U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

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FINAL

SEAD-16 and SEAD-17
PROJECT SCOPING PLAN FOR PERFORMING A CERCLA REMEDIAL INVESTIGATION / FEASIBILITY STUDY (RI / FS) AT THE ABANDONED DEACTIVATION FURNACE (SEAD-16) AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17)

OCTOBER 1995

PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AT SEAD-16 AND SEAD-17
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared For:

Seneca Army Depot Activity
Romulus, New York

Prepared By:

Parsons Engineering Science, Inc.
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Boston, Massachusetts

726511

July 1995

TABLE OF CONTENTS

TABLE OF CONTENTS
(CONT.)

Section **Page**

TABLE OF CONTENTS
(CONT.)

TABLE OF CONTENTS
(CONT.)

Section **Page**

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

AA	Atomic absorption
AMC	U.S. Army Material Command
AN	Army-Navy
AOC	Area 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
atm	atmosphere
BCF	Bioconcentration Factor
BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
C	Celsius
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
Eh	Oxidation-Reduction Potential
EM-31	Electromagnetic
EPA	Environmental Protection Agency
ESI	Expanded Site Inspection

LIST OF ACRONYMS
(CONT.)

FS	Feasibility Study
ft	feet
ft/ft	feet per foot
ft/sec	feet per second
ft/yr	feet per year
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
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
kg	kilogram
k_{obs}	psuedo-first-order rate constant
K_{oc}	Organic carbon partition coefficient
K_{ow}	Octanol-water partition coefficient
lb	pound
L/min	Liters per minute
MCL	Maximum Contaminant Level
m	meter
mg	milligram
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
mol	mole
MS	Mass spectrometry
MSL	Mean sea level

LIST OF ACRONYMS
(CONT.)

mV	millivolts
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
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

LIST OF ACRONYMS
(CONT.)

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 Compound
SW	Surface water sample
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target analyte list
TCL	Target compound list
TDS	Total dissolved solