *	0	100 J	360 U	380 U	360 U	350 U	410 U	390 U

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-0.2 10/25/93 SS26-8 202254	SOIL SEAD-26 0-2 11/17/93 SB26-1.1 204829	SOIL SEAD-26 2-4 11/17/93 SB26-1.2 204830	SOIL SEAD-26 0-2 11/18/93 SB26-2.1 205095	SOIL SEAD-26 0-2 11/18/93 SB26-2.5 205096 SB26-2.1DUP	SOIL SEAD-26 8-10 11/18/93 SB28-2.6 205097	SOIL SEAD-26 10-12 11/18/93 SB26-2.7 205098
PESTICIDES/PCB												
beta-BHC	ug/kg	1.4	2.9%	200	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
Endosulfan I	ug/kg	5.3	2.9%	900	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
Dieldrin	ug/kg	4.2	2.9%	44	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
4,4'-DDE	ug/kg	17	22.9%	2100	0	3.5 U	3 J	3.8 U	2.7 J	3.2 J	4.1 U	3.9 U
Endosulfan II	ug/kg	60	5.7%	900	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
4,4'-DDD	ug/kg	22	2.9%	2900	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
Endosulfan sulfate	ug/kg	23	5.7%	1000	0	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
4,4'-DDT	ug/kg	3.5	5.7%	2100	0	3.5 U	3.5 J	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
Methoxychlor	ug/kg	21	2.9%	10000	0	18 U	19 U	20 U	19 U	18 U	21 U	20 U
Endrin aldehyde	ug/kg	23	5.7%	NA	NA	3.5 U	3.6 U	3.8 U	3.6 U	3.5 U	4.1 U	3.9 U
gamma-Chlordane	ug/kg	7.8	5.7%	540	0	1.8 U	1.9 U	2 U	1.9 U	1.8 U	2.1 U	2 U
METALS												
Aluminum	mg/kg	21000	100.0%	15523	5	9400	5560	9040	5230	7900	21000	14200
Arsenic	mg/kg	13	100.0%	7.5	15	7.5	3.2	5.3	6.5 J	5.3 J	8.8 J	7.6 J
Barium	mg/kg	119	100.0%	300	0	36.1	73.2	43.7	21.1 J	102 J	83.6	90.8
Beryllium	mg/kg	0.97	100.0%	1	0	0.47 J	0.35 J	0.41 J	0.32 J	0.46 J	0.97 J	0.67 J
Cadmium	mg/kg	0.56	2.9%	1	0	0.46 U	0.46 U	0.42 U	0.57 U	0.55 U	0.72 U	0.72 U
Calcium	mg/kg	293000	100.0%	120725	11	157000	293000	47300	238000	189000	2090	17800
Chromium	mg/kg	32.4	100.0%	24	4	15.2	10.3	15.7	8.8	13.9	32.4	21.9
Cobalt	mg/kg	17.5	100.0%	30	0	8.4	5.9 J	9.5	5.6 J	10.1	17.5	11
Copper	mg/kg	259	100.0%	25	4	22.5	9.7	14.3	10.6	14.3	24.4	24
Iron	mg/kg	70200	100.0%	28986	9	17200	8770	19100	11400	15500	44100	33700
Lead	mg/kg	522	100.0%	30	3	16.1	6.33	8.5	10.3	15.5	10.3	27
Magnesium	mg/kg	120000	100.0%	12308	8	8460	29100	9160	7790	18100	7210	4700
Manganese	mg/kg	1740	45.7%	759	2	297	309	551	442 R	433 R	279 R	712 R
Mercury	mg/kg	0.87	65.7%	0.1	6	0.09	0.02 U	0.02 U	0.03 UJ	0.03 UJ	0.05 J	0.03 UJ
Nickel	mg/kg	46.2	77.1%	37	2	31.6 R	16.3	23.9	17.5	29.2	46.2	32.4
Potassium	mg/kg	2090	100.0%	1548	10	1970	1710	901	882	1710	1490	1960
Selenium	mg/kg	0.82	71.4%	2	0	0.15 J	0.13 UJ	0.26 J	0.14 UJ	0.14 UJ	0.32 J	0.16 UJ
Sodium	mg/kg	247	100.0%	114	16	183 J	192 J	108 J	163 J	175 J	67.1 J	220 J
Vanadium	mg/kg	31.1	100.0%	150	0	17.4	12.7	14.4	10.9	15.9	28	27.4
Zinc	mg/kg	201	77.1%	90	7	283 R	56	90.6	29.5	54.8	69.3	201
Cyanide	mg/kg	0.56	5.7%	NA	NA	0.54 U	0.48 U	0.57 U	0.53 U	0.5 U	0.6 U	0.48 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/kg	2.2	100.0%	NA	NA	0.09	0.43	0.48	0.05	0.1	0.26	2.2
Total Solids	%W/W	97.6				92.8	91.2	87.1	91.1	93.6	80.5	84.9
Total Petroleum Hydrocarbons	mg/kg	21000	100.0%	NA	NA	260	43	38	42	57	74	52

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-2 11/18/93 SB26-3.1 205099	SOIL SEAD-26 6-8 11/18/93 SB26-3.4 205100	SOIL SEAD-26 10-12 11/18/93 SB26-3.6 205101	SOIL SEAD-26 0-2 11/19/93 SB26-4.1 205102	SOIL SEAD-26 2-4 11/19/93 SB26-4.2 205103	SOIL SEAD-26 6-8 11/19/93 SB26-4.4 205104	SOIL SEAD-26 0-0.7 11/18/93 TP26-1.1 205105	SOIL SEAD-26 5.0+ 11/18/93 TP26-1.2 205106	SOIL SEAD-26 0-0.7 11/18/93 TP26-2.1 205113	SOIL SEAD-26 5.0+ 11/18/93 TP26-2.2 205114
VOLATILE ORGANICS															
Methylene Chloride	ug/kg	11	11.4%	100	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U	12 U
Acetone	ug/kg	78	5.7%	200	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U	78
Chloroform	ug/kg	6	2.9%	300	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U	12 U
2-Butanone	ug/kg	19	2.9%	300	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U	19
Toluene	ug/kg	3	2.9%	1500	0	12 U	12 U	13 U	11 U	11 U	12 U	11 U	12 U	11 U	12 U
MTBE	ug/kg	0	0.0%	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
HERBICIDES															
2,4-D	ug/kg	260	2.9%	500	0	58 U	61 U	58 U	57 U	56 U	58 U	57 U	57 U	54 U	62 U
2,4,5-T	ug/kg	220	8.6%	1900	0	5.8 U	6.1 U	5.8 U	5.7 U	5.6 U	5.8 U	5.7 U	5.7 U	5.4 U	6.2 U
Dicamba	ug/kg	9.1	8.7%	NA	NA	5.8 U	6.1 U	5.8 U	5.7 U	5.8	5.8 U	9.1	5.7 U	5.4 U	6.2 U
MCPA	ug/kg	29000	11.4%	NA	NA	5800 U	6100 U	5800 U	5700 U	29000	5800	8100	5700 U	5400 U	6200 U
MCPP	ug/kg	7600	2.9%	NA	NA	5800 U	6100 U	5800 U	5700 U	5800 U	5800 U	5700 U	5700 U	5400 U	6200 U
NITROAROMATICS															
HMX	ug/kg	120	23.1%	NA	NA										
2,4-Dinitrotoluene	ug/kg	420	23.1%	NA	NA										
SEMIVOLATILE ORGANICS															
Naphthalene	ug/kg	24	2.9%	13000	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
2-Methylnaphthalene	ug/kg	590	8.6%	36400	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Acenaphthene	ug/kg	820	11.4%	41000	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Dibenzofuran	ug/kg	240	5.7%	6200	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Fluorene	ug/kg	600	14.3%	50000 *	0	380 U	22 J	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Phenanthrene	ug/kg	7300	42.9%	50000 *	0	380 U	190 J	380 UJ	370 U	370 U	64 J	2500 U	370 U	2400 U	120 J
Anthracene	ug/kg	1400	20.0%	50000 *	0	380 U	45 J	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	22 J
Carbazole	ug/kg	1100	11.4%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Di-n-butylphthalate	ug/kg	6200	2.9%	8100	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Fluoranthene	ug/kg	45000	60.0%	50000 *	0	380 U	170 J	380 UJ	24 J	370 U	71 J	2500 U	370 U	300 J	170 J
Pyrene	ug/kg	8500	71.4%	50000 *	0	380 U	130 J	380 UJ	30 J	370 U	64 J	2500 U	370 U	250 J	130 J
Butylbenzylphthalate	ug/kg	210	2.9%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U
Benzo(a)anthracene	ug/kg	4500	48.6%	220	4	380 U	65 J	380 UJ	370 U	370 U	28 J	2500 U	370 U	160 J	71 J
Chrysene	ug/kg	4400	54.3%	400	3	380 U	69 J	380 UJ	370 U	370 U	46 J	2500 U	370 U	180 J	97 J
bis(2-Ethylhexyl)phthalate	ug/kg	930	17.1%	50000 *	0	380 U	400 U	230 J	930	820	380 U	2500 U	370 U	2400 U	410 U
Benzo(b)fluoranthene	ug/kg	4800	48.6%	1100	2	380 U	42 J	380 UJ	370 U	370 U	33 J	2500 U	370 U	130 J	83 J
Benzo(k)fluoranthene	ug/kg	3500	48.6%	1100	2	380 U	51 J	380 UJ	370 U	370 U	41 J	2500 U	370 U	190 J	75 J
Benzo(a)pyrene	ug/kg	3900	51.4%	61	8	380 U	55 J	380 UJ	370 U	370 U	40 J	2500 U	370 U	200 J	86 J
Indeno(1,2,3-cd)pyrene	ug/kg	2600	31.4%	3200	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	69 J
Dibenz(a,h)anthracene	ug/kg	1100	11.4%	14	4	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	29 J
Benzo(g,h,i)perylene	ug/kg	910	31.4%	50000 *	0	380 U	400 U	380 UJ	370 U	370 U	380 U	2500 U	370 U	2400 U	410 U

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26	SEAD-26
	DEPTH (FEET)					0-2	6-8	10-12	0-2	2-4	6-8	0-0.7	5.0+	0-0.7	5.0+
	SAMPLE DATE		FREQUENCY		NO.	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93	11/19/93	11/18/93	11/18/93	11/18/93	11/18/93
	ES ID		OF		ABOVE	SB26-3.1	SB26-3.4	SB26-3.6	SB26-4.1	SB26-4.2	SB26-4.4	TP26-1.1	TP26-1.2	TP26-2.1	TP26-2.2
	LAB ID	MAXIMUM	DETECTION	TAGM	TAGM	205099	205100	205101	205102	205103	205104	205105	205106	205113	205114
COMPOUND	UNITS														
PESTICIDES/PCB															
beta-BHC	ug/kg	1.4	2.9%	200	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U	2.1 U
Endosulfan I	ug/kg	5.3	2.9%	900	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U	2.1 U
Dieldrin	ug/kg	4.2	2.9%	44	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U	4.1 U
4,4'-DDE	ug/kg	17	22.9%	2100	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	6.4	3.7 U	3.6 U	4.1 U
Endosulfan II	ug/kg	60	5.7%	900	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.8 U	4.1 U
4,4'-DDD	ug/kg	22	2.9%	2900	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.8 U	4.1 U
Endosulfan sulfate	ug/kg	23	5.7%	1000	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.8 U	4.1 U
4,4'-DDT	ug/kg	3.5	5.7%	2100	0	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U	4.1 U
Methoxychlor	ug/kg	21	2.9%	10000	0	20 U	21 U	20 U	19 U	19 U	20 U	19 U	19 U	18 U	21 U
Endrin aldehyde	ug/kg	23	5.7%	NA	NA	3.8 U	4 U	3.8 U	3.7 U	3.7 U	3.8 U	3.7 U	3.7 U	3.6 U	4.1 U
gamma-Chlordane	ug/kg	7.8	5.7%	540	0	2 U	2.1 U	2 U	1.9 U	1.9 U	2 U	1.9 U	1.9 U	1.8 U	2.1 U
METALS															
Aluminum	mg/kg	21000	100.0%	15523	5	13700	14400	12900	14300	13800	15300	13100	10000	10000	13200
Arsenic	mg/kg	13	100.0%	7.5	15	8.3 J	8.4 J	6.7 J	13 J	10.3 J	10.2 J	6.8 J	5.9 J	10 J	6.4 J
Barium	mg/kg	119	100.0%	300	0	77.1	93.2	57.5	87.3	62.4	74.3	105	67.3	38.2	119
Beryllium	mg/kg	0.97	100.0%	1	0	0.69 J	0.68 J	0.61 J	0.67 J	0.61 J	0.73 J	0.62 J	0.47 J	0.48 J	0.7 J
Cadmium	mg/kg	0.56	2.9%	1	0	0.65 U	0.78 U	0.41 U	0.57 U	0.58 U	0.71 U	0.5 U	0.68 U	0.57 U	0.77 U
Calcium	mg/kg	293000	100.0%	120725	11	25600	20100	2820	28000	17500	14500	18500	65400	9330	41800
Chromium	mg/kg	32.4	100.0%	24	4	20.7	20.9	21.4	22.7	22.2	23.5	20.2	15.2	16.5	19.7
Cobalt	mg/kg	17.5	100.0%	30	0	10.8	7.9 J	11.8	15.8	12	14.8	12.5	8.7 J	10	11.4 J
Copper	mg/kg	259	100.0%	25	4	20.6	18.3	23.2	28.8	18.9	24.1	18	23.5	13.9	23.5
Iron	mg/kg	70200	100.0%	28986	9	28400	25900	29600	31700	29000	33200	28300	20400	22200	25500
Lead	mg/kg	522	100.0%	30	3	20.7	14.9	10.5	14.6	11.7	13.1	13.6	11.9	6.5	66.8
Magnesium	mg/kg	120000	100.0%	12308	8	8760	4810	5290	6910	6330	6290	5340	15300	4720	5030
Manganese	mg/kg	1740	45.7%	759	2	486 R	561 R	486 R	696 R	541 R	668 R	814 R	433 R	461 R	951 R
Mercury	mg/kg	0.87	65.7%	0.1	6	0.03 J	0.03 J	0.03 J	0.04 J	0.04 J	0.03 J	0.04 UJ	0.03 UJ	0.01 UJ	0.11 J
Nickel	mg/kg	46.2	77.1%	37	2	29.7	29.1	34.7	35.2	32.8	38.5	31.1	28.7	25.5	30.2
Potassium	mg/kg	2090	100.0%	1548	10	1140	1130 J	1110	1370	1140	1390	950	1180	573 J	1840
Selenium	mg/kg	0.82	71.4%	2	0	0.48 J	0.79 J	0.18 UJ	0.37 J	0.58 J	0.28 J	0.25 J	0.57 J	0.31 J	0.72 J
Sodium	mg/kg	247	100.0%	114	16	71.6 J	60.9 J	56.8 J	119 J	87.6 J	78 J	60.9 J	110 J	56.7 J	93.8 J
Vanadium	mg/kg	31.1	100.0%	150	0	22.2	21.8	19.5	20.1	18.6	22.2	18.5	16.3	12.8	21.1
Zinc	mg/kg	201	77.1%	90	7	64.9	78.2	72.5	84.9	72.4	115	80.7	60.1	59.8	135
Cyanide	mg/kg	0.56	5.7%	NA	NA	0.57 U	0.59 U	0.58 U	0.53 U	0.54 U	0.52 U	0.54 U	0.49 U	0.49 U	0.59 U
OTHER ANALYSES															
Nitrate/Nitrite-Nitrogen	mg/kg	2.2	100.0%	NA	NA	0.14	1.06	0.07	0.75	0.37	1.55	0.32	0.72	0.03	0.5
Total Solids	%W/W	97.6				85.7	82	86.1	88.3	89	85.6	87.7	88.3	91.8	80.7
Total Petroleum Hydrocarbons	mg/kg	21000	100.0%	NA	NA	69	71	74	90	65	66	87	71	72	230

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-1 11/17/93 TP26-3.1 204832	SOIL SEAD-26 6.5-7.2 11/17/93 TP26-3.2 204833	SOIL SEAD-26 SURFACE 11/17/93 TP26-4.1 204834	SOIL SEAD-26 FILL 11/17/93 TP26-4.2 204835	SOIL SEAD-26 SURFACE 11/17/93 TP26-5.1 204836
VOLATILE ORGANICS										
Methylene Chloride	ug/kg	11	11.4%	100	0	12 U	12 U	12 U	12 U	12 U
Acetone	ug/kg	78	5.7%	200	0	12 U	12 U	12 U	12 U	12 U
Chloroform	ug/kg	6	2.9%	300	0	12 U	12 U	12 U	12 U	12 U
2-Butanone	ug/kg	19	2.9%	300	0	12 U	12 U	12 U	12 U	12 U
Toluene	ug/kg	3	2.9%	1500	0	12 U	12 U	12 U	12 U	12 U
MTBE	ug/kg	0	0.0%	NA	NA	NA	NA	NA	NA	NA
HERBICIDES										
2,4-D	ug/kg	260	2.9%	500	0	61 UJ	61 UJ	58 UJ	55 UJ	60 UJ
2,4,5-T	ug/kg	220	8.6%	1900	0	6.1 UJ	6.1 UJ	5.8 UJ	5.5 UJ	6 UJ
Dicamba	ug/kg	9.1	8.7%	NA	NA					
MCPA	ug/kg	29000	11.4%	NA	NA	6100 UJ	6100 UJ	5800 UJ	5500 UJ	6000 UJ
MCPP	ug/kg	7600	2.9%	NA	NA	6100 UJ	6100 UJ	5800 UJ	5500 UJ	6000 UJ
NITROAROMATICS										
HMX	ug/kg	120	23.1%	NA	NA	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	ug/kg	420	23.1%	NA	NA	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANICS										
Naphthalene	ug/kg	24	2.9%	13000	0	400 U	400 U	380 U	370 U	390 U
2-Methylnaphthalene	ug/kg	590	8.6%	36400	0	400 U	400 U	380 U	370 U	390 U
Acenaphthene	ug/kg	820	11.4%	41000	0	400 U	400 U	380 U	370 U	390 U
Dibenzofuran	ug/kg	240	5.7%	6200	0	400 U	400 U	380 U	370 U	390 U
Fluorene	ug/kg	600	14.3%	50000 *	0	400 U	400 U	380 U	370 U	390 U
Phenanthrene	ug/kg	7300	42.9%	50000 *	0	400 U	31 J	31 J	22 J	68 J
Anthracene	ug/kg	1400	20.0%	50000 *	0	400 U	400 U	380 U	370 U	390 U
Carbazole	ug/kg	1100	11.4%	50000 *	0	400 U	400 U	380 U	370 U	390 U
Di-n-butylphthalate	ug/kg	6200	2.9%	8100	0	400 U	400 U	380 U	370 U	390 U
Fluoranthene	ug/kg	45000	60.0%	50000 *	0	30 J	79 J	71 J	45 J	150 J
Pyrene	ug/kg	8500	71.4%	50000 *	0	29 J	64 J	66 J	43 J	110 J
Butylbenzylphthalate	ug/kg	210	2.9%	50000 *	0	400 U	400 U	380 U	370 U	390 U
Benzo(a)anthracene	ug/kg	4500	48.6%	220	4	400 U	37 J	33 J	22 J	52 J
Chrysene	ug/kg	4400	54.3%	400	3	400 U	43 J	38 J	25 J	60 J
bis(2-Ethylhexyl)phthalate	ug/kg	930	17.1%	50000 *	0	400 U	400 U	380 U	370 U	390 U
Benzo(b)fluoranthene	ug/kg	4800	46.6%	1100	2	400 U	29 J	33 J	21 J	55 J
Benzo(k)fluoranthene	ug/kg	3500	48.6%	1100	2	400 U	39 J	35 J	24 J	45 J
Benzo(a)pyrene	ug/kg	3900	51.4%	61	8	400 U	38 J	31 J	20 J	52 J
Indeno(1,2,3-cd)pyrene	ug/kg	2600	31.4%	3200	0	400 U	24 J	23 J	370 U	34 J
Dibenz(a,h)anthracene	ug/kg	1100	11.4%	14	4	400 U	400 U	380 U	370 U	390 U
Benzo(g,h,i)perylene	ug/kg	910	31.4%	50000 *	0	400 U	21 J	23 J	370 U	34 J

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 0-1 11/17/93 TP26-3.1 204832	SOIL SEAD-26 6.5-7.2 11/17/93 TP26-3.2 204833	SOIL SEAD-26 SURFACE 11/17/93 TP26-4.1 204834	SOIL SEAD-26 FILL 11/17/93 TP26-4.2 204835	SOIL SEAD-26 SURFACE 11/17/93 TP26-5.1 204836
PESTICIDES/PCB										
beta-BHC	ug/kg	1.4	2.9%	200	0	2.1 U	2.1 U	2 U	1.9 U	2 U
Endosulfan I	ug/kg	5.3	2.9%	900	0	2.1 U	2.1 U	2 U	1.9 U	2 U
Dieldrin	ug/kg	4.2	2.9%	44	0	4 U	4 U	3.8 U	3.7 U	3.9 U
4,4'-DDE	ug/kg	17	22.9%	2100	0	4 U	4 U	3.8 U	3.7 U	3.9 U
Endosulfan II	ug/kg	60	5.7%	900	0	4 U	4 U	3.8 U	3.7 U	3.9 U
4,4'-DDD	ug/kg	22	2.9%	2900	0	4 U	4 U	3.8 U	3.7 U	3.9 U
Endosulfan sulfate	ug/kg	23	5.7%	1000	0	4 U	4 U	3.8 U	3.7 U	3.9 U
4,4'-DDT	ug/kg	3.5	5.7%	2100	0	4 U	4 U	3.8 U	3.7 U	3.9 U
Methoxychlor	ug/kg	21	2.9%	10000	0	21 U	21 U	20 U	19 U	20 U
Endrin aldehyde	ug/kg	23	5.7%	NA	NA	4 U	4 U	3.8 U	3.7 U	3.9 U
gamma-Chlordane	ug/kg	7.8	5.7%	540	0	2.1 U	2.1 U	2 U	1.9 U	2 U
METALS										
Aluminum	mg/kg	21000	100.0%	15523	5	4680	15600	11000	11200	15000
Arsenic	mg/kg	13	100.0%	7.5	15	5.8	5.6	9	7.7	5.6
Barium	mg/kg	119	100.0%	300	0	48.5	94.8	58.1	70.2	94
Beryllium	mg/kg	0.97	100.0%	1	0	0.28 J	0.78 J	0.49 J	0.5 J	0.73 J
Cadmium	mg/kg	0.56	2.9%	1	0	0.4 U	0.59 U	0.44 U	0.43 U	0.77 U
Calcium	mg/kg	293000	100.0%	120725	11	227000	7500	14100	16300	5330
Chromium	mg/kg	32.4	100.0%	24	4	6.9	22.1	17.8	18.4	23.4
Cobalt	mg/kg	17.5	100.0%	30	0	3 J	10.6	9.9	12	13.3
Copper	mg/kg	259	100.0%	25	4	8.6	18.6	12.4	13.5	23
Iron	mg/kg	70200	100.0%	28986	9	12000	23800	23200	23200	28500
Lead	mg/kg	522	100.0%	30	3	17.4	18.4	10.3	13.6	19.5
Magnesium	mg/kg	120000	100.0%	12308	8	120000	4480	5020	5130	5250
Manganese	mg/kg	1740	45.7%	759	2	1740	657	421	535	694
Mercury	mg/kg	0.87	65.7%	0.1	6	0.18	0.02 U	0.03 U	0.03 J	0.06
Nickel	mg/kg	46.2	77.1%	37	2	7.8	27.3	26.7	27.3	34.9
Potassium	mg/kg	2090	100.0%	1548	10	867	1850	1090	1220	1740
Selenium	mg/kg	0.82	71.4%	2	0	0.57 J	0.39 J	0.37 J	0.31 J	0.32 J
Sodium	mg/kg	247	100.0%	114	18	247 J	58.9 J	58.4 J	74.8 J	46.8 J
Vanadium	mg/kg	31.1	100.0%	150	0	17.1	26.8	16	16.8	24.9
Zinc	mg/kg	201	77.1%	90	7	130	76	80.7	69.2	91.5
Cyanide	mg/kg	0.56	5.7%	NA	NA	0.59 U	0.53 U	0.58 U	0.46 U	0.54 U
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/kg	2.2	100.0%	NA	NA	1.8	2.1	0.08	0.03	0.55
Total Solids	%W/W	97.6				81.5	81.6	85.8	90.3	83.6
Total Petroleum Hydrocarbons	mg/kg	21000	100.0%	NA	NA	49	80	68	76	42

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 FILL 11/17/93 TP26-5.2 204837	SOIL SEAD-26 0-0.7 11/18/93 TP26-6.1 205107	SOIL SEAD-26 5.0+ 11/18/93 TP26-6.2 205108	SOIL SEAD-26 0-0.7 11/18/93 TP26-7.1 205109	SOIL SEAD-26 5.0+ 11/18/93 TP26-7.2 205110	SOIL SEAD-26 0-0.7 11/19/93 TP26-8.1 205115	SOIL SEAD-26 5.0+ 11/19/93 TP26-8.2 205116
VOLATILE ORGANICS												
Methylene Chloride	ug/kg	11	11.4%	100	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
Acetone	ug/kg	78	5.7%	200	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
Chloroform	ug/kg	6	2.9%	300	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
2-Butanone	ug/kg	19	2.9%	300	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
Toluene	ug/kg	3	2.9%	1500	0	12 U	12 U	12 U	11 U	12 U	11 U	12 U
MTBE	ug/kg	0	0.0%	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
HERBICIDES												
2,4-D	ug/kg	260	2.9%	500	0	59 UJ	56 U	63 U	56 U	61 U	56 U	61 U
2,4,5-T	ug/kg	220	8.6%	1900	0	5.9 UJ	5.6 U	6.3 U	5.6 U	6.1 U	5.6 U	6.1 U
Dicamba	ug/kg	9.1	8.7%	NA	NA							
MCPA	ug/kg	29000	11.4%	NA	NA	5900 UJ	5600 U	6300 U	5800	6100 U	5600 U	6100 U
MCPP	ug/kg	7600	2.9%	NA	NA	5900 UJ	5600 U	6300 U	7600	6100 U	5600 U	6100 U
NITROAROMATICS												
HMX	ug/kg	120	23.1%	NA	NA	130 U						
2,4-Dinitrotoluene	ug/kg	420	23.1%	NA	NA	130 U						
SEMIVOLATILE ORGANICS												
Naphthalene	ug/kg	24	2.9%	13000	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
2-Methylnaphthalene	ug/kg	590	8.6%	36400	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
Acenaphthene	ug/kg	820	11.4%	41000	0	390 U	370 U	420 U	42 J	410 U	820 J	400 U
Dibenzofuran	ug/kg	240	5.7%	6200	0	390 U	370 U	420 U	370 U	410 U	240 J	400 U
Fluorene	ug/kg	600	14.3%	50000 *	0	390 U	370 U	420 U	25 J	410 U	600 J	400 U
Phenanthrene	ug/kg	7300	42.9%	50000 *	0	390 U	95 J	420 U	370 J	410 U	7300	400 U
Anthracene	ug/kg	1400	20.0%	50000 *	0	390 U	370 U	420 U	61 J	410 U	1400 J	400 U
Carbazole	ug/kg	1100	11.4%	50000 *	0	390 U	370 U	420 U	40 J	410 U	1100 J	400 U
Di-n-butylphthalate	ug/kg	6200	2.9%	8100	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
Fluoranthene	ug/kg	45000	60.0%	50000 *	0	390 U	250 J	62 J	770	410 U	13000	23 J
Pyrene	ug/kg	8500	71.4%	50000 *	0	390 U	220 J	61 J	610	410 U	8500	38 J
Butylbenzylphthalate	ug/kg	210	2.9%	50000 *	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
Benzo(a)anthracene	ug/kg	4500	48.6%	220	4	390 U	100 J	34 J	280 J	410 U	4500	400 U
Chrysene	ug/kg	4400	54.3%	400	3	390 U	120 J	37 J	320 J	410 U	4400	400 U
bis(2-Ethylhexyl)phthalate	ug/kg	930	17.1%	50000 *	0	390 U	370 U	420 U	370 U	410 U	2500 U	400 U
Benzo(b)fluoranthene	ug/kg	4800	48.6%	1100	2	390 U	94 J	28 J	300 J	410 U	4800	400 U
Benzo(k)fluoranthene	ug/kg	3500	48.6%	1100	2	390 U	120 J	34 J	270 J	410 U	3500	400 U
Benzo(a)pyrene	ug/kg	3900	51.4%	61	8	390 U	110 J	38 J	270 J	410 U	3900	62 J
Indeno(1,2,3-cd)pyrene	ug/kg	2600	31.4%	3200	0	390 U	65 J	420 U	190 J	410 U	2600	400 U
Dibenz(a,h)anthracene	ug/kg	1100	11.4%	14	4	390 U	370 U	420 U	370 U	410 U	1100 J	400 U
Benzo(g,h,i)perylene	ug/kg	910	31.4%	50000 *	0	390 U	56 J	420 U	160 J	410 U	910 J	77 J

TABLE 2-3

SOIL ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NO. ABOVE TAGM	SOIL SEAD-26 FILL 11/17/93 TP26-5.2 204837	SOIL SEAD-26 0-0.7 11/18/93 TP26-6.1 205107	SOIL SEAD-26 5.0+ 11/18/93 TP26-6.2 205108	SOIL SEAD-26 0-0.7 11/18/93 TP26-7.1 205109	SOIL SEAD-26 5.0+ 11/18/93 TP26-7.2 205110	SOIL SEAD-26 0-0.7 11/19/93 TP26-8.1 205115	SOIL SEAD-26 5.0+ 11/19/93 TP26-8.2 205116
PESTICIDES/PCB												
beta-BHC	ug/kg	1.4	2.9%	200	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
Endosulfan I	ug/kg	5.3	2.9%	900	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
Dieldrin	ug/kg	4.2	2.9%	44	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
4,4'-DDE	ug/kg	17	22.9%	2100	0	3.9 U	2.8 J	4.1 U	3.7 U	4 U	3.7 U	4 U
Endosulfan II	ug/kg	60	5.7%	900	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
4,4'-DDD	ug/kg	22	2.9%	2900	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
Endosulfan sulfate	ug/kg	23	5.7%	1000	0	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
4,4'-DDT	ug/kg	3.5	5.7%	2100	0	3.9 U	1.6 J	4.1 U	3.7 U	4 U	3.7 U	4 U
Methoxychlor	ug/kg	21	2.9%	10000	0	20 U	19 U	21 U	19 U	21 U	19 U	21 U
Endrin aldehyde	ug/kg	23	5.7%	NA	NA	3.9 U	3.7 U	4.1 U	3.7 U	4 U	3.7 U	4 U
gamma-Chlordane	ug/kg	7.8	5.7%	540	0	2 U	1.9 U	2.1 U	1.9 U	2.1 U	1.9 U	2.1 U
METALS												
Aluminum	mg/kg	21000	100.0%	15523	5	15700	8060	15900	8550	10000	13700	20500
Arsenic	mg/kg	13	100.0%	7.5	15	6.7	6.6 J	9 J	8.1 J	7.6 J	6.4 J	5.4 J
Barium	mg/kg	119	100.0%	300	0	107	45.7	81.4	43.6	53	69.2	109
Beryllium	mg/kg	0.97	100.0%	1	0	0.81 J	0.46 J	0.77 J	0.44 J	0.48 J	0.59 J	0.96 J
Cadmium	mg/kg	0.56	2.9%	1	0	0.55 U	0.63 U	0.63 U	0.68 U	0.78 U	0.44 U	0.78 U
Calcium	mg/kg	293000	100.0%	120725	11	9500	116000	6100	40600	79300	42100	4090
Chromium	mg/kg	32.4	100.0%	24	4	24.2	12.1	25.1	13.2	14.3	21.7	26.3
Cobalt	mg/kg	17.5	100.0%	30	0	13.2	7.9 J	14.3	7.1 J	7.1 J	11.1	12.5
Copper	mg/kg	259	100.0%	25	4	27.3	14.5	29.1	17.1	13.1	21.3	21.8
Iron	mg/kg	70200	100.0%	28986	9	32500	17200	38100	18200	18600	27500	26900
Lead	mg/kg	522	100.0%	30	3	23.8	15	13.5	12	16.2	13.1	18
Magnesium	mg/kg	120000	100.0%	12308	8	5850	9180	6250	4760	26900	8260	4760
Manganese	mg/kg	1740	45.7%	759	2	821 R	487 R	507 R	596 R	573 R	594 R	1260 R
Mercury	mg/kg	0.87	65.7%	0.1	6	0.04 J	0.02 J	0.03 J	0.04 J	0.05 J	0.04 J	0.07 J
Nickel	mg/kg	46.2	77.1%	37	2	34.2	23	40.6	19.8	20.3	35.4	32.1
Potassium	mg/kg	2090	100.0%	1548	10	1330	1050	1570	721 J	964 J	1290	2090
Selenium	mg/kg	0.82	71.4%	2	0	0.44 J	0.82 J	0.29 J	0.41 J	0.33 J	0.57 J	0.59 J
Sodium	mg/kg	247	100.0%	114	16	55.2 J	101 J	52.6 J	90.7 J	117 J	117 J	64.2 J
Vanadium	mg/kg	31.1	100.0%	150	0	28.1	13.1	25.4	12.3	15.4	19.6	31.1
Zinc	mg/kg	201	77.1%	90	7	96.9	70.3	88.1	50.9	62.7	78	88.2
Cyanide	mg/kg	0.56	5.7%	NA	NA	0.58 U	0.53 U	0.54 U	0.54 U	0.52 U	0.54 U	0.55 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/kg	2.2	100.0%	NA	NA	0.17	0.55	0.53	1.08	0.43	0.12	0.52
Total Solids	%W/W	97.6				84.9	90.1	78.9	88.4	80.9	88.6	82.3
Total Petroleum Hydrocarbons	mg/kg	21000	100.0%	NA	NA	42	86	550	63	72	137	113

Notes:
a) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
b) NA = Not Available
c) U = Compound was not detected.
d) J = the reported value is an estimated concentration.
e) R = the data was rejected in the data validating process.
f) UJ = the compound was not detected; the associated reporting limit is approximate.
g) TAGM values are based on an assumed Total Organic Carbon content of 1 percent.

which are common laboratory and sampling contaminants, were detected in few samples, and at very low concentrations. All of the volatile organics detected in the surface soils werepresent in concentrations well below their respective TAGM values.

Subsurface Soils

Acetone and 2-butanone were the only VOCs detected in the subsurface soils analyzed. Both of these compounds were detected in one sample only, TP26-2.2, which was collected from depths greater than 5 feet. The reported concentrations of each compound (78 μg/kg of acetone and 19 μg/kg of 2-butanone) were below their respective TAGM values.

Semivolatile Organic Compounds

Surface Soils

A total of 21 semivolatile organic compounds were found at varying concentrations in the surface soil samples collected at SEAD-26. The semivolatile organic compounds detected can be split into the two general classes: phthalates and PAHs. The phthalates were typically found at low concentrations, and were never found at concentrations exceeding the respective TAGM values. Various PAHs were found at concentrations exceeding the respective TAGM in 7 of the 20 surface soil samples analyzed.

The more noteworthy class of semivolatile organic compounds is the PAHs. PAHs are fuel components, and would be typical of the residues remaining after the burning of fuels. PAHs were far more prevalent than the phthalates, being found in up to 90% of the surface soil samples. There were several TAGM exceedances. The four surface soil samples SS26-4, SS26-6, TP26-7.1, and TP26-8.1, exceeded the 210 μg/kg TAGM for benzo(a)anthracene. Three of these four samples, SS26-4, SS26-6, and TP26-8.1 had concentrations exceeding the 400 μg/kg TAGM for chrysene and the 14 μg/kg TAGM for dibenz(a,h)anthracene. Samples SS26-6 and TP26-8.1 also exceeded the TAGM concentrations for benzo(b)fluoranthene and benzo(k)fluoranthene. The TAGM for benzo(a)pyrene, 61 μg/kg, was exceeded in the four samples described above, and three additional samples, including SS26-8, TP26-2.1, and TP26-6.1, though the highest concentrations were found in samples SS26-6 and TP26-8.1.

The sampling results indicate at least two areas of relatively high concentrations, though relatively low concentrations are present throughout the site. The first area is in the southern end of the site. Sample SS26-4 was collected in this area. The other area is the far north end of the site, where sample TP26-8.1 was collected. By contrast, samples collected in the center of the site, near the pit (SS26-1, SS26-2, and SS26-3) had little or no PAH contamination.

Subsurface Soils

The only subsurface samples to exceed a TAGM were TP26-2.2 and TP26-8.2, though the concentration of benzo(a)pyrene in sample TP26-8.2 (62 μg/kg) just barely exceeded the TAGM (61 μg/kg). Benza(a)pyrene (86J μg/kg) and dibenz(a,h)anthracene (29J μg/kg) were the only PAH compounds to exceed TAGM values in sample TP26-8.2. In general, few PAHs were found in samples collected at depth. The exceptions were samples SB26-3.4, collected near the center pit at a depth of 6 to 8 feet, SB26-4.4, collected at the southern end of the site at a depth of 6 to 8 feet, TP26-2.2, collected at the southern end of the site at a depth of 5 to 6 feet, TP26-3.2, collected in the southern part of the site at a depth of 6.5 to 7.2 feet, and TP26-8.2, collected in the northern end of the site at a depth of 5 to 6 feet.

Pesticides and PCBs

Surface Soils

Eleven pesticides were found in the surface soil samples collected at SEAD-26. The frequency of detection of these compounds ranged from 5% to 50%. All of the concentrations were very low, well below the respective TAGM values. Most of the pesticides were detected in the surface soil samples SS26-1, SS26-2, and SS26-3, which were collected in the center of the site adjacent to the fire training pit.

Subsurface Soils

No pesticides or PCBs were detected in the subsurface soil samples analyzed.

Herbicides

Surface Soils

Five herbicides were detected in the surface soil samples collected at the site. The frequencies of detection ranged from 5% to 15%. Most of the concentrations were very low, with the exception of MCPA, which was detected in sample TP26-2.1 at a concentration of 8100 μg/kg. This sample was collected in the southern end of the site. Elevated concentrations of MCPA (5800 μg/kg) and MCPP (7600 μg/kg) were present in sample TP26-7.1, which was collected in the north-central portion of the site. Most of the other herbicides were detected in the three surface soil samples, SS26-1, SS26-2, and SS26-3.

Subsurface Soils

Dicamba and MCPA were the only herbicides detected in the subsurface soils samples collected at SEAD-26. Dicamba was detected at a concentration of 5.8 μg/kg in subsurface sample SB26-4.2. MCPA was detected at concentrations of 5,800 and 29,000 μg/kg in samples SB26-4.4 and SB26-4.2, respectively. These samples were collected in the southern portion of the site. Herbicides were undetected in the 13 remaining subsurface soil samples.

Metals

Surface Soils

A variety of samples were found to contain various metals at concentrations that exceed the associated TAGM values. Of the 24 metals reported, 14 of these were found in one or more samples at concentrations above the TAGM values. Most of the exceedances were minor. These exceedances were for only a few samples, and the maximum concentrations were only slightly above the associated TAGM value.

The metals of note in the surface at this site are arsenic, copper, lead, magnesium, and manganese. Seven samples had arsenic concentrations in excess of the TAGM (7.5 mg/kg), though the maximum concentration of arsenic detected was 13 mg/kg. The highest concentrations were found in soil samples collected from the soil borings SB26-4 and SB26-6.

Copper concentrations exceeded the TAGM (25 mg/kg) in only two samples, with the maximum value detected of 259 mg/kg found in the surface soil in sample SS26-6. No other copper concentrations exceeded the 25 mg/kg TAGM value.

Lead concentrations exceeded the TAGM (30 mg/kg) in only two samples, but the concentrations were well above the TAGM. The surface soil samples SS26-6 (522 mg/kg) and SS26-7 (58.5 mg/kg) had lead concentrations reported well above the TAGM value.

Magnesium concentrations exceeded the TAGM (12,308 mg/kg) in 6 samples. As with copper, most of the exceedances were minor, with the exception of sample TP26-3.1, which had a magnesium concentration of 120,000 mg/kg.
Manganese concentrations exceeded the TAGM (759 mg/kg) in one sample. The most notable occurrence of manganese was 1740 mg/kg found in the surface soil sample TP26-3.1.

In general, while there were a number of metals which exceeded the TAGMs, there was no definite pattern to the exceedances, and there were no surface soil samples which consistently had the highest metals concentration.

Subsurface Soils

The occurrence and distribution of metals in the subsurface soil samples are similar to those observed in the surface soil samples. The metals of note in the subsurface soil samples are Arsenic and Zinc. Arsenic was detected in eight of the fifteen samples analyzed, however, the highest reported concentrations was only 10.3J mg/kg. The TAGM for arsenic in soils is 7.5 mg/kg. Zinc was found at elevated concentrations in five of the subsurface soil samples. The highest concentration reported was 201 mg/kg (in sample SB26-2.7). The TAGM for Zinc in soils is 90 mg/kg.

Nitroaromatics

Surface Soils

The two nitroaromatic compounds HMX and 2,4-dinitrotoluene, were detected in several of the surface soil samples collected at SEAD-26. All of the reported concentrations were low. These compounds were identified primarily in the three surface soil samples SS26-1, SS26-2, and SS26-3.

Subsurface Soils

Nitroaromatic compounds were undetected in the subsurface soil samples analyzed.

Indicator Compounds

Surface Soils

Soil samples at SEAD-26 were analyzed for nitrate/nitrite nitrogen and TPH. Both analytes were detected in all the samples. All the nitrate/nitrite nitrogen concentrations were very low, with a maximum detected concentration of 2.2 mg/kg in sample SS26-2.7. TPH concentrations were more variable. Most of the concentrations were in the 50- to 150- mg/kg range, but elevated concentrations were detected in samples SS26-3 (21,000 mg/kg), SS26-4 (880 mg/kg), and SS26-7 (330 mg/kg).

Subsurface Soils

Nitrate/nitrite nitrogen and TPH were detected in all of the subsurface soil samples analyzed. Nitrate/nitrite nitrogen was detected at concentrations ranging from 0.03 to 2.2 mg/kg. TPH was detected at concentrations below 100 mg/kg in all of the samples except TP26-6.2 (550 mg/kg), TP26-2.2 (230 mg/kg), and TP26-8.2 (113 mg/kg).

2.4.2.3 Groundwater

Four monitoring wells were installed as part of the SEAD-26 investigation. During the sampling event, monitoring well MW26-2 was found to be dry and therefore was not sampled. The summary chemical analyses are presented in Table 2-4. The locations of the wells were shown in Figure 2-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-26.

Volatile Organic Compounds

No volatile organic compounds were detected in any of the three monitoring wells sampled at SEAD-26.

Semivolatile Organic Compounds

The only semivolatile organic compound detected at SEAD-26 was diethylphthalate, which was detected at very low concentrations in the samples MW26-1 (0.6J μg/L) and MW26-4 (0.5J μg/L). The NYSDEC Class GA groundwater standard for diethylphthalate is 50 μg/L.

TABLE 2-4

GROUNDWATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	FREQUENCY OF DETECTION	MAXIMUM	NY AWQS CLASS GA (a)	MCL STANDARDS	NO. ABOVE CRITERIA	WATER SEAD-26 01/21/94 MW26-1 209256,	WATER SEAD-26 01/22/94 MW26-3 209258 209945	WATER SEAD-26 01/22/94 MW26-4 209260
SEMIVOLATILE ORGANICS									
Diethylphthalate	ug/L	66.7%	0.6	50	NA	0	0.6 J	10 U	0.5 J
METALS									
Aluminum	ug/L	100.0%	73300	NA	NA	NA	188 J	665	73300
Arsenic	ug/L	66.7%	32.6	25	50	1	0.8 U	1.3 J	32.6
Barium	ug/L	100.0%	399	1000	2000	0	31.9 J	83.8 J	399
Beryllium	ug/L	33.3%	3.4	3	4	1	0.4 U	0.4 U	3.4 J
Calcium	ug/L	100.0%	199000	NA	NA	NA	115000	194000	199000
Chromium	ug/L	33.3%	122	50	100	1	2.6 U	2.6 U	122
Cobalt	ug/L	66.7%	62.2	NA	NA	NA	4.4 U	4.4 J	62.2
Copper	ug/L	33.3%	92	200	1300(g)	0	3.1 U	3.1 U	92
Iron	ug/L	100.0%	145000	300	NA	2	286	858	145000
Lead	ug/L	66.7%	32.9	25	15(h)	1	0.5 U	0.61 J	32.9
Magnesium	ug/L	100.0%	60900	35000	NA	2	16700	36500	60900
Manganese	ug/L	100.0%	4280	300	NA	3	529	4280	2770
Mercury	ug/L	66.7%	0.14	2	2	0	0.05 J	0.04 U	0.14 J
Nickel	ug/L	66.7%	163	NA	100	1	4 U	4.7 J	163
Potassium	ug/L	100.0%	108000	NA	NA	NA	10200	4480 J	108000
Selenium	ug/L	66.7%	2	10	50	0	0.7 U	0.85 J	2 J
Sodium	ug/L	100.0%	30300	20000	NA	1	30300	11600	14600
Vanadium	ug/L	33.3%	110	NA	NA	NA	3.7 U	3.7 U	110
Zinc	ug/L	100.0%	355	300	NA	1	26.7	13.9 J	355
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	100.0%	3.6	10	10	0	1.18	0.04	3.6
Total Petroleum Hydrocarbons	mg/L	33.3%	0.41	NA	NA	NA	0.41 U	0.41	0.37 U
pH	standard units		7.63				7.63	6.8	6.95
Specific Conductivity	umhos/cm		775				400	650	775
Turbidity	NTU		5000				4.8	325	5000

NOTES:

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

Pesticides and PCBs

No pesticides or PCBs were found in any of the 3 monitoring wells sampled at SEAD-26.

Herbicides

No herbicides were found in any of the 3 monitoring wells sampled at SEAD-26.

Metals

The metals arsenic, beryllium, chromium, iron, lead, magnesium, manganese, nickel, sodium, and zinc were detected in one or more of the groundwater samples at concentrations above their criteria. Most of the exceedances occurred in only 1 sample, with the exceptions of iron, magnesium, and manganese. Iron was found in 2 of the 3 monitoring wells at concentrations above the criteria value of 300 µg/L. The maximum iron concentration, 145,000 µg/L, was found in the sample collected from monitoring well MW26-4. This high concentration may have been due to silt in the water sample, as evidenced by the very high turbidity (5000 NTU) and the high aluminum concentration (73,300 µg/L) detected in the same well. Magnesium exceeded the NYSDEC Class GA criteria in 2 of the 3 wells sampled, MW26-3, and MW26-4. The maximum concentration detected was 60,900 µg/L in monitoring well MW26-4. As with iron, this high concentration is likely due to silt being present in the groundwater sample. Manganese was found in all 3 groundwater samples at concentrations exceeding the NYSDEC Class GA groundwater standard of 300 µg/L, with the maximum concentration of 4280 µg/L being found in monitoring well MW26-3. Nickel was found in sample MW26-4 at a concentration of 163 µg/L. This concentration exceeded the Federal MCL standard of 100 µg/L, however, this high concentration may also have been due to the sample's high turbidity.

Nitroaromatics

No nitroaromatic compounds were detected in any of the 3 monitoring wells sampled at SEAD-26.

Indicator Compounds

None of the 3 groundwater samples analyzed had nitrate concentrations above the criteria value of 10 mg/L. The maximum nitrate value detected was 3.6 mg/L in sample MW26-4. TPH was detected in only 1 of the 3 groundwater samples analyzed, MW26-3, at a concentration of 0.41 mg/L.

2.4.2.4 Surface Water

One surface water sample was collected as part of the SEAD-26 investigation. The summary chemical analyses are presented in Table 2-5. The sample location is shown in Figure 2-2. The following sections describe the results of these analyses.

Volatile Organic Compounds

No volatile organic compounds were found in the surface water sample collected at SEAD-26.

Semivolatile Organic Compounds

No semivolatile organic compounds were found in the surface water sample collected at SEAD-26.

Pesticides and PCBs

One pesticide, endrin aldehyde, was detected in the surface water sample. The concentration of endrin aldehyde was 0.072J μg/L. This sample was collected near surface soil samples SS26-2 and SS26-3, which also contained endrin aldehyde, and may be indicative of localized pesticide contamination. As described below, the sediment sample collected in the same location as this surface water sample also contained pesticides.

Herbicides

One herbicide, 2,4-DB was detected in the surface water sample, at a concentration of 2.9 μg/L. There are no criteria for this compound.

TABLE 2-5

SURFACE WATER ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	NYS GUIDELINES CLASS D (a)	EPA AWQC ACUTE (b)	EPA AWQC CHRONIC (b)	NO. ABOVE CRITERIA	WATER SEAD-26 11/01/93 SW26-1 202939	WATER SEAD-26 11/01/93 SW200 202944 SW26-1DUP
HERBICIDES								
2,4-DB	ug/L	2.9	NA	NA	NA	NA	2.9	
NITROAROMATICS								
2,4-Dinitrotoluene	ug/L	3.5	NA	330	230	0	3.5	
PESTICIDES/PCB								
Endrin aldehyde	ug/L	0.072	NA	NA	NA	NA	0.072 J	
METALS								
Arsenic	ug/L	7	360	360	190	0	7 J	
Barium	ug/L	NA	NA	NA	NA	NA	NA	
Calcium	ug/L	61200	NA	NA	NA	NA	61200	
Iron	ug/L	2940	300	NA	1000	1	2940 J	
Lead	ug/L	2.8	330	330.6	12.9	0	2.8 J	
Magnesium	ug/L	4530	NA	NA	NA	NA	4530 J	
Manganese	ug/L	55.5	NA	NA	NA	NA	55.5	
Nickel	ug/L	6.3	4250	3592.5	399.4	0	6.3 J	
Potassium	ug/L	2510	NA	NA	NA	NA	2510 J	
Sodium	ug/L	4670	NA	NA	NA	NA	4670 J	
Zinc	ug/L	7.1	800	296.8	268.9	0	7.1 J	
Cyanide	ug/L	8.5	22	22	5.2	1	8.5	
OTHER ANALYSES								
Nitrate/Nitrite-Nitrogen	mg/L	0.03	NA	NA	NA	NA	0.03	NS
Total Petroleum Hydrocarbons	mg/L	4.17	NA	NA	NA	NA	4	4.17

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

Metals

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

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

The metals iron and cyanide were found in the surface water sample collected at SEAD-26 at concentrations above the associated criteria values. Iron was detected at 2940J μg/L, which exceeds the NYSDEC Class D standard of 1000 μg/L. Cyanide was detected at 8.5 μg/L, which exceeds the EPA water quality criteria.

Nitroaromatics

The nitroaromatic compound 2,4-dinitrotoluene was detected in the surface sample at a concentration of 3.5 μg/L. No other nitroaromatic compounds were detected in the surface water sample. This compound was also present in the sediment and surface soil samples collected in the same general area.

Indicator Compounds

Nitrate/nitrite nitrogen was detected in the surface water sample at a concentration of 0.03 mg/L. TPH was detected at a concentration of 4 mg/L.

2.4.2.5 Sediment

One sediment sample was collected as part of the SEAD-26 investigation. The summary analytical results are presented in Table 2-6. The sample location is shown in Figure 2-2. The following sections describe the results of these analyses.

Volatile Organic Compounds

The two volatile organic compounds acetone and 2-butanone were detected in the sediment sample collected at SEAD-26. Both compounds were detected at low concentrations, and both are common laboratory contaminants.

TABLE 2-6

SEDIMENT ANALYSIS RESULTS
SENECA ARMY DEPOT
SEAD-26 EXPANDED SITE INSPECTION

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOT (b)	NO. ABOVE CRITERIA	SOIL SEAD-26 0-0.5 11/01/93 SD26-1 202995	SOIL SEAD-26 0-0.5 11/01/93 SD200 203000 SD26-1DUP
VOLATILE ORGANICS									
Acetone	ug/kg	26	NA	NA	NA		NA	26	
2-Butanone	ug/kg	23	NA	NA	NA		NA	23	
HERBICIDES									
2,4,5-T	ug/kg	21	NA	NA	NA		NA	21	
NITROAROMATICS									
HMX	ug/kg	72	NA	NA	NA		NA	72 J	
2,4-Dinitrotoluene	ug/kg	660	NA	NA	NA		NA	660 J	
SEMIVOLATILE ORGANICS									
2-Methylnaphthalene	ug/kg	420	NA	NA	NA		NA	420 J	
Phenanthrene	ug/kg	420	1390	NA	NA		NA	420 J	
PESTICIDES/PCB									
Heptachlor epoxide	ug/kg	6.4	0.3	1.1	1		1	6.4 J	
Dieldrin	ug/kg	3.8	NA	13	7.7		0	3.8 J	
4,4'-DDE	ug/kg	13	500	0.1	10		1	13 J	
Endrin	ug/kg	6.5	10.4	0.5	NA		1	6.5 J	
Endosulfan II	ug/kg	4.4	0.3	NA	NA		1	4.4 J	
METALS									
Aluminum	mg/kg	1270	NA			NA	NA	1270	
Arsenic	mg/kg	14.6	5			33	1	14.6	
Barium	mg/kg	26	NA			NA	NA	26 J	
Beryllium	mg/kg	0.15	NA			NA	NA	0.15 J	
Calcium	mg/kg	313000	NA			NA	NA	313000	
Chromium	mg/kg	2.5	26			111	0	2.5	
Cobalt	mg/kg	2.5	NA			NA	NA	2.5 J	
Copper	mg/kg	10.9	19			114	0	10.9	
Iron	mg/kg	3170	24000			40000	0	3170	
Lead	mg/kg	8.3	27			250	0	8.3	
Magnesium	mg/kg	7270	NA			NA	NA	7270	
Manganese	mg/kg	190	428			1100	0	190	
Mercury	mg/kg	0.01	0.11			2	0	0.01 J	
Nickel	mg/kg	10.5	22			90	0	10.5	
Potassium	mg/kg	784	NA			NA	NA	784 J	
Selenium	mg/kg	0.37	NA			NA	NA	0.37 J	
Sodium	mg/kg	231	NA			NA	NA	231 J	
Vanadium	mg/kg	7.6	NA			NA	NA	7.6 J	
Zinc	mg/kg	34.3	85			800	0	34.3	
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/kg	0.02	NA			NA	NA	0.02	NS
Total Petroleum Hydrocarbons	mg/kg	22000	NA			NA	NA	20000	22000

NOTES:

a) NYSDEC Sediment Criteria - 1989.
b) LOT = limit of tolerance; represents point at which significant toxic effects on benthis species occur.
c) J = the reported value is an estimated concentration.
d) NS = Not Sampled

Semivolatile Organic Compounds

Two semivolatile organic compounds were detected in the sediment sample collected at SEAD-26. Both compounds, 2-methylnaphthalene and phenanthrene were detected at 420 μg/kg, which is below the NYSDEC sediment criteria (for phenanthrene). These compounds are both PAHs, and their presence is consistent with the soils data from the site, and with the identified use of the site for fire training activities.

Pesticides and PCBs

Five pesticides were detected in the sediment sample collected at SEAD-26. The concentrations were low, ranging from 3.8J μg/kg for dieldrin to 13J μg/kg for 4,4'-DDE. Even though these concentrations were low, four of the five compounds were present at concentrations exceeding their respective criteria. Pesticides were also present in the surface water and surface soil samples collected in the same area of the site.

Herbicides

The one herbicide 2,4,5-T was detected in the sediment sample collected at the site at a concentration of 21 μg/kg. Herbicides were also detected in the surface water and surface soil samples collected in the same area of the site.

Metals

A number of metals were detected in the SEAD-26 sediment sample. Of these, only arsenic was detected in excess of any criteria. The concentration of arsenic was 14.6 mg/kg, which exceeded the NYSDEC sediment criteria for aquatic life of 5 mg/kg. Arsenic was also a contaminant of concern in the site soils.

Nitroaromatics

Two nitroaromatic compounds were detected in the sediment samples collected at SEAD-26. The compounds HMX and 2,4-dinitrotoluene were detected at concentrations of 72 μg/kg and 660J μg/kg, respectively. There are no sediment criteria available for these compounds. These compounds were also a concern in other site media.

Indicator Compounds

The sediment sample was also analyzed for nitrate/nitrite nitrogen and TPH. Nitrate/nitrite nitrogen was detected at 0.02 mg/kg and TPH was detected at 20,000 mg/kg. The high TPH value, along with the prevalent PAHs at the site are indicative of residues from the burning of petroleum products at the fire training area.

2.4.2.6 Tentatively Identified Compounds

Surface Soils

Three surface soil samples had total TIC concentrations greater than 50 mg/kg. Surface soil samples SS26-1, SS26-2, and SS26-3 had total TIC concentrations ranging from 284.5 mg/kg (in SS26-2) to 1,043 mg/kg (in SS26-3). An elevated total TIC concentration was also reported in SS26-9 (788.7 mg/kg), the duplicate sample to SS26-3. The primary tentatively identified compounds in these samples were decanes and cosanes. Although none of these 4 surface soil samples (3 samples and 1 duplicate) had reported SVO TAGM exceedance, the SVO detection limits for these samples were very high, possibly due to interferences caused in the laboratory methods from these high TIC concentrations.

Subsurface Soils

All of the total TIC concentrations reported in the subsurface soil samples were below 50 mg/kg.

Sediment

The one sediment sample SD26-1, had a total TIC concentration of 342.5 mg/kg, due primarily to the presence of decanes. Only two SVOs were detected in this sample and neither exceeded a TAGM value.

3.0 SCOPING OF THE RI/FS

This section describes the current conditions of SEAD-25 and SEAD-26 based upon the results of the ESI Report. 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 are data quality objectives (DQOs) and potential remedial actions for SEAD-25 and SEAD-26. These considerations will also be integrated into the scoping process to ensure that adequate data is collected to complete the RI/FS process for these AOCs.

3.1 CONCEPTUAL SITE MODEL

The conceptual site model for SEAD-25 and SEAD-26 takes into account both site conditions and expected pollutant behavior to formulate an understanding of the sites. These will serve as a basis for determining necessary additional studies for the RI. The model was developed by evaluating the following aspects:

1. Historical usage and waste disposal practices.

2. <u>Physical site characteristics:</u> 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.

3. <u>Environmental fate of constituents:</u> This considers the fate and transport of residual materials in the environment based upon known chemical and physical properties.

3.1.1 <u>Physical Site Characterization</u>

3.1.1.1 SEAD-25, Fire Training and Demonstration Pad

The Fire Training and Demonstration Pad (SEAD-25) is located in the east-central portion of SEDA (Figure 1-1). It is characterized by a small (100 feet by 100 feet), sparsely vegetated square pad, the surface of which is mostly composed of crushed shale; most of the vegetation on the pad appears to be stressed (Figure 1-2).

The Fire Training and Demonstration Pad (SEAD-25) has been in use from the late 1960s to the late 1980s. In the past, the pad was used for fire control training. During the 1980's, the pad was used twice for fire fighting demonstrations, once in 1982 or 1983 and in 1987.

The site is bound to the east by Administration Avenue beyond which is undeveloped land covered by deciduous trees, to the south by Ordnance Drive beyond which is an open grassy field and a stand of coniferous trees, to the west by grassland and conifers, and to the north by grassland and a baseball field. The nearest off-site residence is located approximately 3,500 feet east-south-east of the site.

Locally, the on-site topography slopes gently in all directions away from the center of the mound. Regionally, the topography slopes to the south-southwest. However, in the immediate vicinity of the site, the pad represents a small topographic high and the topography slopes to the west, south and east around it. East of the site across Administration Drive, the topography slopes gently toward a small ditch which drains to the south. West of the site, the topography slopes to the west toward a small drainage ditch located approximately 300 feet from the site. A drainage swale parallels Administration Drive and divides in the southeastern potion of the site where part of it continues under Ordnance Drive via a conduit and part is directed west into another drainage ditch.

A crushed shale road provides access to the site from the east on Administration Avenue; the road continues west of the pad and turns south to intersect with Ordnance Drive. Within SEDA, vehicular and pedestrian access to the site is unrestricted.

Local Geology

Based on the results of the ESI Report, till and calcareous black shale were found to be the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. The surface of the pad is composed of a one-foot thick layer of crushed shale fill. In most instances, a petroleum odor was noted in this crushed shale unit as well as in the till below the pad.

In the boring performed outside the limits of the crushed shale pad, a very thin soil horizon was observed with till present within one foot of the ground surface.

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

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

Local Hydrology and Hydrogeology

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

The groundwater flow direction in the till/weathered shale aquifer on the site is apparently to the east based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3-1 and Figure 3-1). This flow direction is approximately opposite to the expected southwesterly flow direction based on an examination of the regional topography in this area of SEDA and by seismic data, which mapped a relatively flat (although westward-sloping) bedrock surface at the site. At SEDA, the direction of the slope of the bedrock surface is a good indication of the direction of groundwater flow. Also, groundwater flow directions at other nearby sites were to the west or southwest.

TABLE 3-1
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-25

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW25-1	742.69	1/8/94	5.95	736.74	2/6/94	5.67	737.02	4/4/94	5.45	737.24
MW25-2	746.11	11/11/93	5.12	740.99	2/4/94	5.54	740.57	4/4/94	4.35	741.76
MW25-3	745.56	11/9/93	4.8	740.76	11/15/93	4.78	740.78	4/4/94	3.15	742.41

at TP26-6 and TP26-7. At TP26-6, a large concrete slab (5 feet by 3 feet by 8 inches) was also uncovered.

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

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

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

Local Hydrology and Hydrogeology

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

The groundwater flow direction in the till/weathered shale aquifer on the site is west southwest across the site based on the groundwater elevations measured in four monitoring wells on April 4, 1994 (Table 3-2 and Figure 3-2). The groundwater measurements obtained in late January 1994 also show the groundwater flows in a west southwest direction. The recharge of water to the wells during sampling was generally good, although one well (MW26-2) was dry during the sampling period.

3.1.2 Environmental Fate of Constituents at SEAD-25 and SEAD-26

The potential contaminants of concern at SEAD-25 and SEAD-26 (The Generic Installation RI/FS Workplan addresses all potential contaminants of concern site-wide as "constituents of concern") are volatile organic compounds and semivolatile organic compounds. This discussion is meant to present general information on the fate of the selected constituents of concern, and where possible, site-specific characteristic are presented. A summary of fate and transport parameters for volatile organics and semivolatile organics is presented in Table 3-3.

Environmental fate information on the constituents at these two SEADs is presented in Sections 3.1.3.1 and 3.1.3.2 of the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.1.2.1 Volatile Organic Compounds

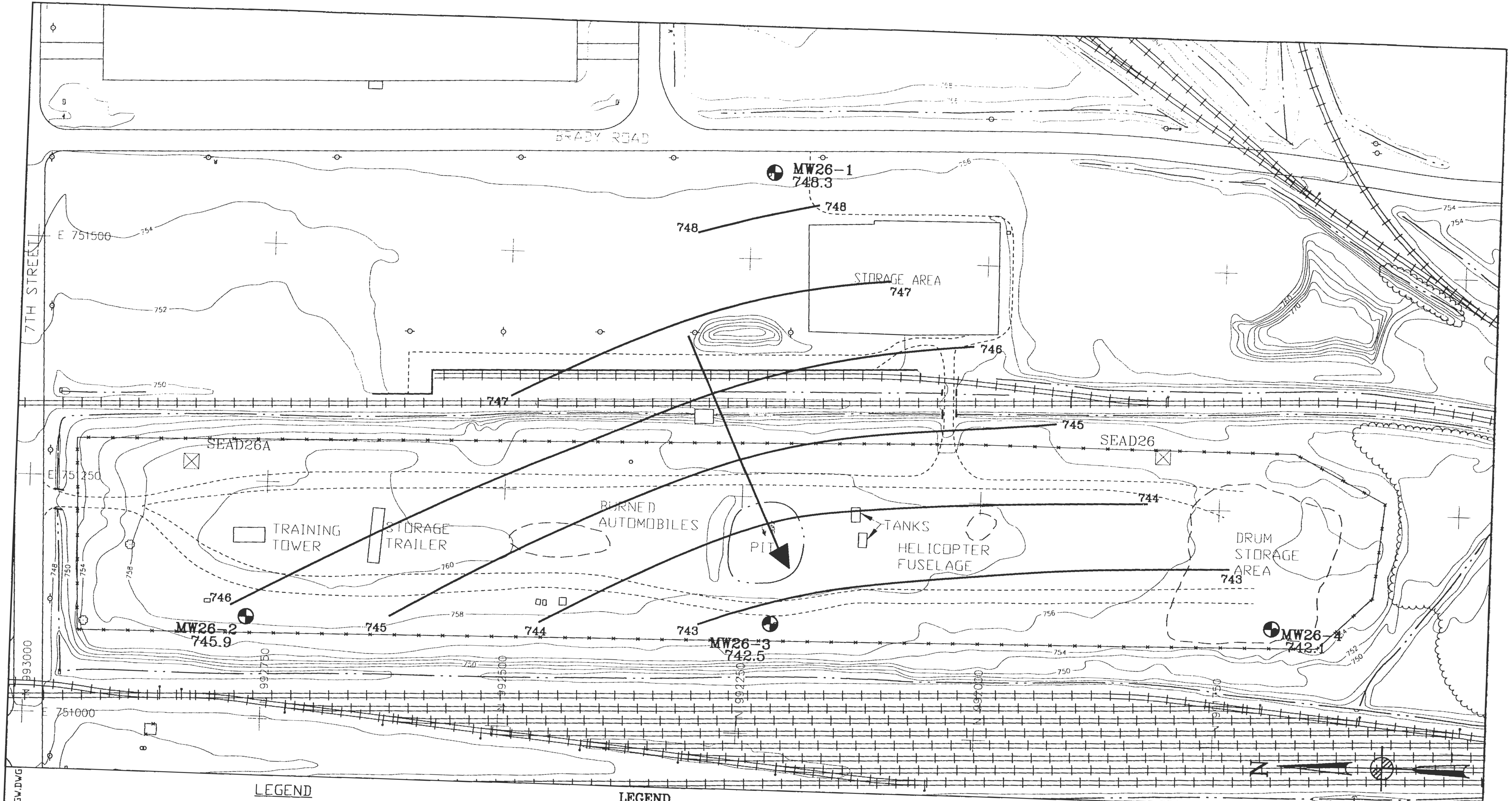
Volatile organic compounds tend to have a low residence time in surface soil and surface water environments. These chemicals can be persistent in groundwater. However, there is evidence that non-chlorinated volatile organic compounds may degrade rapidly in the vadose zone aboveground water plumes. (Gas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

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.

TABLE 3-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-26

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER WATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW26-1	753.57	11/20/93	4.76	748.81	1/21/94	7.12	746.45	4/4/94	5.28	748.29
MW26-2	761.42	1/9/94	15.76	745.66	1/25/94	16.50	744.92	4/4/94	15.54	745.88
MW26-3	753.92	11/20/93	11.42	742.50	1/22/94	12.94	740.98	4/4/94	11.4	742.52
MW26-4	752.42	12/6/93	10.35	742.07	1/22/94	12.09	740.33	4/4/94	10.28	742.14



ACAD\SENECA\RIFS\SD25-26\SD26GW.DWG

LEGEND

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

- ⊠ SURVEY MONUMENT
- ROAD SIGN
- DECIDUOUS TREE
- FIRE HYDRANT
- ⊗ MANHOLE
- △ GUIDE POST
- ○ POLE
- ☐ UTILITY BOX
- \+ COORDINATE GRID (250' GRID)
- OVERHEAD UTILITY POLE
- ☐ MAILBOX/RR SIGNAL

LEGEND

MW26-1 748.3 MONITORING WELL WITH WATER TABLE ELEVATION

748 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 4/4/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 3-2
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 100'	JULY 1995	A

TABLE 3 - 3

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

SENECA ARMY DEPOT

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
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
Trichloroethene	1100	75	9.10E-03	1.26E+02	2.40E+02	3-300	13-39
1,1-Dichloroethene	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
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
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	
Acenaphthene	3.42	0.00155	9.20E-05	4.60E+03	1.00E+04		
Dibenzofuran				4.16E+03	1.32E+04		
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
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	

TABLE 3 - 3

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

SENECA ARMY DEPOT

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m^3/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
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	
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.	
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	

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).

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-25 and SEAD-26 are discussed below.

This section addresses the contaminant persistence (fate and transport) and focuses on volatile organic compounds, the primary constituents of concern at SEAD-25 and SEAD-26. Volatile organic chlorinated (aliphatic) compounds associated with SEAD-25 are primarily benzene, toluene, ethylbenzene and xylenes (BTEX) which are associated with petroleum hydrocarbons, including gasoline, and to a lesser extent chlorinated compounds such as TCE and the breakdown products of TCE, including cis- and trans-1,2-dichloroethene (1,2-DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride. At SEAD-26, the volatile constituents of concern are methylene chloride, acetone, chloroform, 2-butanone, and toluene.

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 3-3 summarizes the chemical specific properties of TCE and its breakdown products, and 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.

Benzene

The estimate for 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 for 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, dispersion and diffusion. 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 for 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 movement of infiltrating water), dispersion and diffusion. 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 for 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 has 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.

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 suggest 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 sand soils.

These 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 ethyl benzene, the bioconcentration factor suggest moderate bioaccumulation in aquatic organism 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 photoxidized in the atmosphere, its volatility suggests that it may be found in air as well.

Chlorinated Volatile Organics

Table 3-3 presents the information which will serve as a basis for predicting the likely environmental fate of the chlorinated substances at SEAD-25 and SEAD-26. The most volatile of the chlorinated compounds being examined at this site is vinyl chloride, with a vapor pressure of 2300 millimeters mercury (mm Hg) at 20°C. TCE has a vapor pressure of 59 mm Hg at 20°C. Consequently, volatilization represents a significant environmental pathway, provided that there is an ample amount of air space in the soil through which the vapor can migrate. Volatile constituents enter the air through void spaces in the soil above the saturated zone which may then leave the system through the ground surface.

An important chemical specific property which can be used to understand the potential for chemical migration is Henry's Law. At low concentrations and equilibrium, Henry's Law states that the concentration in the vapor phase is directly proportional to the concentration in the aqueous phase. The Henry's constant is the proportionality factor between the vapor and liquid phase concentrations. Henry's constants for the major compounds detected at SEAD-25 are presented in Table 3-3. Generally, for compounds with a Henry's constant less than 5×10^{-3} atm-m^3/mole, volatilization is not expected to be a significant environmental pathway (Dragun, 1988). TCE and its four breakdown products all have Henry's Constants greater than 5×10^{-3} atm-m^3/mole which suggests that volatilization will be a significant mechanism in the partitioning of these volatile chlorinated compounds.

Compounds in soil are only mobile in the aqueous and air phases. Compounds enter the groundwater as precipitation migrates through the soil and mixes with these materials, eventually recharging to groundwater. The solubilities for these compounds range from 1,100 mg/l for TCE to 6,300 mg/l for trans 1,2 DCE which is sufficient to cause impacts to the groundwater. A review of the melting points and boiling points indicate that vinyl chloride is a gas at ambient temperatures, and TCE and the DCE isomers are liquids at room temperature.

The affinity of a compound to sorb to the organic fraction of soil is estimated from the organic carbon partition coefficient (K_{oc}). The K_{oc} is the ratio of the amount of the compound present in the organic fraction to that present in the aqueous fraction, at equilibrium. K_{oc} values are presented in Table 3-3 for TCE and its breakdown products. The relationship between K_{oc} and mobility is presented in Table 3-4. Compounds with a K_{oc} between 500 mL/g and 2,000 ml/g are generally considered low mobility compounds and those with a K_{oc} value greater than 2,000 ml/g are considered to be immobile (Dragun, 1988). TCE, the DCE isomers and vinyl chloride all have K_{oc} values less than 500 mL/g and are therefore considered to be mobile. K_{oc} values are generally determined by experiment, but are often estimated using octanol-water partition coefficients (K_{ow}). Octanol-water partition coefficients are determined in the laboratory and then converted to K_{oc} via empirical relationships.

Understanding the type of soils present is useful for estimating the mobility of compounds. The site soils, clay loams, generally have low permeabilities and high water retention capacities. Therefore dissolved materials tend to move much slower through clay soils than sandy soils. Since adsorption of solutes on soils is controlled by the amount of organic carbon in the soil, soils with a higher organic content will adsorb more organics than soils which are low in carbon but rich in clay. Generally, surface soils, i.e. soils in the agricultural A horizon, have a higher organic content than deeper soils, i.e. soils in the B and C horizon, due to the presence of decomposing plant matter at the surface. In general, the larger the amount of organic matter in the soil, the less mobile the compounds of concern will be.

Compounds degrade through a variety of mechanisms including biodegradation, hydrolysis, photodecomposition, and are converted to other organic degradation products. Biodegradation is considered to be the most likely transformation pathway for TCE, since the reaction kinetics are the fastest of the mechanisms considered. Known biological breakdown products of TCE include vinyl chloride and 1,2-DCE. The degradation rate, which is a measure of how fast a compound degrades, is influenced by several factors including: solubility, which determines the availability of the compound to the bacteria, temperature, oxygen concentrations, moisture content, substrate concentrations and toxicity, which is a measure of how toxic the compound is to the bacteria. For estimating simplicity, degradation has been assumed to be a first order reaction, which will allow degradation rates to be expressed as first order rate constants or half lives. A half-life refers to the time it would take for half of the mass of the organic constituent to degrade to either an intermediate compound or to carbon dioxide and water. A detailed analysis of biodegradation would evaluate the complete pathway. Half-lives for selected organic compounds that were detected at these two

TABLE 3-4

RELATIVE RELATIONSHIPS BETWEEN K_{oc} AND MOBILITY

K_{oc}	Mobility Class
>2000	I - Immobile
500-2000	II - Low Mobility
150-500	III - Intermediate Mobility
50-150	IV - Mobile
<50	V - Very Mobile

K_{oc} - Organic carbon partition coefficient

Source: The Soil Chemistry of Hazardous Materials; James Dragun, Ph.D; The Hazardous Materials Control Research Institute; 1988.

SEADs are shown in Table 3-3. The first order degradation rate is often assumed to be independent of the mass of the constituent present in order to facilitate modeling, but in reality, as the mass of a compound decreases, the degradation rate will also decrease.

Fate of Chlorinated Compounds

Following a release, source materials partition into the three environmental media, i.e. soil, water and air. Estimations of phase partitioning at the source can be used to understand the expected fate of the released materials. The fate of the chlorinated chemicals found at these two SEADs can be determined by Level I equilibrium partitioning calculations following procedures developed by MacKay and Paterson, (1981). The details of the fugacity calculations are included in the Generic Installation RI/FS Workplan in Section 3.1.3.1.2 on page 3-11.

The results of these partitioning analyses indicate that the chlorinated solvents will be partioned into the soil-water and the soil-airspace.

A summary of the identified breakdown products resulting from the environmental biodegradation of TCE is provided in the Generic Installation RI/FS Workplan. Dechlorination and methane production are carried out by anaerobic microbes. Anaerobic conditions are likely to exist in the soils and therefore anaerobic degradation is a likely degradation pathway. Research indicates that under methanogenic conditions TCE is sequentially reduced by dechlorination to DCE isomers, then to vinyl chloride, and eventually to ethene. At each step a chlorine is replaced by hydrogen, and hydrogen chloride is produced. Of the three possible DCE isomers, the cis- and trans- 1,2-dichloroethene isomers are much more prevalent than 1,1-dichloroethene. Both an energy source and an electron, or an electron donor source appear to be necessary for this transformation to take place. Compounds with a greater degree of halogenation are more likely to undergo dehalogenation, suggesting that vinyl chloride, with one remaining chlorine is not as likely to degrade to ethene as TCE is to degrade to DCE.

TCE is relatively mobile and will partition in the water of the soil-groundwater system especially in soils with a low organic content. Volatilization may also be a significant pathway for TCE near the surface or in the soil-air phase. Hydrolysis is not expected to be significant in natural soils due to slow reaction mechanisms.

DCE and vinyl chloride are also considered to be mobile in soil/groundwater systems and volatilization is also considered to be significant near the surface. However, unlike TCE and DCE, partitioning of vinyl chloride in the soil-air phase dominates the expected partitioning pathways and most of the vinyl chloride will likely be volatilized from the surface of the soil.

3.1.2.2 Semivolatile 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 material 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 Data Summary and Conclusions

The ESI investigations at SEAD-25 and SEAD-26 included surficial soil sampling, installation of groundwater monitoring wells, overburden and bedrock characterization, seismic surveys, groundwater sampling, and soil borings. No sampling data was available for SEAD-25 or SEAD-26 prior to the ESI. The results of the ESI at both SEAD-25 and SEAD-26 were documented in the ESI Report. This section will summarize the data collected to date and draw conclusions as to the likely environmental impacts those constituents have made to the sites.

3.1.3.1 SEAD-25, Fire Training and Demonstration Pad

Soil Data

The ESI conducted at SEAD-25 indicates that impacts from the release of BTEX compounds to the surface and subsurface soils has occurred at this site. The BTEX compounds were found in a number of soil samples above the associated TAGM values, and individual samples also exceeded the NYSDEC TAGM criteria for total VOCs of 5 mg/kg. The BTEX concentrations appear to be limited to the central and western portions of the pad.

Groundwater Data

The groundwater investigation completed at SEAD-25 indicates that chlorinated and BTEX compounds are present in the groundwater at concentrations above the NYS AWQS Class GA groundwater standard. Class GA specifies that the quality of groundwater is suitable to be used as a source of drinking water.

Data Summary

Based upon the results of the ESI conducted at SEAD-25, a threat to human health and the environment may exist due to the presence of volatile and semivolatile organic compounds in soil and groundwater at the site. The volatile constituents have the potential to migrate in groundwater. Impacts to surface water and sediment have not been fully evaluated. Additional data is necessary to further evaluate the nature and extent of these constituents in the environment and the degree to which they may be migrating in the groundwater.

3.1.3.2 SEAD-26, Fire Training Pit and Area

Soil Data

The ESI data at SEAD-26 indicates that surface soils at the north and south ends of the site were impacted by PAHs, which were present at concentrations above their TAGM values. Several metals were detected at concentrations that exceeded their TAGM values in various samples across the site. Petroleum hydrocarbons were detected at elevated concentrations in surface soil samples obtained from around the pit.

Groundwater Data

No VOCs, pesticides, PCBs, herbicides, and nitroaromatic compounds were detected in the groundwater samples. Diethylphthalate, the only SVO detected, was detected at concentrations well below the NYSDEC Class GA groundwater standards. Several metals concentrations exceeded the standards, including arsenic, beryllium, lead, and zinc, but these concentrations were likely due to silt suspended in the samples, as evidenced by high turbidities. The well downgradient of the fire training pit contained a detectable concentration of TPH (0.41 mg/L). The detection limit for TPH in water is 0.4 mg/L.

Surface Water Data

The primary constituent in the surface water in the fire training pit was petroleum hydrocarbons (4 mg/L TRPH). The surface water also contained a pesticide compound, a herbicide compound, eleven metals, a nitroaromatic compound, and cyanide. Only iron and cyanide were present in concentrations exceeding their criteria.

Sediment Data

The primary constituent in the sediment sample collected from the fire training pit was petroleum hydrocarbons (22,000 mg/Kg). The sample also contained PAHs, pesticides, a herbicide compound, and metals. Four of the pesticide compounds and arsenic were detected at concentrations exceeding their criteria.

Data Summary

Based upon the results of the ESI conducted at SEAD-26, a threat to human health and the environment may exist due to the presence of primarily PAHs and TRPH in soils and sediment. The data indicate that groundwater has not been impacted by these constituents, however, only a limited number of wells have been installed at the site. Impacts to surface water and sediment surrounding the elevated Fire Training Pit have not been investigated. Additional data is necessary to further evaluate these pathways in the overall evaluation of risk.

3.2 PRELIMINARY IDENTIFICATION OF POTENTIAL RECEPTORS AND EXPOSURE SCENARIOS

This section will identify the source areas, release mechanisms, potential exposure pathways and likely human and environmental receptors at SEAD-25 and SEAD-26 using conceptual site models. Conceptual site models for SEAD-25 and SEAD-26 were developed based on the ESI data for these two sites, historical and current site usage, and physical site characteristics. These models were presented in the draft ESI report and are presented in this Project Scoping Plan.

This section also discusses the current understanding of site risk for SEAD-25 and SEAD-26 based upon the data gathered for the draft ESI Report. 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 the risk assessment.

This is a generic discussion. The future use scenario and the required degrees of cleanup will be proposed on a site-by-site basis as part of each feasibility study. The future plans for each site will be taken into account at that time. Currently, the Army has no plans to change the use of this facility or to transfer the ownership.

As of early July, the Base Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Until the BRAC Commission recommendations are voted on by the President and the Congress, BRAC does not apply to SEDA and the installation will remain open.

The President must approve the entire list by July 15, 1995 at which time the list is forwarded to Congress. If Congress approves the recommendations, they will become public law on October 1, 1995. If BRAC applies to SEDA, future use of the sites will be determined by the Army. In accordance with BRAC regulations, the Army will perform any additional investigations and remedial actions to assure that any change in intended land use is protective of human health and the environment. However, not all sites at SEDA will be turned over for residential use.

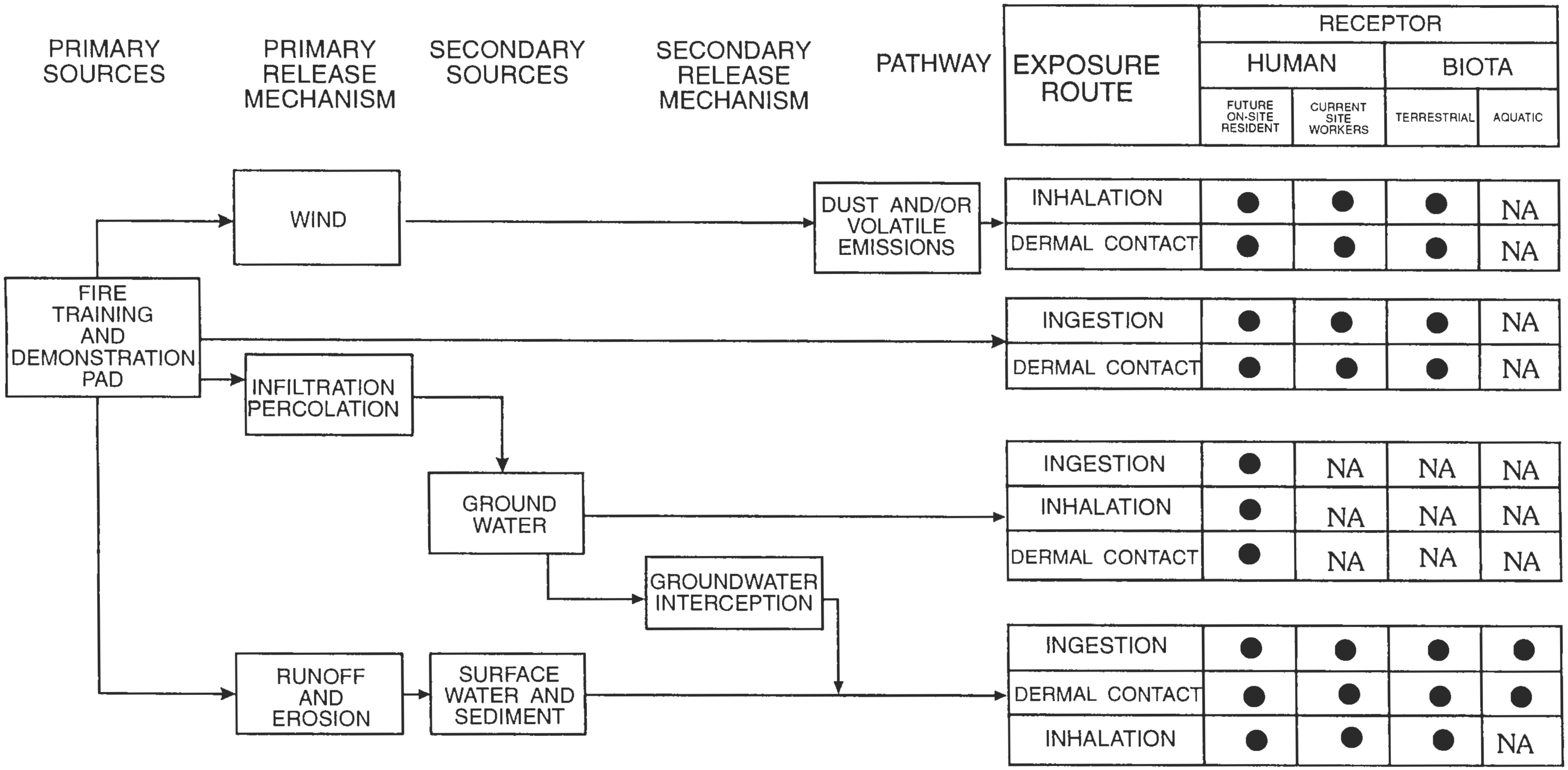
At this time, the specific details for closure procedures, projected timetables of closure, discussion of the Army's future intention for the sites, and detailed account of notification methods to prospective purchasers are unavailable for inclusion in this Workplan. If it is decided that the base will be closed, then closure procedures will be obtained.

3.2.1 Potential Source Areas and Release Mechanisms

SEAD-25

The Fire Training and Demonstration Pad has been in use from the late 1960s to the late 1980s. In the past it was used for fire control training. The suspected source area is the pad on which burning took place. This area has the potential to contain various petroleum (volatile and semivolatile) compounds and possibly heavy metals.

The potential primary release mechanisms from the Fire Training and Demonstration Pad are surface water runoff and erosion, infiltration, and emissions of dust and/or volatiles. If infiltration of precipitation occurs then groundwater would be a potential secondary source. Soil, surface water and sediment are also potential secondary sources (Figure 3-3).



EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	FUTURE ON-SITE RESIDENT	CURRENT SITE WORKERS	TERRESTRIAL	AQUATIC
INHALATION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	NA	NA	NA
INHALATION	●	NA	NA	NA
DERMAL CONTACT	●	NA	NA	NA
INGESTION	●	●	●	●
DERMAL CONTACT	●	●	●	●
INHALATION	●	●	●	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 726511-02004

FIGURE 3-3
EXPOSURE PATHWAY SUMMARY

SCALE NA
DATE JULY 1995

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SEAD-26

The Fire Training Pit and the surrounding area was in use from 1977 to 1994. A bentonite layer was installed in the pit in 1982 or 1983. The pit was used one to two times a year for fire fighting training, which involves igniting and extinguishing petroleum fuels. The suspected source areas at the site are the Fire Training Pit, the areas surrounding the pit where burned vehicles are located, and the drum and tank storage area in the southern end of the site. These areas have the potential to contain various petroleum (volatile and semivolatile) organic compounds and possibly heavy metals.

The potential primary release mechanisms from the Fire Training Pit and surrounding areas are surface water runoff, infiltration of precipitation, and, to a lesser extent, dust and/or volatile emissions into the air. At the pit, surface water flow is a concern if the water level in the pit rises above the level of the low berm that defines it. If an overflow were to occur, the surface water from the pit would flow radially away and possibly impact surrounding lowland areas (Figure 3-4).

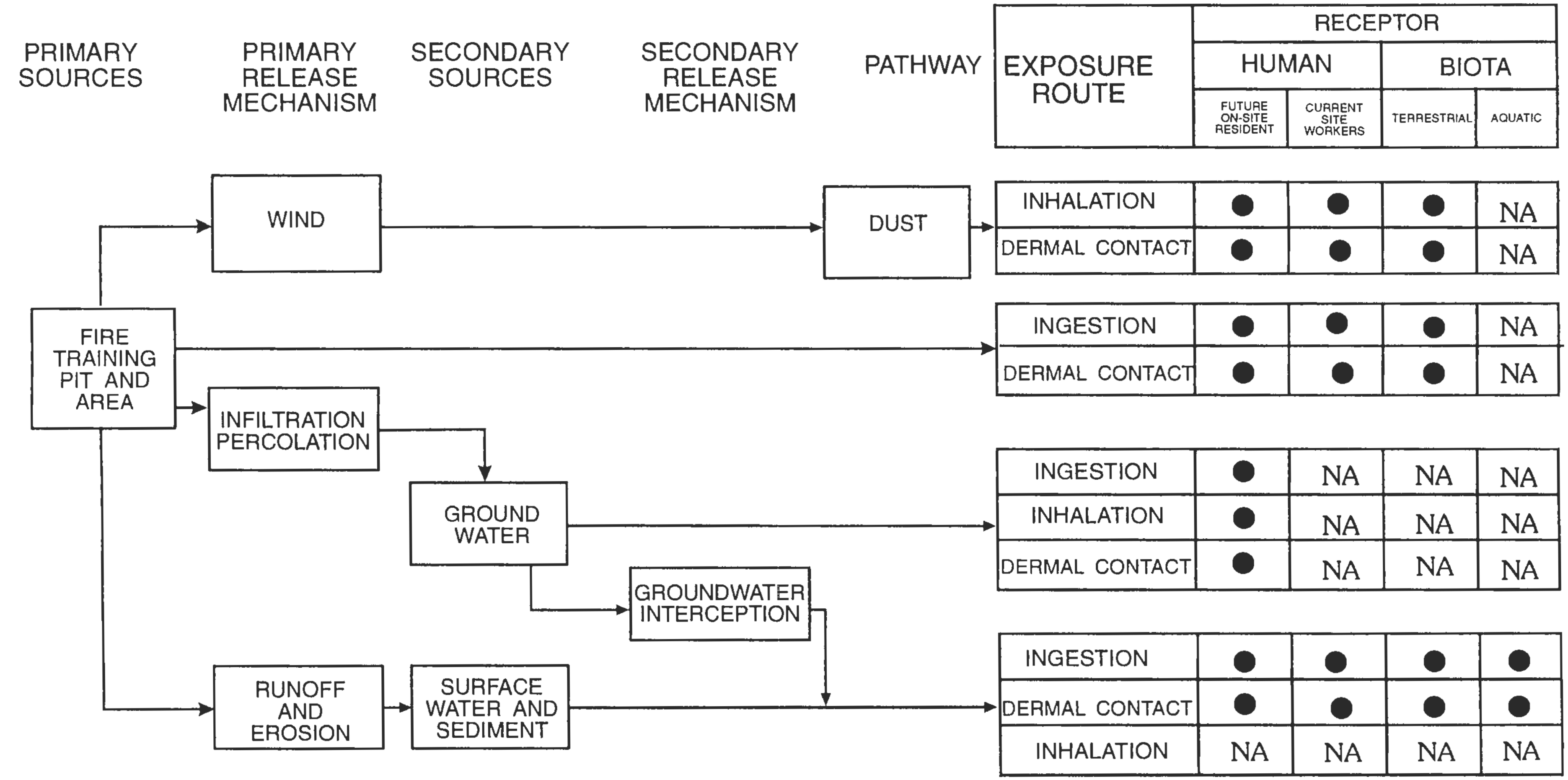
3.2.2 Potential Exposure Pathways and Receptors for SEAD-25 - Current Uses

The potential exposure pathways from sources to receptors are shown schematically in Figure 3-3. The potential for human exposure is directly affected by the accessibility to the site. Human and vehicular access to the site is restricted by a chain-link fence and locking gate, which is part of SEDA's general security provisions. However, Administration Avenue, which passes by the site, is highly trafficked by SEDA employees and service vehicles.

There are two primary receptor populations for potential releases of contaminants from the Fire Training and Demonstration Pad:

1. SEDA personnel who might work on or near the Fire Training and Demonstration Pad and visitors who may go there; and
2. Terrestrial biota near the site.

Aquatic biota are not considered potential receptors because there are no ponds or streams on-site. The exposure pathways and media of exposure are described below as they may affect the various receptors.



EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	FUTURE ON-SITE RESIDENT	CURRENT SITE WORKERS	TERRESTRIAL	AQUATIC
INHALATION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	NA	NA	NA
INHALATION	●	NA	NA	NA
DERMAL CONTACT	●	NA	NA	NA
INGESTION	●	●	●	●
DERMAL CONTACT	●	●	●	●
INHALATION	NA	NA	NA	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 726511-02004

FIGURE 3-4
EXPOSURE PATHWAY SUMMARY

SCALE NA
DATE JULY 1995

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The numerical assumptions that will be used in the risk assessment for the current and future exposure scenarios are listed in Table 4-1 of the Generic Installation RI/FS Workplan.

3.2.2.1 Ingestion, Inhalation, and Dermal Exposure Due to Surface Water Runoff and Sediment

Surface water runoff from precipitation events is controlled by the local topography and the most significant relief on-site is due to the small crushed shale pad. No sustained surface water bodies are present on-site. Well-defined drainage ditches are present approximately 100 feet to the east and west of the pad along paved roads, and approximately 325 feet to the northwest of the pad.

The likelihood of exposure by ingestion, inhalation of volatiles, and dermal exposure via this pathway is low based on the lack of any sustained surface water bodies on-site. SEDA workers or visitors could be exposed to impacted surface water near the site when there is water in the drainage channels. Terrestrial biota that drink and come in contact with impacted surface waters may be exposed. Aquatic biota in the drainage channels may also be affected through ingestion and dermal exposure.

3.2.2.2 Incidental Soil Ingestion and Dermal Contact

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

3.2.2.3 Ingestion of Groundwater

The groundwater at SEAD-25 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to SEDA personnel, visitors, or terrestrial biota.

3.2.2.4 Dust Inhalation and Dermal Contact

Contaminated fugitive dust may be released from SEAD-25 due to high winds, vehicle traffic through the area, or disturbance of the soils during site use. This is not believed to be a dominant release mechanism and pathway, since most of the site is grass-covered and site use is limited. The primary human receptors of fugitive dust releases are SEDA personnel who may be working at SEAD-25 or in surrounding areas. Fugitive dust would not be expected to be transported in significant quantities beyond the SEDA facility boundaries.

3.2.3 Potential Exposure Pathways and Receptors for SEAD-25 - Future Use

There is limited site access under current site conditions. While strict land use control cannot be ensured in future uses, limitations may be imposed through zoning restrictions or deed restrictions. Potential future uses of the site include light industrial and unrestricted residential or other private development.

For future uses of SEAD-25, the receptor population that would differ from the above mentioned receptors would be on-site residents. For the ingestion of soil, surface water, and sediment, the receptors would be primarily children. The following are potential routes of exposure for all future on-site residents: dermal contact with soil, ingestion of drinking water, inhalation of volatiles while showering if on-site groundwater is used as a source of drinking water, inhalation and dermal contact of fugitive dust, and dermal contact with and inhalation of volatiles from surface water and sediment.

3.2.4 Potential Exposure Pathways and Receptors for SEAD-26 - Current Uses

The potential exposure pathways from sources to receptors are shown schematically in Figure 3-4. The potential for human exposure is directly affected by the accessibility to the site. Human and vehicular access to the site is restricted by a chain-link fence and locking gate that serves as general security provisions for SEDA.

There are two primary receptor populations for potential releases of contaminants from the Fire Training Pit and Area:

1. SEDA personnel who might work on or near the Fire Training Pit and visitors who may go there; and
2. Terrestrial biota near the site.

Aquatic biota are not considered potential receptors because there are no ponds or streams on-site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

3.2.4.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

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

Although most of these surface water bodies are not very accessible, SEDA personnel or visitors could be exposed to impacted surface water during certain periods of the year. Terrestrial biota that drink and come in contact with impacted surface water may be exposed. Aquatic biota in the drainage channels may also be affected.

3.2.4.2 Incidental Soil Ingestion and Dermal Contact

Incidental ingestion of soil and dermal contact with soil are potential pathways for current site workers, visitors, and terrestrial biota.

3.2.4.3 Ingestion of Groundwater

The groundwater at SEAD-26 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to SEDA personnel, visitors, or terrestrial biota.

3.2.4.4 Dust Inhalation and Dermal Contact

Contaminated fugitive dust may be released from SEAD-26 due to high winds, vehicle traffic through the area, or disturbance of the soils during site use. This is not believed to be a dominant release mechanism and pathway, since most of the site is grass-covered and site use is restricted by a chain-link fence with a locking gate around its perimeter. The primary human receptors of fugitive dust releases are SEDA personnel who may be working at SEAD-26 or in surrounding areas. Fugitive dust would not be expected to be transported in significant quantities beyond the SEDA facility boundaries.

3.2.5 Potential Exposure Pathways and Receptors for SEAD-26 - Future Use

There is limited site access under current site conditions. While strict land use control cannot be ensured in future uses, limitations may be imposed through zoning restrictions or deed restrictions. Potential future uses of the site include light industrial and unrestricted residential or other private development.

For future uses of SEAD-26, the receptor population that would differ from the above mentioned receptors would be on-site residents. For the ingestion of soil, surface water, and sediment, the receptors would be primarily children. The following are potential routes of exposure for all future on-site residents: dermal contact with soil, ingestion of drinking water, inhalation of volatiles while showering if on-site groundwater is used as a source of drinking water, inhalation and dermal contact of fugitive dust, and dermal contact with and inhalation of volatiles from surface water and sediment.

3.3 SCOPING OF POTENTIAL REMEDIAL ACTION 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.

Based upon sampling data gathered during the ESI, the media of concern at both SEAD-25 and SEAD-26 for protection of human health and the environment and compliance with ARARs are:

a. subsurface and surficial soils containing volatiles and semivolatiles;
b. groundwater containing volatiles (SEAD-25 only); and,
c. surface water and sediment containing semivolatiles.

Human health concerns for both SEAD-25 and SEAD-26 would focus primarily on inhalation and dermal contact of surficial soils for current site usage. For future site usage, ingestion of and inhalation of volatiles outgassing from groundwater would be additional human health concerns as well as compliance with ARARs.

3.4 PRELIMINARY IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

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

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.

3.5 DATA QUALITY OBJECTIVES (DQOs)

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

The RI investigations at both SEAD-25 and SEAD-26 will conform with all the stated DQOs. Chemical analysis of groundwater, soil, sediment, and surface water samples will generally require the Level IV quality data.

3.6 DATA GAPS AND DATA NEEDS

A conceptual site model also developed for the ESI Work Plan identifying potential source area release mechanisms and receptor pathways at SEAD-25 and SEAD-26. The results of the investigations at these two SEADs 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.

3.6.1 SEAD-25

The data gaps and data needs for SEAD-25 are a result of the need to meet the DQOs identified in the Generic Work Plan. By media, these data needs are:

Groundwater Data

- Determine the directions of groundwater flow on the site. The direction of groundwater flow prior to the ESI was thought to be to the southwest; however, the ESI showed a flow pattern more southeast and south. Install additional overburden wells to determine the direction of groundwater flow. Install bedrock wells to determine the groundwater quality traveling throughout fractures in the bedrock.

- Perform a soil gas survey to determine where a plume of volatiles may be present in the groundwater. Perform microwell sampling and field screening of water samples to position monitoring wells in optimum locations to define the extent of the volatiles in groundwater. Collect groundwater samples to determine the type and extent of any contaminants present in the groundwater.

- In addition to assessing the groundwater quality, determine hydrologic properties of the aquifer to assess contaminant migration and potential remedial actions. Determine hydraulic conductivity and potential for vertical connection for the wells at SEAD-25.

- Determine the background groundwater quality at SEAD-25 to allow comparison with other SEAD-25 groundwater data.

- Establish a database to determine compliance with ARAR's, to perform baseline risk assessment, and to develop remedial action alternatives.

Surface Water/Sediment Data

- Determine the nature and extent of contamination in the drainage ditches in the immediate vicinity of SEAD-25. The ditches of concern are east, south, and west of the Fire Training Pad.

- Total Organic Carbon (TOC) and grain size analysis will be performed on sediment to assess the sorption potential of the sediment.
- Establish potential for impacts to off-site surface water and sediment.
- Establish a database to determine environmental compliance with ARARs or clean up goals, to perform baseline risk assessment, and to develop remedial action alternatives.
- Obtain a background surface water/sediment sample to allow comparison to SEAD-25 data.

Soil Data

- Determine the nature and extent of contamination in the SEAD-25 area. Establish the extent of impacts to soils at the site using a soil boring program. Collect samples for a risk assessment.
- Obtain background soil samples to allow comparison to SEAD-25 data. Also compare SEAD-25 data to sitewide soil background data that has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs and Remedial Investigations at the OB Grounds and Ash Landfill.
- Collect soil samples for analysis of grain size, moisture content, and TOC to establish potential remedial alternatives.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment, and to develop remedial action alternatives.

Ecological Data

- Delineate any wetlands in and around SEAD-25.
- Perform an Ecological Assessment to systematically document visual observations discriminating between obviously and potentially impacted and non-impacted areas. This will determine where and if there is a need for further ecological investigations.

- Analyze the flora/fauna and endangered species on and in the vicinity of the site.

3.6.2 SEAD-26

The data gaps and needs for SEAD-26 are a result of the need to meet the DQOs identified in the Generic Work Plan. By media, these data needs are:

Groundwater Data

- Groundwater at SEAD-26 has been shown to have not been significantly impacted by the site; however, the current array of wells does not provide for complete coverage of the areas of concern at the site. Additional monitoring wells are needed around the Fire Training Pit and the drum and tank storage area to ensure that groundwater has not been impacted by contaminants that may have migrated from these areas.

- In addition to assessing the groundwater quality, determine hydrologic properties of the aquifer to assess contaminant migration and potential remedial actions. Hydraulic conductivity will be determined for several wells at this site.

- Establish a database to determine compliance with ARARs, to perform baseline risk assessment, and to develop remedial action alternatives.

Surface Water/Sediment Data

- Determine the nature and extent of impacts to on-site and off-site surface water and sediment.

- Sample surface water and sediment from the swale areas that surround the elevated Fire Training Pit. In addition, a surface water and sediment sample will be collected in the Fire Training Pit.

- Determine the background surface water/sediment quality by obtaining a sample of surface water and sediment not impacted by the site.

- Establish a database for environmental compliance with ARARs or clean-up goals, to perform baseline risk assessment, and to develop remedial action alternatives.

Soil Data

- Determine the nature and extent of impacts to the soil at SEAD-26. Collect samples for a risk assessment.
- Systematically collect surface soil samples from the elevated pad to evaluate the extent of contaminants. Collect subsurface soil samples from beneath the Fire Training Pit and the drum and tank storage area.
- Collect soil samples for analysis of grain size, moisture content, and TOC to establish potential remedial alternatives.
- Establish a database for environmental compliance with ARARs or clean-up goals, to perform baseline risk assessment, and to develop remedial action alternatives.
- Compare SEAD-26 data to sitewide soil background data that has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs and Remedial Investigations at the OB Grounds and Ash Landfill.

Ecological Data

- Perform an Ecological Assessment to systematically document visual observations between obvious and potentially impacted and non-impacted areas. This will determine where and if there is a need for ecological investigations.
- Analyze floral/fauna and endangered species on and in the vicinity of the site.
- Establish a database for environmental compliance with ARARs or clean-up goals, to perform baseline risk assessment, and to develop remedial action alternatives.

4.0 TASK PLAN FOR THE RI

This section describes the tasks required for completion of the Remedial Investigation (RI) at both SEAD-25 and SEAD-26. These include the following:

1. Pre-field Activities
2. Field Investigations
3. Data Reduction, Interpretation, and Assessment
4. Data Reporting
5. Task Plan Summary

4.1 PRE-FIELD ACTIVITIES

Pre-field activities include the following:

1. A site inspection to familiarize key project personnel with site conditions and finalize direction and scope of field activities.
2. A comprehensive review of the Health and Safety Plan with field team members to insure that the hazards that might occur and preventative and protective measures for those are completely understood.
3. An inspection of all equipment necessary for field activities to insure proper functioning and usage.
4. A comprehensive review of sampling and work procedures with field team members.
5. Site clearance, if required.

4.2 FIELD INVESTIGATIONS AT SEAD-25

The following field investigations will be performed to complete the RI characterization of SEAD-25:

1. Soil gas survey,
2. Soil investigation,
3. Groundwater investigation (microwells, overburden and bedrock wells),
4. Surface water/sediment investigation,
5. Ecological assessment, and
6. Surveying.

To collect the most meaningful data from soil borings and monitoring wells, the field screening programs (i.e., soil gas survey and microwell sampling) will be conducted prior to the other investigations. During these initial investigations, the soil gas survey will be performed first and the results used to guide the microwell installation and sampling.

4.2.1 Soil Gas Survey

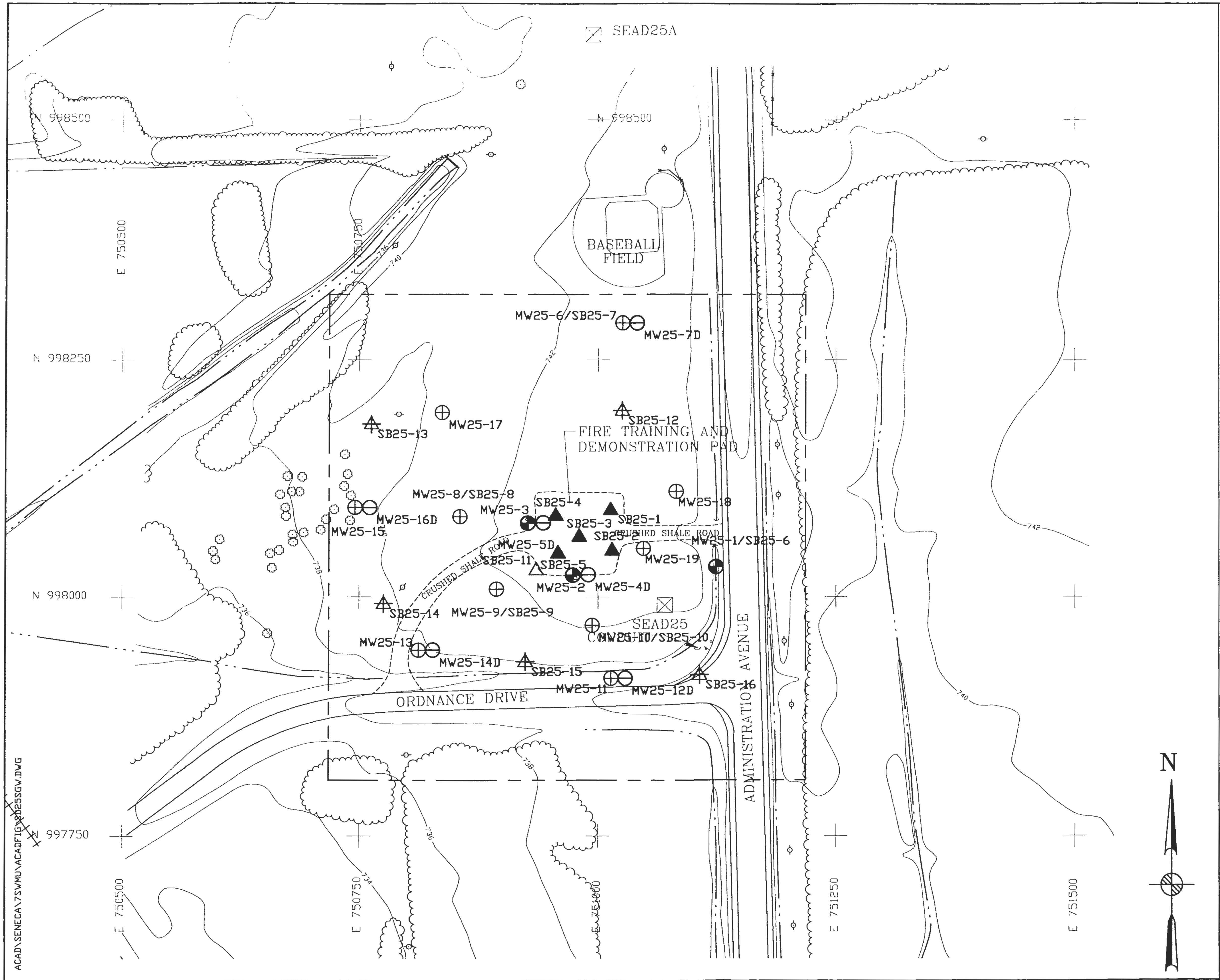
A soil gas survey will be performed at SEAD-25 to approximately locate the extent of VOCs in the groundwater. Soil gas samples will be collected on a 50 foot grid within an approximately 500 by 500 foot area on the SEAD-25 pad and adjacent areas (Figure 4-1). Sample probes will be driven into the vadose zone and soil vapor will be extracted from the probe and collected directly into a syringe. The soil gas samples will then be analyzed for BTEX compounds in the field using a Photovac 10S50 portable gas chromatograph. A map will be developed showing the concentrations of BTEX in soil gas. If groundwater is encountered during soil gas extractions, the liquid will be collected in 40 ml glass vials and the gas from the headspace of the vial will be injected into the Photovac.

Soil gas survey procedures are included in Appendix A, Field Sampling and Analysis Plan.

4.2.2 Soil Investigation

4.2.2.1 Soil Boring Program

A total of 10 soil borings will be performed at SEAD-25. Five soil borings will be performed at specific locations and five additional soil borings will be located based on the soil gas results (Figure 4-1). The purpose of the soil borings will be to obtain soil samples that will allow delineation of the horizontal and vertical extent of contaminated soil. The specific locations for five of the soil borings are as follows. One soil boring will be drilled in the background location north of the pad near the ballfield; this will be completed as an overburden well. Three soil borings will be drilled at locations west, southwest and south of the pad; they will be completed as overburden wells. One soil boring will also be drilled on the southwest corner of the pad; this boring will not be completed as a monitoring well.



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENT
RAILROAD
GROUND SURFACE ELEVATION CONTOUR (760)

ROAD SIGN
DECIDUOUS TREE
△ GUIDE POST
FIRE HYDRANT
⊗ MANHOLE
\+ COORDINATE GRID (250' GRID)
POLE
▭ UTILITY BOX
⊡ MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
⊠ SURVEY MONUMENT

LEGEND

⊖ PROPOSED BEDROCK MONITORING WELL

⊕ PROPOSED OVERBURDEN MONITORING WELL

◕ EXISTING OVERBURDEN MONITORING WELL

▲ EXISTING SOIL BORING

△ PROPOSED SOIL BORING

PROPOSED SOIL BORING BASED UPON RESULTS OF SOIL GAS SURVEY

PROPOSED SOIL GAS SURVEY AREA: SAMPLES ON A 50' X 50' GRID

50 0 50 100
(feet)

PARSONS

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CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	726511-02003

FIGURE 4-1
LOCATION OF EXISTING AND PROPOSED MONITORING WELLS, SOIL BORINGS AND SOIL GAS SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	JULY 1995	C

Soil samples will be collected until split-spoon refusal is encountered. The soil boring will continue until auger refusal is reached. Auger refusal for this project is defined in Appendix A, Field Sampling and Analysis Plan.

Each boring will be continuously sampled to the top of the water table. A total of three samples from each boring will be collected for chemical analysis. At each location, one surface soil sample will be collected from the top 2 inches of soil. Two additional subsurface soil samples will be collected from the borings according to the procedures outlined in Appendix A, Field Sampling and Analysis Plan. In addition, at two of the boring locations, three subsurface soil samples (one near the surface, one immediately below the water table, and one intermediate sample) will be collected and submitted for analysis of TOC and grain size distribution. The samples obtained below the water table will be analyzed to characterize the soil in the aquifer.

Soil boring procedures and the sampling criteria for soil borings are outlined in Appendix A, Field Sampling and Analysis Plan.

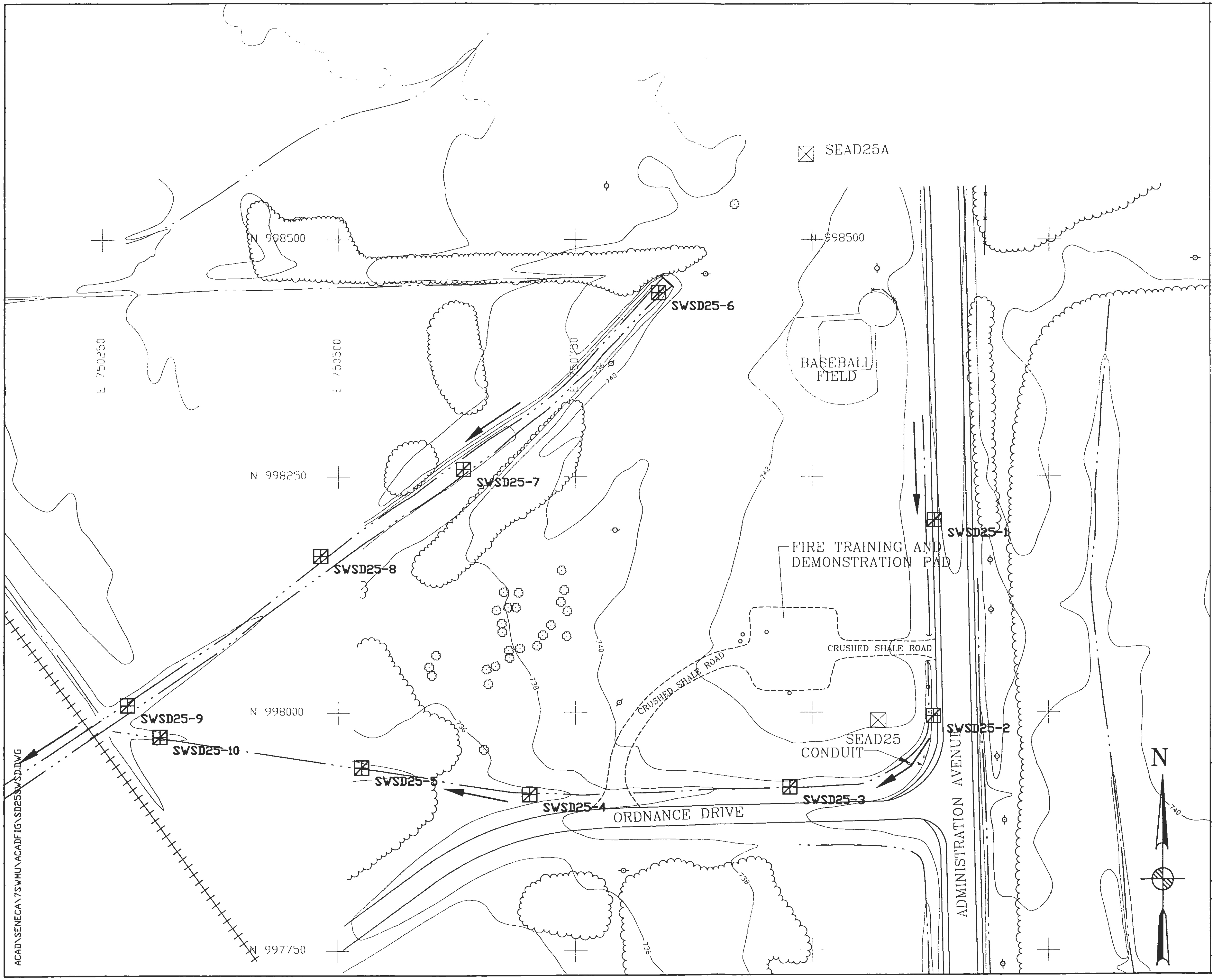
4.2.2.2 **Soil Sampling Summary**

One surface soil sample (0 to 2 inches below the organic matter) will be collected from each of the ten boring locations resulting in ten surface soil samples. Two subsurface soil samples will be collected from each of the ten borings resulting in 20 subsurface soil samples. In total, 30 soil samples will be collected for chemical testing. In addition, six subsurface soil samples will be collected from two of the soil borings and submitted for analysis of TOC and grain size distribution.

Soil samples will be analyzed for the parameters listed in Section 4.2.6.

4.2.3 Surface Water and Sediment Sampling

Ten surface water and sediment samples will be collected in the drainage ditches adjacent to the site (Figure 4-2). Two surface water/sediment samples will be collected in the eastern drainage ditch, three in the southern drainage ditch, and three in the western drainage ditch. Two samples, will be collected in drainage ditches that comprise the upper reaches of Kendaia Creek just south and west of SEAD-25.



LEGEND

─ · ─	MINOR WATERWAY
─ · · ─	MAJOR WATERWAY
─x─x─x─	FENCE
------	UNPAVED ROAD
︶︶︶	BRUSH LINE
• • • • •	LANDFILL EXTENT
++++++++	RAILROAD
─── 760 ───	GROUND SURFACE ELEVATION CONTOUR

ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
☒ SURVEY MONUMENT
PROPOSED SURFACE WATER /SEDIMENT SAMPLE
SURFACE WATER FLOW DIRECTION

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-25 FIRE TRAINING AND DEMONSTRATION PAD

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 726511-02003

FIGURE 4-2
LOCATION OF PROPOSED SURFACE WATER AND SEDIMENT SAMPLES

SCALE 1" = 100'
DATE JULY 1995
REV C

These locations were chosen to determine the surface water and sediment quality at background locations (SWSD25-1 and -6) and at locations adjacent to and downstream of the site. Surface water and sediment sampling will occur during or immediately after a rainstorm when there is water in the drainage channels and streams. This information will be used to delineate the extent of contamination on site and identify areas where contaminants have migrated off-site.

Surface water runoff patterns will be observed during a rainstorm and recorded in a notebook or on a plan of the site.

Surface water and sediment procedures are provided in Appendix A, Field Sampling and Analysis Plan.

Surface water and sediment samples will be analyzed for the parameters listed in Section 4.2.6.

4.2.4 Groundwater Investigation

4.2.4.1 Microwell Installation and Sampling

A groundwater screening program will be conducted using ten microwells. Since plumes of VOCs detected in the vadose zone by the soil gas survey are at approximately the same location as VOCs in the groundwater, these microwells will be used to more accurately locate the extent of VOCs in the groundwater by placing them in and around the plume detected in the soil gas survey. The proposed locations of these microwells are not shown on Figure 4-1 because the soil gas survey has not been performed at this time.

The microwell will be composed of an AW drilling rod and penetrometer point. The rod and point will be driven beyond the depth of the water table, and then the rod will be raised a few inches allowing the penetrometer point to fall out. The groundwater will be permitted to equilibrate within the drill pipe. A sample of the water will be collected using a Teflon tube and transferred to a 40 ml vial. A syringe will be used to collect the vapor in the headspace of the vial for injection into a Photovac portable gas chromatograph, which will be calibrated using the appropriate volatile organic standards.

The procedures for the installation and sampling of the microwells and analysis of the samples using a Photovac portable gas chromatograph are provided in Appendix A, Field Sampling and Analysis Plan.

4.2.4.2 Monitoring Well Installation and Sampling

The purpose of the monitoring well installation program is to define the horizontal and vertical extent of impacted groundwater and determine the background groundwater quality.

A total of 16 new monitoring wells will be installed at SEAD-25 (Figure 4-1). Ten of the new wells will be installed in the overburden and six will be installed in the shallow bedrock (0 to 20 feet of bedrock). The final locations of these wells will depend on the results of the soil gas survey and the screening of water samples collected from the microwells. The wells will be placed in and around any detected plumes in the groundwater.

While drilling the boreholes in which the ten overburden wells will be installed, split spoon samples of the soil will be collected continuously to competent rock. A monitoring well will then be installed in the boring and screened over the entire depth of the overburden aquifer to a maximum screen length of 10 feet.

Double-cased bedrock wells will also be installed adjacent to six of the overburden well locations creating six pairs of wells. During the well installation, the boring will be drilled to auger refusal. Then the hole will be advanced using coring or air hammer methods until 2 to 3 feet of competent shale has been penetrated. An appropriate length of six-inch casing will installed 2 to 3 feet into the competent shale and grouted in place. Then a 20-foot long section of competent bedrock will be cored, logged and archived. A bedrock well with a screen 20 feet long will be installed in the boring.

Installation and development procedures for overburden and shallow bedrock wells are provided in Appendix A, Field Sampling and Analysis Plan.

Groundwater from the 19 existing and new monitoring wells will be sampled twice and analyzed for the parameters listed in Section 4.2.6. 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.

If monitoring wells MW25-2 and MW25-3 are destroyed during the removal of soils at SEAD-25 as described in the Decision Document for Removal Action at SEAD-25, then they will be replaced.

4.2.4.3 Aquifer Testing

Slug tests will be performed at the 19 monitoring wells on site to determine hydraulic conductivities. Vertical connection testing will be performed at the six well pairs.

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 procedures for slug testing (hydraulic conductivity determination), vertical connection testing, and water level measurement procedures are provided in Appendix A, Field Sampling and Analysis Plan.

4.2.5 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 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.

4.2.5.1 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. If they were present prior to contaminant introduction, the appropriate information will be provided 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; habitats supporting endangered, threatened or rare species or species of concern; regulated wetlands; wild and scenic rivers; significant coastal zones; streams; lakes; and other major resources.

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.

4.2.5.2 Contaminant-Specific Impact Analysis

Information from the site description developed in Section 4.2.5.1 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.

4.2.6 Analytical Program

A total of 30 soil samples, 38 groundwater samples, and 10 surface water and sediment samples will be collected for chemical testing.

All samples will be analyzed for the following: TCL volatile organic compounds, TCL semivolatile organic compounds, TCL pesticides/PCBs, TAL metals and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Statement of Work (SOW), and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1.

A second round of groundwater samples will be obtained from the 19 monitoring wells approximately three months after the first round. The second set of samples will be analyzed using the same methods as during the first round except the wells in which no volatile organic compounds were detected in the groundwater will be analyzed using EPA Method 524.2.

Six subsurface samples from two borings will be analyzed for total organic carbon (TOC) and grain size distribution (including the distribution within the silt and clay fractions).

The ten surface water samples will be analyzed for hardness, pH, and TOC.

The ten sediment samples will also be analyzed for TOC and grain size distribution including the distribution within the silt and clay fractions.

A summary of the analyses to be performed at SEAD-25 is provided in Table 4-1.

4.2.7 Surveying

Surveying will be performed at SEAD-25 to provide an accurate site base map which will be used for the following purposes:

1. Mapping the direction and computing the velocity of groundwater movements;
2. Locating the environmental sampling points;
3. Estimating the volume of impacted soils and sediments which may require a remedial action;
4. Mapping the extent of any impacted groundwater above established ARAR limits; and
5. Providing accurate and current information regarding the topography and site conditions.

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 soil gas survey points, soil borings, microwells, monitoring wells (new and existing), and all surface water/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 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.

Table 4-1

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-25

MEDIA		VOCs		SVOCs	Pesticides/PCBs	Metals	TRPH	Grain Size*	pH	Hardness	TOC
		TCL NYSDEC CLP	EPA 524.2	TCL NYSDEC CLP	TCL NYSDEC CLP	TAL NYSDEC CLP	Method 418.1	ASTM or Similar Method	Method 150.1	Method 130.2	Method 415.1
Soil	**Surface**	10	0	10	10	10	10	0	0	0	0
	Subsurface	20	0	20	20	20	20	6	0	0	6
Groundwater		19	19	38	38	38	38	0	0	0	0
Surface water		10	0	10	10	10	10	0	10	10	10
Sediment		10	0	10	10	10	10	10	0	0	10

Notes:
1) * Grain size analysis includes determination of the grain size distribution within the silt and clay size fraction.
2) QA/QC sampling requirements are described in Appendix C, Section 5.3 of the Generic Installation RI/FS Workplan.

4.2.8 VOC Emissions

Outdoor ambient air concentrations of volatile organic compounds measured in the soil at SEAD-25 will be estimated using an emission model and an atmospheric diffusion model. First, the emissions or flux of each VOC upward through the soil surface will be modeled using an emission model. Then the mixing and dilution of these emissions into the breathing zone in the air above the contaminated soil area will be modeled using an atmospheric diffusion model. The concentrations which are determined will be used to evaluate this exposure pathway during the risk assessment.

A published screening model developed by Jury et al. (1983, 1990) will be used to calculate the volatilization of VOCs from the soil surface. A user-friendly version of the Jury model, was developed under contract to the USEPA, based on model codes provided by William Jury. This model, called EMSOFT (Exposure Model for Soil-Organic Fate and Transport) performs the same computations as the Jury model.

The Jury model predicts the time-averaged flux or emissions of chemicals in contaminated soils. The model considers physical and chemical properties of compounds as well site-specific soil characteristics in computing emissions. The Jury model is somewhat more sophisticated and realistic than its alternatives in that it can consider the biodegradation rate of chemicals, leaching and evaporation influences on contaminant movement, and mass conservation.

A simple box model will be used to calculate the potential air concentrations of the compounds of concern in the air above the area where these compounds were measured in the soil. This model treats the contaminated soil as a uniform emission source over the time period of interest. The box, or mixing volume, is defined by the soil surface area and an assumed mixing height. The chemical flux from the surface is assumed to mix uniformly throughout the box, with dilution from surface winds.

4.3 FIELD INVESTIGATIONS AT SEAD-26

The following field investigations will be performed to complete the RI characterization of SEAD-26:

1. Soil Investigation,
2. Groundwater Investigation,
3. Surface Water and Sediment Investigation,
4. Ecological Investigation, and
5. Surveying.

4.3.1 Soil Investigation

The soil investigation will consist of both surface soil sampling and soil borings.

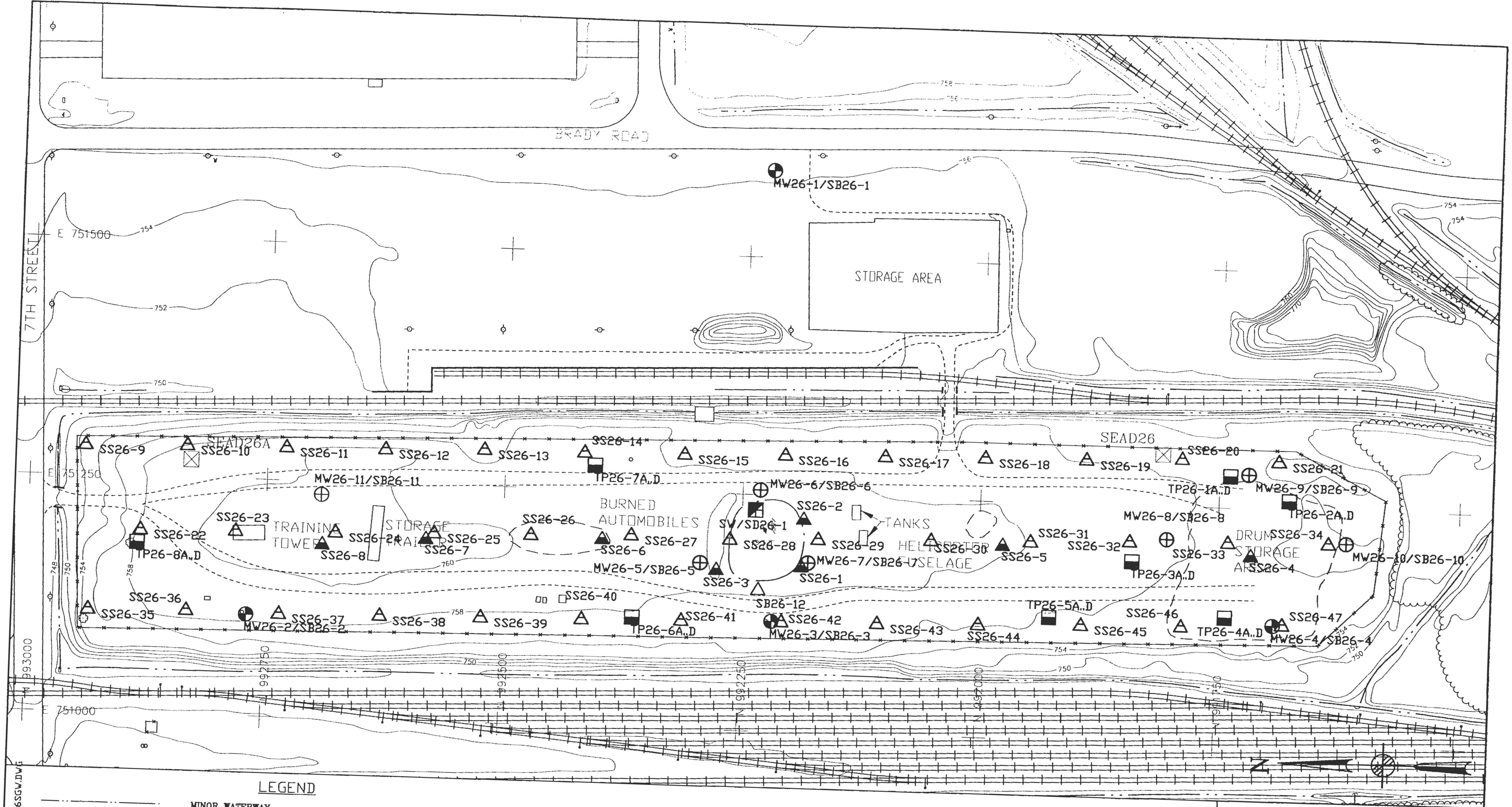
4.3.1.1 Soil Boring Program

The soil boring program is designed to address impacts to soil in two areas where a release has occurred and where there is a potential for a release; these areas are the Fire Training Pit and the drum and tank storage area in the southern end of the site, respectively.

Eight borings will be performed in the two areas (Figure 4-3). At the Fire Training Pit, a total of four borings will be performed, three of which will be located on the northern, eastern and southern sides of the pit (these borings will be completed as monitoring wells). One boring (SB26-12) will be performed on the western side of the pit. This boring will be drilled at an angle beneath the pit to determine if subsurface soils under the pit have been impacted. Each boring will be continuously sampled to the top of the water table. Three soil samples will be collected from each boring for chemical analysis: a surface soil sample from the top two inches of soil below the organic matter, a soil sample at the water table, and an intermediate soil sample.

At two of the boring locations (SB26-8 and -11), three subsurface soil samples (one near the ground surface, one immediately below the water table, and one between these two samples) will be collected and submitted for analysis of TOC and grain size distribution. The samples obtained below the water table will be analyzed to characterize the soil in the aquifer.

Soil boring procedures and the selection criteria for the subsurface soils samples for chemical testing are described in Appendix A, Field Sampling and Analysis Plan.



ACAD\SENECA\RIFS\SD25-26\SD26SGW.DWG

LEGEND

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

☒ SURVEY MONUMENT
ROAD SIGN
DECIDUOUS TREE
FIRE HYDRANT
⊗ MANHOLE
△ GUIDE POST
○ POLE
▭ UTILITY BOX
+ COORDINATE GRID (250' GRID)
OVERHEAD UTILITY POLE
☐ MAILBOX/RR SIGNAL

⊕ PROPOSED MONITORING WELL/SOIL BORING
△ PROPOSED SURFACE SOIL SAMPLE
△ PROPOSED SOIL BORING
▄ EXISTING TEST PIT
◐ EXISTING MONITORING WELL/SOIL BORING
▲ EXISTING SURFACE SOIL SAMPLE

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 4-3
LOCATION OF EXISTING AND PROPOSED
SOIL AND GROUNDWATER SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	JULY 1995	A

4.3.1.2 Surface Soil Sampling Program

The surface soil sampling program is designed to address the widespread, somewhat random, impacts to surface soils indicated by the ESI Report.

Because of the wide distribution of impacts to surface soils at the site, the proposed sampling program is designed to evaluate the entire rectangular Fire Training Pit and Area. Therefore, sample locations were selected using a random-start equilateral triangular grid method ("Statistical Methods For Evaluating the Attainment of Cleanup Standards, Volume 3: Referenced-Based Standards for Soils and Soil Media," EPA, Policy, Planning and Evaluation, EPA 230-R-94-004). This method provides uniform coverage of the area to be sampled, whereas random sampling can leave subareas that are not sampled.

Using the method, a rectangular area encompassing the site was established and a random point within this area was located using equations that use data on the size of the area to be sampled and random numbers. The random numbers in this instance, were generated on a hand calculator. This location was the random starting point for the grid.

Using the equations specified in the method, a distance of 103 feet between sampling points was determined; 30 was the specified number of sampling points for the grid. The distance between grid lines was determined to be 89 feet. After laying out the individual sampling points in the area to be sampled, the resulting grid contains 39 points (Figure 4-3).

Surface soil samples (0 to 2 inches below the organic mater) will be collected from all 39 sample locations. Procedures for the collection of surface soil samples are provided in Appendix A, Field Sampling and Analysis Plan.

4.3.1.3 Soil Sampling Summary

A total of 63 soil samples will be collected at SEAD-26. Twenty-four soil samples will be collected from the soil borings. In addition, 39 surface soil samples (0 to 2 inches below the organic matter) will be collected during the surface soil sampling program.

Six subsurface soil samples from two borings will also be collected for analysis of TOC and grain size distribution.

Soil samples will be analyzed for the parameters listed in Section 4.3.5.

4.3.2 Groundwater Investigation

4.3.2.1 Monitoring Well Installation and Sampling

A total of seven overburden monitoring wells will be installed on site. The wells will be located in three areas of interest: the Fire Training Pit, the drum storage area, and the area near the training tower and storage trailer.

Groundwater flow beneath the Fire Training Pit and Area may be influenced by the elevated nature of the site such that flow is not strictly west-southwest as indicated by the four wells installed for the ESI. At the Fire Training Pit, three wells will be installed; one each on the northwestern, eastern, and southeastern sides of the pit. At the drum and tank storage area, three monitoring wells will be installed; one each on the northern, eastern and southern sides of the area. One well will be installed near the training tower and storage trailer (Figure 4-3). Each well will be screened over the entire depth of the overburden aquifer to a maximum screen length of 10 feet.

Groundwater samples from the 11 monitoring wells on site will be sampled twice and analyzed for the parameters listed in Section 4.3.5. 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.

4.3.2.2 Aquifer Testing

Slug tests will be performed at the 11 monitoring wells on-site to determine hydraulic conductivities.

Three rounds of water level measurements will be performed. One measurement will take place before well development and 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 procedures for slug testing to determine hydraulic conductivity and water level measurements are provided in Appendix A, Field Sampling and Analysis Plan.

4.3.3 Surface Water/Sediment Investigation

A total of ten surface water and sediment samples will be collected on or near the site.

Surface water and sediment samples will be collected from the same locations. Eight samples (SWSD26-2 to -9) will be collected from drainage ditches around the base of the elevated Fire Training Pit and Area (Figure 4-4). One sample (SWSD26-10) will be collected from the center of the Fire Training Pit. One background sample (SWSD26-11) will be obtained from a drainage channel located 300 ft. east of SEAD-26. This background location was selected because it was near the site, but not affected by it. The drainage channels that surround the site originate at the base of the slope; therefore, there is no section of the drainage channel that is upstream of SEAD-26.

Surface water and sediment sampling will occur during or immediately after a rainstorm when there is water in the drainage channels. This information will be used to delineate the extent of contamination on-site and identify whether contaminants have migrated off-site.

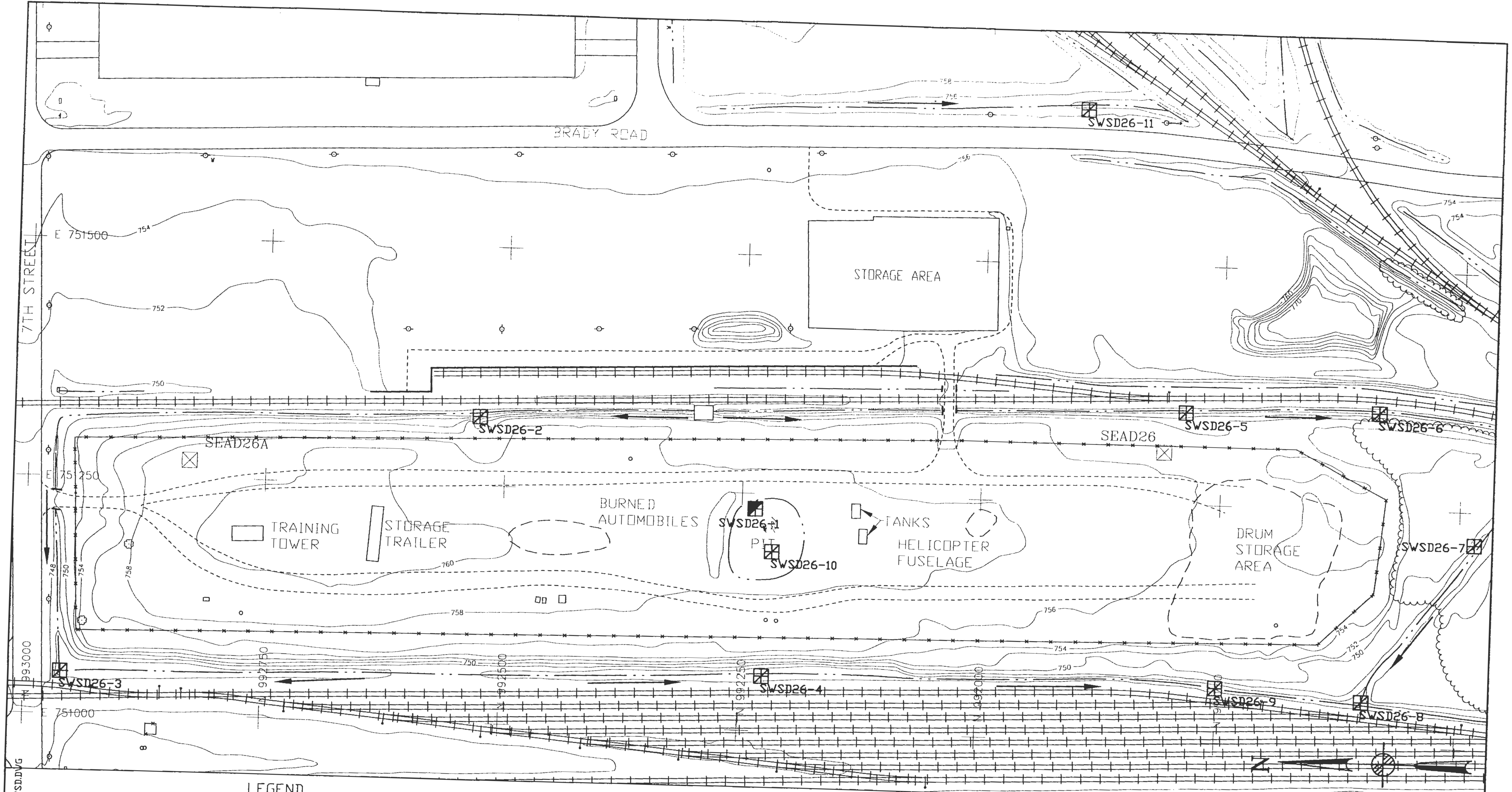
Surface water runoff patterns on site and in the surrounding drainage channels will be observed during a rainstorm and recorded in a notebook or on a plan of the site.

Surface water and sediment procedure are provided in Appendix A, Field Sampling and Analysis Plan.

Surface water and sediment samples will be analyzed for the parameters listed in Section 4.3.5.

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 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.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720477-02000

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

SCALE 1" = 100'
DATE JULY 1995
REV A

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. If they were present prior to contaminant introduction, the appropriate information will be provided 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; habitats supporting endangered, threatened or rare species or species of concern; regulated wetlands; wild and scenic rivers; significant coastal zones; streams; lakes; and other major resources.

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.

4.3.4.2 **Contaminant-Specific Impact Analysis**

Information from the site description developed in Section 4.2.5.1 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.

4.3.5 Analytical Program

A total of 63 soil samples (47 surface soil and 16 subsurface soil), 10 surface water and sediment samples, and 11 groundwater samples will be collected at SEAD-26 for chemical testing. These samples will be analyzed for the following: volatile organic compounds using EPA Method 524.2, TCL semivolatile organics compounds, TCL pesticides/PCBs, and TAL metals and cyanide according to NYSDEC CLP SOW, and TRPH by EPA Method 418.1. Additional analyses are presented below.

A second round of groundwater samples will be obtained from the 19 monitoring wells approximately three months after the first round. The second set of samples will be analyzed using the same methods as during the first round.

Six subsurface samples from the soil borings (SB26-8 and-11) will be analyzed for grain size distribution (including distribution within the silt and clay size fractions) and for total organic carbon (TOC).

The ten surface water samples will also be analyzed for hardness, pH, and TOC.

The ten sediment samples will also be analyzed for TOC and grain size distribution (including the distribution within the silt and clay).

A summary of the analyses to be performed at SEAD-26 is provided in Table 4-2.

4.3.6 Surveying

Surveying will be performed at SEAD-26 to provide accurate site base maps which will be used for the following purposes:

1. Map the direction and compute the velocity of groundwater movements.
2. Locate all the environmental sampling points.
3. Serve as the basis for volume estimates of impacted soils and sediments which may require a remedial action.
4. Map the extent of any impacted groundwater above established ARAR limits.
5. Provide accurate and current information regarding the topography and site conditions.

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 surface soil sample locations, soil borings, monitoring wells (new and existing) and all surface water/sediment

Table 4-2

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-26

MEDIA	VOCs		SVOCs	Pesticides/PCBs	Metals	TRPH	Grain Size*	pH	Hardness	TOC
	TCL NYSDEC CLP	Method 524.2	TCL NYSDEC CLP	TCL NYSDEC CLP	TAL NYSDEC CLP	Method 418.1	ASTM or Similar Method	Method 150.1	Method 130.2	Method 415.1
Soil Surface	47	0	47	47	47	47	0	0	0	0
Subsurface	16	0	16	16	16	16	6	0	0	6
Groundwater	0	22	22	22	22	22	0	0	0	0
Surface water	10	0	10	10	10	10	0	10	10	10
Sediment	10	0	10	10	10	10	10	0	0	10

Notes:

1) * Grain size analysis includes determination of the grain size distribution within the silt and clay size fraction.

2) QA/QC sampling requirements are described in Appendix C, Section 5.3 of the Generic Installation RI/FS Workplan.

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 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.

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.

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

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.

Detailed Task Plan Summaries that indicate the number and type of samples to be collected at SEAD-25 and SEAD-26 are provided in Tables 4-1 and 4-2, respectively.

5.0 TASK PLAN FOR THE 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 RESPONSE ALTERNATIVES

A discussion of the development of remedial response 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.

5.3 SCREENING OF REMEDIAL ACTION ALTERNATIVES

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.

5.4 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.

5.5 TASK PLAN SUMMARY FOR THE FS

The task plan summary for the FS is provided 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-25 and SEAD-26. 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 shipping 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 used during the RI.

6.1 SCHEDULING

The proposed schedule for performing the RI/FSs at SEAD-25 and SEAD-26 is presented in Figure 6-1. This schedule assumes that each phase of the field work will be performed at both sites before performing the next phase.

6.2 STAFFING

A discussion of the staffing for the RI/FS to be conducted at SEAD-25 and SEAD-26 is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

Table 6-1
SEAD-25 and SEAD-26 RI/FS Schedule
Seneca Army Depot Activity

Page 1 of 2

7/13/1995

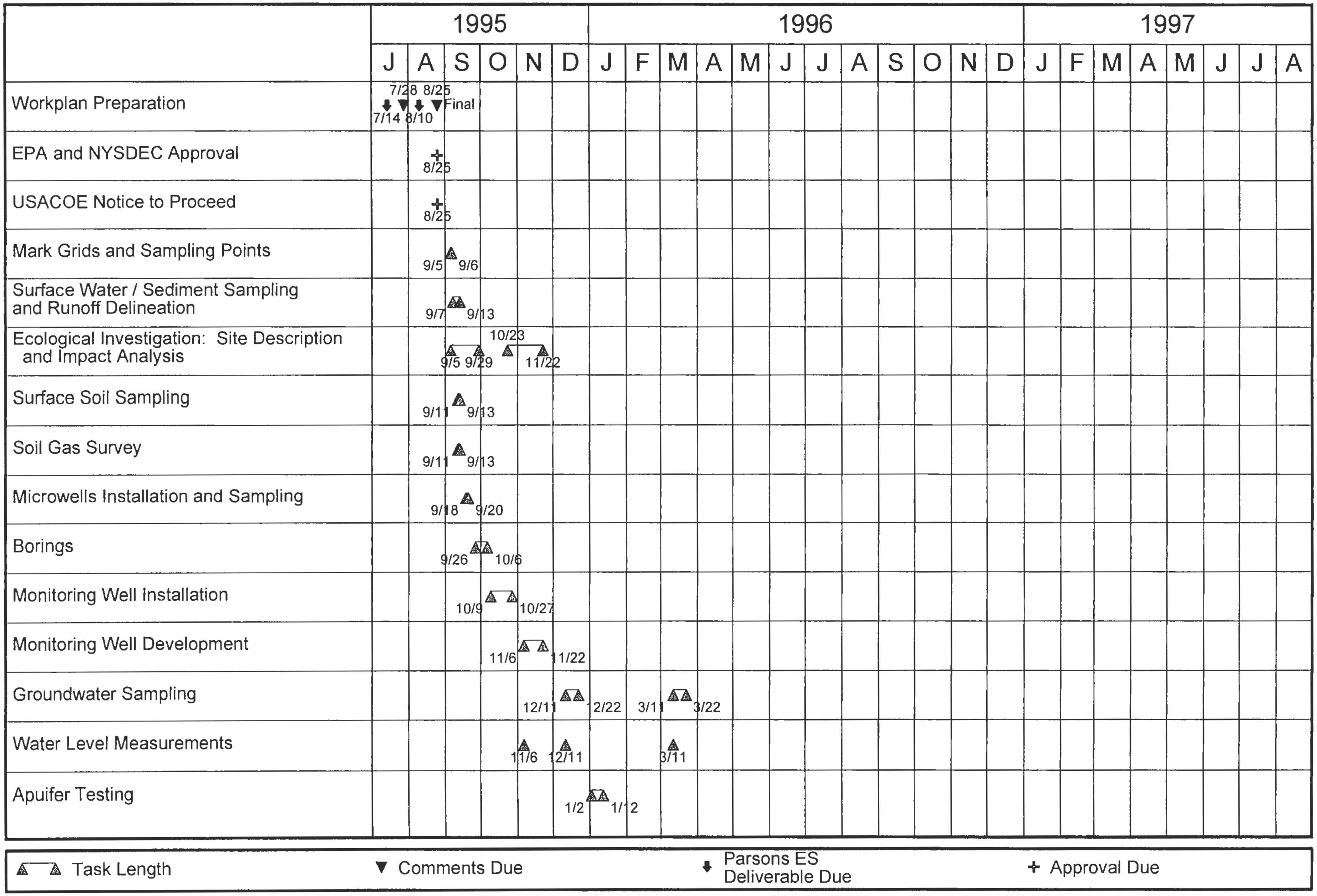
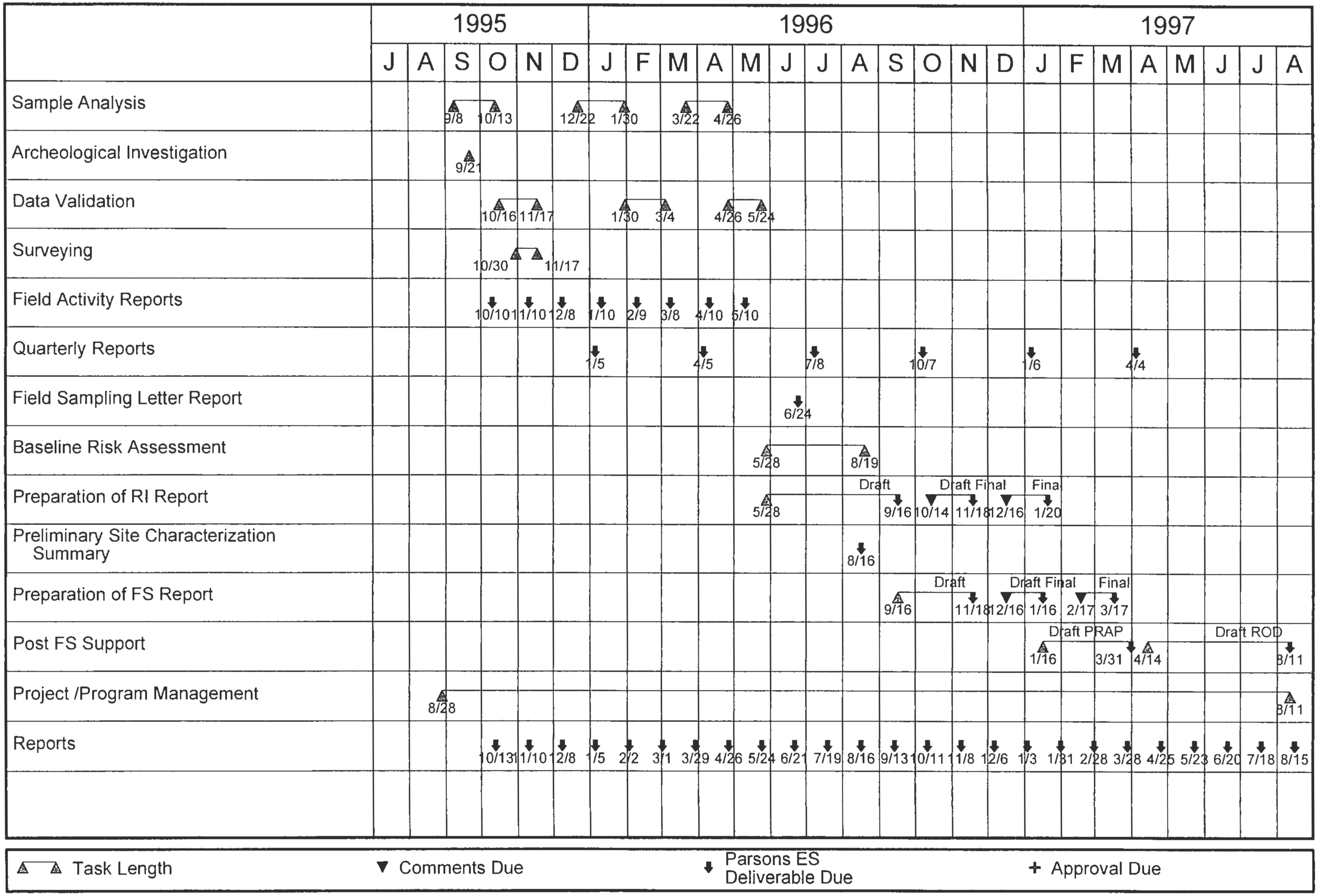


Table 6-1
SEAD-25 and SEAD-26 RI/FS Schedule
Seneca Army Depot Activity

Page 2 of 2

7/13/1995



7.0 REFERENCES

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

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

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

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

IRP Technology Guide

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

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

New York State Department of Environmental Conservation, November 1993, Technical and Administrative Guidance Memorandum (TAGM) for Screening Contaminated Sediments.

New York State Department of Environmental Conservation, 1994, Technical and Administrative Guidance Memorandum (TAGM): Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites.

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

REFERENCES
(Continued)

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

New York State Department of Environmental Conservation Contract Laboratory Program Statement of Work, OLM 01, March 1990.

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): Guidelines for Remedial Investigation/Feasibility Studies, March 1989 (HWR-4025).

6 NYCRR Parts 701-705, June, 1995.

Parsons Engineering Science, Inc., May 1995, Draft Final Report, Exapnaded Site Inspections of Seven High Priority Solid Waste Management Units.

Parsons Engineering Science, Inc., Decision Document for Removal Actions at SWMUs SEAD-11, SEAD-25, SEAD-26, SEAD-38, SEAD-39, SEAD-40, and SEAD-41, Seneca Army Depot Acitivity, Pre-Draft, January 1995.

Parsons Engineering Science, Inc., September 1994, Remedial Investigation Report at the Open Burning Grounds.

Parsons Engineering Science, Inc., Generic Installation Remedial Investigation/Feasibility Study (RI/FS) Workplan for Seneca Army Depot Activity, Draft Final, June 1995.

U.S. Army Material Command, Seneca Army Depot, Fish and Wildlife Management Plan, Revised July 1988.

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

REFERENCES
(Continued)

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), "Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Referenced-Based Standards for Soils and Soil Media", EPA 230-R-94-004.

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

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

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

U.S. Environmental Protection Agency (USEPA), 1986, "Quality Criteria for Water," with Updates #1 and #2.

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

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 ENDANGERED 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

COMMENTS BY
USEPA - REGION II
FOR THE DRAFT RI/FS SCOPING PLAN FOR
SEAD 25 & 26

GENERAL

Comment #1 When reviewing the generic plan it was noticed that in several instances the plan referred the reader to the site specific scoping documents, however in several instances no information was given in either document. Comments later in this letter will note the specific instances where cross-referencing between the two documents occurred but not information was given in either document.

Response #1 Acknowledged. These instances have been corrected.

Comment #2 Section 2.4 Results of Previous Investigations: Many of the comments in EPA's March 13, 1995 letter regarding the Draft Expanded Site Inspection for SEADs 4, 16, 17, 24, 25, 26, and 45 pertain to section 2.4 of the Draft Project Scoping Plan for SEADs 25 and 26. All general and SEAD specific comments in the March 13, 1995 letter should be addressed when revising this Draft Project Scoping Plan.

Response #2 All of the relevant general comments and comments specific to SEADs-25 and -26 in EPA's March 13, 1995 letter regarding the Draft ESI were responded to in this Project Scoping Plan.

Comment #3 **Table 3-1**: It is unclear from reading the text or reviewing the table why the dates shown for the collection of the groundwater samples from this site were collected several months apart. The difference in the dates may indicate that a typographical error has occurred during data entry, this should be checked and corrected if needed.

Response #3 A person from EPA's contractor, TRC, was on site in November 1994 to obtain split samples from selected wells. The person wanted monitoring well MW25-3 sampled at that time. The other two wells were sampled with wells from other SEADs in February 1995.

Comment #4 **Figure 3-1**: The date of the water level data collection shown on this figure does not correspond with any of the dates shown in Table 3-1. The number "741" also appears to the west of well location MW25-3 and does not appear to be related to a contour in this area.

Response #4 Agreed. The measurement data was corrected and the number "741" appearing west of MW25-3 was deleted from this figure.

Comment #5 **Figure 3-2**: The date of the water level data collection shown on this figure does not correspond with any of the dates shown in Table 3-2.

Response #5 Agreed. The measurement date was corrected.

Comment #6 **Page 3-27 pl**: The text states that the Army has no plans to change the use of the facility, however the base has been slated for closure and is awaiting approval, this should be stated in the text and other potential scenarios should be discussed.

Response #6 Acknowledged. The following text was inserted at the end of Section 3-2.

As of early July 1995, the Base Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Until the BRAC Commission recommendations are voted on by the President and the Congress, BRAC does not apply to SEDA and the installation will remain open.

The President must approve the entire list by July 15, 1995 at which time the list is forwarded to Congress. If Congress approves the recommendations they will become public law on October 1, 1995. If BRAC applies to SEDA, future use of the sites will be determined by the Army. In accordance with BRAC regulations, the Army will perform any additional investigations and remedial actions to assure that any change in intended land use is protective of human health and the environment. However, not all sites at SEDA will be turned over for residential use.

At this time, the specific details for closure procedures, projected timetables of closure, discussion of the Army's future intention for the sites, and a detailed account of notification methods to prospective purchasers are unavailable for inclusion in this Workplan. If it is decided that the base will be closed, then closure procedures will be obtained.

Comment #7 **Figure 3-4**: A section of the matrix shown on this figure has been left blank, i.e., the inhalation pathway for groundwater under aquatic biota, the appropriate symbol should be placed within this box.

Response #7 Agreed. An "NA" was placed in this box.

Comment #8 **Page 4-4 p2**: As previously discussed in our review letter on the draft generic work plan, all volatile organic samples should be collected as a core sample from a depth of approximately zero to 6-inches below the ground surface.

Response #8 Disagree. As per previous agreement with NYSDEC and USEPA, surface soil samples will be collected from a depth of 0 to 2 inches below the organic matter.

Comment #9 **Page 4-4 Section 4.2.2.2**: The text in this section and other portions of the document states that two samples will undergo physical testing and limited chemical testing. However, the text does not discuss what is defined by limited chemical testing.

Response #9 Disagree. The first paragraph states six, not two, samples will undergo limited physical and chemical testing. This response also applies to Section 4.3.1.3. The third paragraph in Section 4.2.6 and the second paragraph in Section 4.3.5 define the limited physical and chemical analyses for the six samples at both SEADs.

Comment #10 **Page 4-6 Section 4.2.4.1**: The locations of the proposed microwell installations should be shown on a figure, and a rationale should be given for each of the proposed locations.

Response #10 Acknowledged. The microwells will be located in and around any VOC plumes detected during the soil gas survey. Locating the VOC plume(s) will be one of the first activities during the RI at this SEAD.

Comment #11 **Page 4-7 Section 4.2.4.3**: The text states that three rounds of water levels will be collected at the site, however, the text is unclear when the measurements will be conducted. It is generally appropriate to collect water level data at different times of the year to determine seasonal variations in groundwater flow direction and the depth to water.

Response #11 Agreed. The schedule for taking the water level measurements is described in this section. The three rounds will take place before well development and before each round of groundwater sampling. There will be approximately a two week period between development and the first round of sampling and approximately a three-month period between the two rounds of sampling.

Comment #12 **Page 4-7 Section 4.2.5**: It would be more appropriate to locate the emission flux tests in the area of highest soil contamination, based on the new proposed sampling location results.

Response #12 Acknowledged. The emission flux text has been eliminated from the RI.

Comment #13 **Page 4-9 Section 4.2.7**: Under this section the text is vague as to the analytical method being proposed for the air samples. The text should clearly state the what the proposed analytical method is and what sampling device will be used during field activities.

Response #13 Acknowledged. The emission flux test has been eliminated from the RI.

Comment #14 **Page 4-12 p4**: It is not normal practice to collect soil samples from below the water table. However, if it is ES's intent to collect this soil sample to account for seasonal variations in the water table then the text should be clarified, and the depth below the water table should be given.

Response #14 Acknowledged. The text in this section and in Section 4.2.2.1 has been changed to indicate two soil samples will be obtained immediately below the water table to determine the grain size distribution and TOC content of the soil in the aquifer.

Comment #15 **Page 4-14 p3**: See earlier comment Page 4-4 p2.

Response #15 See Response #8.

Comment #16 **Page 4-14 Section 4.3.2.1**: An additional monitoring well should be installed in the northern portion of the site, in the vicinity of the training tower and storage trailer. This well will give additional chemical and hydraulic control in this area and for the site.

Response #16 Agreed. A monitoring well, labelled MW26-10/SB26-10, has been added near the training tower and the storage trailer.

Comment #17 **Page 4-15 Section 4.3.2.2**: See comment Page 4-7 Section 4.2.4.3.

Response #17 Acknowledged. See response #11.

Comment #18 **Page 4-15 Section 4.3.3**: Sample location SWSD 26-7 appears to be located within a different drainage system. If this sample is to represent a background sample location, as the text states, and will be used for comparison with other surface water and sediment sample results, the sample should be collected from upstream within the same drainage system.

Response #18 Acknowledged. There is no upstream location. The drainage channels around SEAD-26 collect runoff from the site and transport it to other parts of the SEDA facility. SWSD26-7 was located to obtain a nearby background surface water and sediment sample unaffected by the site.

Comment #19 **Page 4-17, p1**: The text should state that an ecological assessment will be conducted on adjacent surface water bodies, i.e., drainage ditches, if the surface water and sediment data indicate that these areas have been adversely impacted.

Response #19 Agreed. The procedure for the ecological investigation was rewritten to conform with the procedure in the NYSDEC Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994).

Comment #20 **Page 6-1, Sections 6.1 and 6.2**: The text states that the staffing and scheduling for the projects is discussed within the generic work plan, however, the generic work plan states that information will be provided within the site specific plans. This cross-referencing error should be corrected.

Response #20 Staffing for this project is discussed generally in the draft final Generic Workplan. Schedules for these projects are presented in the Project Scoping Plan.

Comment #21 **Appendix C**: The plan does not contain the contract laboratories Quality Assurance Project Plan (QAPP) as stated in the generic work plan, this should be provided and the cross-referencing error corrected.

Response #21 Agreed. The final version of the Generic Workplan will contain the QAPP from Inchcape Corporation's Aquatec Laboratory located in Burlington, Vermont.

EPA's Hazardous Waste Facilities Branch

Comment #1 **Section 4.3.5 Analytical Program**: The first sentence in this paragraph contains a typographical error. Five surface water and sediment samples are proposed for the Remedial Investigation. The correct number of samples proposed in other sections of the document is six.

Response #1 Agreed. The number of surface water and sediment samples has been changed to ten, because four additional samples were added to the workplan.

EPA's Biological Technical Assistance Group

Comment #1 The project scoping plans should reference this "Generic Workplan" whenever discussing field sampling and analysis and procedures for conducting ecological risk assessments. In both project scoping plans, soil analysis results are compared to NYSDEC TAGM values which do not address ecological concerns. Soil contaminants of concern for ecological receptors should be screened against site reference levels.

Response #1 Agreed. The RI and ESI chemical analysis data at each SEAD will be compared to the site background data which represent the site reference levels during the ecological investigation to determine if biological sampling is required.

Comment #2

i. Exposure pathways are summarized in Figures 3-3 and 3-4. For biota, inhalation and dermal contact are diagrammed as a pathway considered to pose significant risk. Due to the fact that limited ecological data is available for these exposure routes, exposure via ingestion is the main concern.

ii. In addition, for SEAD-25 where the groundwater table is very high and may resurface, ingestion of groundwater should be considered as a potential exposure route.

iii. Section 3.3 "Scoping of Potential Remedial Action Alternatives," of SEAD-25 & SEAD-26 should include sediment and surface water as media of concern.

iv. In both documents, the "Ecological Investigations" section of the RI states that the focus of the assessment will be "...aquaticspecies in on-site surface water bodies." As none of the areas of concern reviewed in these documents have an "on-site surface water body" the ecological investigation should primarily focus on terrestrial biota evaluation and assessment of environmental risk. When conducting these risk assessments, it may be more cost effective to review indicator chemicals and/or use a phase approach to determine remedial action.

Response #2

i. Exposure via ingestion of soil was changed to a pathway considered to pose potential risk.

ii. Ingestion of groundwater discharging to surface water is shown as a pathway considered to pose potential risk for all four receptors.

iii. Sediment and surface water has been added as media of concern.

iv. Agreed. The procedure for the ecological assessment was rewritten to conform with the procedure in the NYSDEC Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). This procedure will identify any aquatic species near or on the site to evaluate.

Comment #3

i. To better determine the adequacy of the sampling locations, maps illustrating the drainage patterns, along with surface elevations, are necessary.

ii. Information on how these sampling locations were chosen should be included. Sediment and surface water sampling should be conducted to fully delineate the extent of contamination on-site, and identify areas where contaminants may have travelled off-site. For intermittent streams, such as drainage swales, surface water and sediment sampling should occur during high flow conditions in order to assure that water is present for collection (i.e. that samples can be obtained), as well as to characterize stormwater runoff patterns.

iii. Analysis of both filtered and unfiltered surface water samples is recommended.

iv. The BTAG recommends the use of the acute and chronic effect levels from the federal ambient water quality criteria (AWQC) appearing in the Federal Register, Volume 57, No. 246, Dec. 22, 1992. However, where specific contaminants have been dropped (e.g., 2,4-DNT), the 1987 criteria values may still be considered for guidance levels.

v. Sediment sampling should be conducted in the top 6".

vi. Total organic carbon and grain size analysis should be conducted on all sediment samples to help determine the bioavailability of contaminants to potential receptors.

vii. The reference to the 1989 NYSDEC Sediment guidance should be revised to the 1994 document.

viii. In addition, for freshwater sediments, we recommend screening 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).

Response #3

i. Agreed. Arrows have been added to show the direction of flow in the drainage channels and streams in Figures 4-2 and 4-4. Ground surface elevations are associated with the contours shown on the maps.

ii. Agreed. Sampling location information for surface water and sediment has been added to Sections 4.2.3 and 4.3.3.

iii. Disagree. As per NYSDEC requirements, the analysis of surface water samples will not include filtered samples.

iv. Agreed. The RI and ESI chemical analysis data for surface water will be compared to the acute and chronic effect levels from the AWQC.

v. Agreed. Sediment samples will be obtained from the 0 to 0.5 foot depth range.

vi. Agreed. Total organic carbon and grain size analysis will be conducted on all sediment samples.

vii. Agreed. The 1989 NYSDEC sediment guidance was updated to the November 1993 version titled Technical Guidance for Screening Contaminated Sediment. This is the most current version according to the state. The criteria in the November 1993 version will be compared to the RI and ESI chemical analysis data for sediment.

viii. Agreed. The November 1993 sediment guidance document lists the LELs and SELs from the Persaud reference. These levels will be compared to the RI and ESI chemical analysis data for sediment.

Comment #4

i. SEAD-25, Figure 4-2, should indicate the direction of surface water flow, and clearly show the location of the two proposed sampling points in the upper reaches of Kendaia Creek.

ii. Due to the fact that there is a high water table at this site, the potential for groundwater to resurface needs to be addressed.

iii. In addition, the wetland areas should be identified in site figures.

iv. In order to comply with federal wetland ARARs, the three parameter method should be used to delineate wetlands. Also note that a wetlands assessment and restoration plan will be needed for any wetlands impacted or disturbed by contamination or remedial activities.

Response #4

i. Agreed. Arrows are used to show the surface water flow direction in Figure 4-2. The sampling locations SWSD25-9 and -10 are shown on Figure 4-2.

ii. Agreed. The potential for groundwater to discharge to the ground surface or to the drainage channels and stream will be evaluated by examining the groundwater elevation data.

iii. Agreed. Freshwater wetlands identified in the Fish and Wildlife Management Plan (Revised July 1988) are not located on SEADs-25 or 26. Any wetlands identified during the ecological investigation will be shown on plans in the RI report.

iv. Agreed. Section 3.12.2 of Appendix A in the Draft Final version of the Generic Workplan discusses the three parameter method and mentions that a plan will be required to assess and restore the wetlands. The data form in Figure A-22 shows the three parameters that will be used to delineate the wetlands: vegetation, soils, and hydrology.

Comment #5

i. SEAD-26, Figure 4-4, shows the location of proposed sediment and surface water sampling points around the fire pad. Due to the fact that the drum storage area is a potential source, additional sampling points should be established in this vicinity.

ii. Mercury should also be added as a contaminant of concern for this site.

iii. On page 2-25 there is a statement that "the results of these samples support the theory of multiple areas of elevated concentrations." This statement needs to be clarified.

Response #5

i. Four new surface water and sediment samples (SWSD26-6 to 9) have been added around the south end of the site in the vicinity of the drum storage area as shown on Figure 4-4.

ii. Mercury and the other TAL metals will be analyzed in all the environmental samples.

iii. This sentence was eliminated. This section on semivolatile organic compounds in soil at SEAD-25 (page 2-8 in the draft version) was rewritten to discuss surface soils separately from subsurface soils.

D#13

COMMENTS BY NYSDEC
FOR THE DRAFT RI/FS SCOPING PLAN FOR
SEADs 25 & 26

Comment #1

General Comment: We believe that sufficient sampling and analysis have been done during the ESI investigation to establish a list of contaminants which are most likely to be found at each Area of Concern (AOC) and this information should be used in developing an economical RI/FS work plan. It is our suggestion that each sample should be analyzed for those compounds which are expected based on historical use and the ESI investigation results.

Response #1

Agreed. The information obtained during the ESI was used to develop an economical RI/FS that will obtain enough data to perform a baseline risk assessment and FS. The ESI data was used to reduce the number of samples and typed of analyses that will be obtained during the RI. Although the contaminants of concern have been identified for these Areas of Concern, the EPA requires that all samples undergo a full suite of Level IV analyses including VOCs, SVOCs, metals, cyanide, pesticides, and PCBs.

Comment #2

3.2 Preliminary Identification of Potential Receptor and Exposure Scenarios: It is stated that the Army has no plan to change the use of this facility or to transfer the ownership. This seems contrary to the March 1995 announcement by the Department of Defense of the intended closure of the Seneca Army Depot Activity.

Response #2

Acknowledged. The following information has been added to Section 3.2: As of this date, the Base Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Until the BRAC Commission recommendations are voted on by the President and the Congress, BRAC does not apply to SEDA and the installation will remain open.

The BRAC Commission has submitted recommendations to the President. The President must approve the entire list by July 15, 1995 at which time the list is forwarded to Congress. If Congress approves the recommendations, they will become public law on October 1, 1995. If BRAC applies to SEDA, future use of the sites will be determined by the Army. In accordance with BRAC regulations, the Army will perform any additional investigations and remedial actions to assure that any change in intended land use is protective of human health and the environment. However, not all sites at SEDA will be turned over for residential use.

At this time, the specific details for closure procedures, projected timetables of closure, discussion of the Army's future intention for the sites, and a detailed account of notification methods to prospective purchasers are unavailable for inclusion in this Workplan. If it is decided that the base will be closed, then closure procedures will be obtained.

Comments and Recommendations
Pre-Draft Project Scoping Plan
Remedial Investigation Feasibility Study
Fire Training and Demonstration Pad (SEAD-25)
and The Fire Training Pit and Area (SEAD-26)
Seneca Army Depot Activity
Romulus, New York
January 1995

Comments By: 1LT Clemens and K. Hoddinott and L. Peters

Comment #1 Page 1-3, Figure 1-2, Site Plan.

Circle with dot inside and line outside are not defined in the legend for this or any other figure in Document. What do they represent? Power Poles? Circles in and around Fire Training Area and Demonstration Pad are also not defined? What do they represent? Storage drums or tanks?

Recommendations: Define all symbols used on site maps in their respective legends.

Response #1 Agreed. A legend listing the symbols used on the base maps for SEAD-25 and SEAD-26 will be included as Figure 1-4.

Comment #2 Page 2-7, Section 2.4.1.2,Semivolatile Organic Compounds.

SB26-6 is not on Figure 2-2. Because this soil boring had the highest levels of SVOC contamination, its location is extremely important.

Recommendations: Show locations of all soil borings.

Response #2 Agreed. "SB26" is a typographical error that appears twice in that sentence. "SB26" was changed to "SB25". SB25-6 is the boring in which MW25-1 was placed. The well is labelled on Figure 2-2 as "MW25-1/SB25-6".

Comment #3 Page 3-31, Section 3.1.3.1.3.

Inhalation of volatiles due to other potential uses of the ground water and surface water should be considered. For example, inhalation of volatiles during showering with contaminated water is possible.

Recommendations: Include inhalation of volatiles which may occur as a result of using contaminated water as a potential pathway.

Response #3 Agreed. The bulleted item on the top of page 3-32 dealing with surface water as a drinking water supply has been changed to "Groundwater and surface water may be used as drinking water supplies, resulting in exposures from direct ingestion and inhalation during showers". Inhalation has been added as an exposure route to the exposure pathway summaries for SEAD-25 and SEAD-26 in Figures 3-3 and 3-4.

Comment #4 Page 3-36, Section 3.2.2, Potential Exposure Pathways and Receptors - SEAD-25.

This discussion should include the numerical assumptions of the exposure scenarios. This comment also applies to Section 3.2.3.

Recommendations: Include a table or discussion outlining the numerical assumptions associated with the current and future exposure scenarios of SEAD-25 and SEAD-26.

Response #4 Agreed. Table 4-1 in the Generic Scoping Document was referenced in Section 3.2.2 and 3.2.3.

Comment #5 Page 3-46, Section 3.6.1, Data Gaps and Data Needs.

The data needs for the soil must include an adequate determination of the soil background concentrations, with a statistical comparison with the site data. This comment also applies to Section 3.6.2.

Recommendations: Include an adequate determination of the background levels of chemicals in the soil.

Response #5 Agree. Sitewide soil background data has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs, and Remedial Investigations at the OB Grounds and the Ash Landfill. These data were used to evaluate whether contaminants were present at the 25 SEADs where ESIs were performed and will be used to evaluate the RI data from SEAD-25 and SEAD-26. This information has been added to the soil data needs in Sections 3.6.1 and 3.6.2.

Comment #6 Page 4-4, Section 4.2.4.1, Microwell Installation Sampling.

Purpose for installing microwells ("... delineate the horizontal extent of impacted groundwater.") overlaps the purpose for installing monitor wells ("....define the horizontal and vertical extent of groundwater impacts."). Unless a clear distinction between the two groundwater sampling programs can be stated, the Microwell Installation Sampling Program is redundant, therefore a waste of time, money, and resources.

Recommendations: Clearly state goals and objectives for each program and how they are not redundant.

Response #6 Agreed. The extent of contaminants in groundwater must be based on CLP data from monitoring wells. To accurately locate the wells in and around a plume of contaminated groundwater in only one phase of investigation, soil gas surveys and microwells will be used as screening techniques to locate the extent of plume of contamination. The soil gas survey will be used as a first step to locate contaminants in the groundwater. Since plumes of volatile organic compounds (VOCs) detected in the vadose zone by the soil gas survey are at approximately the same location as VOCs in the groundwater, ten microwells will be used to more accurately locate the extent of VOCs in the groundwater by placing them in and around the plume detected in the soil gas survey. Monitoring wells will then be installed in and around the plume. This information has been incorporated into the Scoping Plan.

Comment #7 Page 4-16, Section 4.3.3, Surface Water/Sediment Investigation.

There is no sampling upstream from the site. How will the distinction be made between contamination originating from SEAD-26 and contamination related to traffic on railroad tracks parallel to the streams and the large railroad siding south of the site?

Recommendations: Collect one or two samples at locations upstream from SEAD-26 and not subject to runoff from railroad sidings or embankments.

Response #7 Agreed. The drainage channels appear to originate in the vicinity of SEAD-26; therefore, a surface water/sediment sample (SWSD26-7) has been added on a drainage channel 300 feet east of SEAD-26 that is not affected by railroads or the site though it will be affected by runoff from Brady Road.

Comments By: S. Bradley

Comment #1 Section 1.1, Page 1-1.

The initial statement referencing the Generic Workplan is not correct for this document. Please define the purpose of this document as it is not the same as the RI/FS workplan. Additionally, even if it is somewhat repetitive, citing another document to introduce the purpose of this report exacerbates the challenges of utilizing multiple separate plans tied to a generic workplan. The purpose statement should define how this scoping document ties into the overall program.

Response #1 Agreed. Section 1.1 was rewritten to describe the purpose of this document and to describe how this document ties into the CERCLA program.

Comment #2 Section 1.2, Page 1-1.

Please replace the reference to the generic WP with a brief overview of the report organization.

Response #2 Agreed. Section 1.2 from the Generic work plan has been incorporated verbatim into this document.

Comment #3 Section 2.4, General.

Paragraph numeration is inconsistent. Please rectify.

Response #3 Agreed. The paragraph numbering has been fixed.

Comment #4 Table 2-1, Page 2-2.

This table lists the various values significantly exceeding the reporting limits defined in the generic WP CDAP yet are qualified with a "U" for "not detected". An explanation of this incongruity must be provided in the text. If matrix effects have created this great a variation, some discussion of subsequent data applicability is appropriate.

Response #4 Agreed. Some of the soil samples from SEAD-25 have higher reporting limits for SVOCs. This is apparently due to the presence of tenatively identified compounds (TICs) in the SVOC analysis and other compounds, such as petroleum hydrocarbons, in these samples. The laboratory had to dilute most of these samples, probably due to the presence of the TICs and other compounds.

The undetected data with high reporting limits provides useful information regarding the presence or absence of these compounds at or above these reporting limits.

This comment was responded to in Section 2.4.1.1.2.

Comment #5 Table 2-3, Page 2-13.

This table lists the various values significantly exceeding the reporting limits defined in the generic WP CDAP yet are qualified with a "U" for "not detected". An explanation of this incongruity must be provided in the text. If matrix effects have created this great a variation, some discussion of subsequent data applicability is appropriate.

Response #5 Agreed. Some of the soil samples from SEAD-26 have higher reporting limits for SVOCs. This is apparently due to the presence of tenatively identified compounds (TICs) in the SVOC analysis and other compounds, such as petroleum hydrocarbons, in these samples. The laboratory had to dilute most of these samples, probably due to the presence of the TICs and other compounds.

The undetected data with high reporting limits provides useful information regarding the presence or absence of these compounds at or above these reporting limits.

This comment was responded to in Section 2.4.2.1.2.

Comment #6 Section 3.1.1.1.2, Page 3-3.

Discussion at the bottom of this page is confusing. It is unclear if the slope of the bedrock is a viable indicator of groundwater flow direction at SEAD-25. Clarify that Figure 3-1 is intended to define probable flow direction, despite the contradiction with seismic data, apparently due to mounding at the site. A correlation of the bottom elevation and surface water depth in the drainage swale with GW depth in MW25-1 following a precipitation event may also indicate that the measured GW depth in MW25-1 is influenced by either recharge by surface water or provides a GW discharge to the surface.

Response #6 Agreed. Groundwater flow tends to move in the same direction as the bedrock surface topography at the SEADs at SEDA. This paragraph has been changed to make the discussion clearer. An additional 16 wells are proposed for installation at SEAD-25 to further refine the groundwater flow direction.

Comment #7 Figure 3-1, Page 3-5.

Add date that data was collected for this figure.

Response #7 Agreed. A legend and the date the groundwater levels were obtained were added to this figure.

Comment #8 Section 3.1.2, Page 3-9.

In first sentence, please use term "Potential Contaminants of Concern" and indicate in parenthesis that the generic WP addresses all PCOCs site-wide, as "constituents of concern". This entire section on fate of constituents is too detailed for a scoping document and should be summarized. The details should go in the RI/FS report itself.

Response #8 Agreed. The first sentence was changed in accordance with the comment. The fate of constituents section was summarized.

Comment #9 Figure 3-2, Page 3-11.

Add date that data was collected for this figure.

Response #9 Agreed. The date the groundwater levels were obtained were added to this figure.

Comment #10 Section 3.2, Page 3-35.

Retitle as "Preliminary Identification of Potential Receptors and Exposure Scenarios". This section is too detailed for scoping purposes and should be summarized.

Response #10 Agreed. The section was retitled and summarized.

Comment #11 Section 4.2, Page 4-1.

Under each discussion of field investigation specifics (like number of samples or wells), please rephrase if possible to support a position that the identified quantities are sufficient to characterize the sites.

Response #11 Agreed. The first sentence of Sections 4.2 and 4.3 were changed to indicate that this work would complete the RI characterization of each SEAD.

Comment #12 Section 4.2.6, Page 4-10.

Delete "At SEAD-16.." from italicized text at top of page.

Response #12 Disagreed. K. Healy's Comment #13 requested that "SEAD-16" be changed to "SEAD-25". This change was made.

Comment #13 Section 4.3.4, Page 4-18.

Delete italicized text.

Response #13 Disagreed. The italicized text was left in and the SEAD number was changed from "16" to "26" as requested by K. Healy's Comment #16

Comment #14 Appendix C.

CDAP information on soil gas sampling and analysis must be provided in the Generic WP to make this a true statement.

Response #14 Agree. Soil gas sampling and analysis procedures including information on QA/QC are presented in Appendix A, not Appendix C. It is not discussed in Appendix C because soil gas sampling will be used as a screening technique for VOCs.

<u>Comments By: K. Healy/tib</u>

Comment #1 General.

Typos were rampant!

Response #1 Agreed. The document was spell checked and read through for spelling and grammar.

Comment #2 Section 3.

There appears to be a number of inconsistencies in the section numbering. Please correct.

Response #2 Agreed. The section numbering was corrected.

Comment #3 Page 3-35.

In the last sentence (Line 6 of the page) it is stated that SEAD-26 continues to be used. Please verify this with R. Battaglia who has suggested in the recent past that this is no longer the case.

Response #3 Acknowledged. R. Battaglia was called and said SEAD-26 is no longer used for fire training. Changes in the text were made on pages 3-35 and 3-7.

Comment #4 Page 3-36.

In Line 2 of the SEAD-25 discussion, please verify the current usage as per Comment 3, above.

Response #4 Acknowledged. R. Battaglia was called and said SEAD-25 is no longer used for fire training. Changes in the text were made on pages 3-36 and 3-2.

Comment #5 Page 3-36.

Recommend adding the following after "during the ESI (Figures 3-3 and 3-4)":

"This is a generic discussion. The future use scenario and the required degrees of cleanup will be proposed on a site-by-site basis as part of each feasibility study. The future plans for each site will be taken into account at that time. Currently, the Army has no plans to change the use of this facility or to transfer the ownership."

Response #5 Agreed. This text was added.

Comment #6 Page 3-39.

Verify the statement in Line 3 of the SEAD-26 discussion as per Comment 3, above.

Response #6 Agreed. See Response #3. The first paragraph under the SEAD-26 discussion was changed to indicate this SEAD is no longer used for fire training.

Comment #7 Page 3-40.

Please edit the paragraph "Surface water runoff from precipitation...northwest of the site drains to the southwest." It needs it, bad.

Response #7 Agreed. The paragraph was editted.

Comment #8 Page 3-41.

In the Section currently labeled "3.2.3", please correct "somewhate", "soil, surfacw ater" and "inhlation".

Response #8 Agreed. These spelling errors were corrected.

Comment #9 Page 3-43.

In the Section currently labeled "3.2.3", please correct "somewhate", "soil, surfacater" and "inhlation".

Response #9 Agreed. These spelling errors were corrected.

Comment #10 Page 3-46.

Under the "Soil Data" discussion (Bullet 1) the statement "Collect a sufficient number of samples for a risk assessment." is made. Quite a number of sites on SEDA will be closed out after the ESI stage with a risk assessment/mini-risk assessment. This sentence would imply that this is not possible without additional data from an RI. Recommend changing this sentence to "Collect samples for a risk assessment."

Response #10 Agreed. The change was made.

Comment #11 Page 3-48, Section 4.2.4.1.

Under the "Soil Data" discussion (Bullet 1) the statement "Collect a sufficient number of samples for a risk assessment." is made. Quite a number of sites on SEDA will be closed out after the ESI stage with a risk assessment/mini-risk assessment. This sentence would imply that this is not possible without additional data from an RI. Recommend changing this sentence to "Collect samples for a risk assessment."

Response #11 Agreed. This change was made.

Comment #12 Page 4-6.

Please state the number of microwells to be installed. The following figure indicates 7.

Response #12 Agreed. The number of microwells, seven as shown in Figure 4-3, was increased to ten and was included in the first line of Section 4.2.4.1. Figure 4-3 was eliminated because the microwell locations shown in the figure are misleading.

Comment #13 Page 4-10, 1st Line.

Correct "SEAD-16" to "SEAD-25".

Response #13 Agreed. This item was corrected.

Comment #14 Table 4-1.

Correct the title and add columns to indicate the number of QA/QC samples to be taken, please.

Response #14 Agreed. The frequency at which QA/QC samples will be collected is described in Section 5.3 of Appendix C within the Generic Installation RI/FS Workplan. These samples will be collected in accordance with NYSDEC/EPA and USACOE guidance. A footnote has been added to Tables 4-1 and 4-2 indicating this.

Comment #15 Page 4-12.

In the first full paragraph, reference is made to "geophysical survey areas". I was unaware that any geophysical surveying was to be performed. Please clarify. Also, in the last line, change "designated" to "designed".

Response #15 Agreed. This paragraph was changed as well as the same paragraph in Section 4.3.6 to include the work performed during the RI at each SEAD. The word was also changed.

Comment #16 Page 4-18.

Please correct the two references to "SEAD-16".

Response #16 Agreed. "SEAD-16" was changed to "SEAD-26".

Comment #17 Appendix D.

Correct "Endagered".

Response #17 Agreed.

SENECA ARMY COMMENTS
FOR THE DRAFT RI/FS SCOPING PLAN FOR
SEADs 25 & 26

COMMENTS BY C. FORGET - MRD-ET-EH

Comment #1 **General - Risk Assessment**

The previous comments on this document were NOT INCORPORATED. Please incorporate comments made on SEAD-46 scoping plan. (Attached).

Response #1 This comment does not apply to the Project Scoping Plan for SEADs-25 and -26.

Comment #2 **1.1 - Risk Assessment**

Last sentence of the paragraph. This introduces doubt regarding the adequacy of your DQO process for this investigation. If the DQO process has been accurately completed, no Phase II should be required unless there are unforeseen changes in circumstances.

Response #2 This comment does not apply to the Project Scoping Plan for SEADs-25 and -26.

Comment #3 **Figure 3-1 - Risk Assessment**

Once again, it is good that the contractor has developed this CSM, however, there are several clarifications required represented by the following comments.

First, clarify the use of future residents as a receptor. To avoid wasting federal money, the contractor must justify this is a likely scenario, and not a hypothetical "worst case" scenario. A more thorough justification of what is a more likely future use scenario is required.

Response #3 Acknowledged. This comment applies to Figures 3-3 and 3-4 in the Project Scoping Plan for SEAD-25 and -26. In the two RIs that have been performed at SEDA to date, EPA regulators have required residents to be included in the future uses scenario.

Comment #4 **Risk Assessment**

The text in Section 3.2.2.1 indicates that aquatic biota may be exposed in the creek or pond, yet this is not indicated on the CSM.

Response #4

Agreed. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.2.1 and 3.2.4.1 in the Project Scoping Plan for SEADs-25 and -26. The figures and text in the two sections have been changed to indicate aquatic biota could be a receptor for ingestion of and dermal contact with surface water and sediment.

Comment #5

Figure 3-1 - Risk Assessment

Current workers are said to be exposed by direct contact with soil. Therefore, incidental ingestion must also be assumed while they are in contact with the soil.

Response #5

Agreed. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.2.2 and 3.2.4.2 in the Project Scoping Plan for SEADs-25 and -26. Incidental ingestion of soil has been added as a potential exposure route for current site workers and visitors.

Comment #6

Figure 3-1 - Risk Assessment

If the contractor can justify the assessment of future residential use, also justify the use of groundwater as a potable water supply since it is not currently being used as such.

Response #6

Acknowledged. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.3 and 3.2.5 in the Project Scoping Plan for SEADS-25 and -26. The groundwater at SEDA is classified as GA, water suitable for use as a potable water supply. There are approximately 125 private wells presently located around the perimeter of SEDA. Approximately 95% of the wells in Seneca County are used for domestic or farm use. It is reasonable to assume that SEADs-25 and 26 could be used as residences; therefore, the potential exists for the ingestion of groundwater to be an exposure pathway.

Comment #7

Figure 3-1 - Risk Assessment

Include inhalation of volatiles from surface water, but indicate the pathway is insignificant since volatiles are not potential chemicals of concern at this site.

Response #7

Agreed. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.2.1 and 3.2.4.1 in the Project Scoping Plan for SEADs-25 and -26. Inhalation of volatiles from surface water has been added to SEAD-25. Inhalation of volatiles from surface water at SEAD-26 has not been added because volatiles are not potential chemicals of concern based on the ESI data.

Comment #8

Figure 3-1 - Risk Assessment

Clarify why dermal contact with surface water is indicated as a complete pathway, but incidental ingestion is not.

Response #8 Agreed. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.2.1 and 3.2.4.1 of the Project Scoping Plan for SEADs-25 and -26. Incidental ingestion of surface water has been changed to be considered to pose a potential risk to all four receptors.

Comment #9 **Figure 3-1 - Risk Assessment**

Clarify why aquatic biota are not a receptor when there is apparently a connecting stream and pond. Reference text section 3.2.2.4.

Response #9 This comment does not apply to the Project Scoping Plan for SEADs-25 and -26.

Comment #10 **3.2.2.3- Risk Assessment**

This text states visitors are potential receptors at this site, but they are not included in the CSM.

Response #10 Agreed. This comment applies to Figures 3-3 and 3-4 in the Project Scoping Plan for SEADs-25 and -26. Visitors are implicitly included in the term "Current Site Workers" in these two figures. Visitors are mentioned along with SEDA personnel in Sections 3.2.2 to 3.2.4.

Comment #11 **Figure 3-1 - Risk Assessment**

Dermal contact and ingestion of particulates are normally not addressed since they insignificant compared to direct contact. Evaluate only inhalation of particulates and volatiles.

Response #11 Disagree. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.2.4 and 3.2.4.4. Dermal contact could become more significant if dust is generated while walking across the site, a vehicle drives across the site, or the site is developed. Ingestion of particulates will not be included in the risk assessment for these two sites.

Comment #12 **3.2.3- Risk Assessment**

The text here is not consistent with the CSM.

Response #12 Agreed. This comment applies to Figures 3-3 and 3-4 and Sections 3.2.3 and 3.2.5 in the Project Scoping Plan for SEADs-25 and -26. The text in these two sections are now consistent with their respective figures.

Comment #13 **3.5 - Risk Assessment**

The first sentence is apparently in error. The evaluation of DQOs is not fulfilled by a list of remedial action alternatives.

Response #13

Agreed. This comment applies to Section 3.5 in the Project Scoping Plan for SEADs-25 and -26. The sentence has been changed to read, "Data quality objectives are discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan."

Comment #14

4.2.5 - Risk Assessment

With no previous data at this site to indicate it is a real hazard, the proposed biological sampling is not warranted. The contractor should sample the surface water and sediment downstream from the site to determine if biological sampling is warranted.

Response #14

Agreed. This comment applies to Sections 4.2.5 and 4.3.4 in the Project Scoping Plan for SEADs-25 and -26. The procedure for the ecological investigation was rewritten to conform with the procedure in the NYSDEC Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994).

Comment #15

4.6 - Risk Assessment

Based on the results of the risk assessment in the RI, a determination should be made if further action is warranted at this site before proceeding to the FS.

Response #15

Acknowledged. This comment applies to Section 4.6 of the Project Scoping Plan for SEADs-25 and -26. The last sentence in Section 5.0 of the Generic Installation RI/FS Workplan states that, during the FS, the remedial alternatives will be refined and modified based on additional site characterization or treatability studies conducted during the RI.

APPENDIX F

SCOPE OF WORK

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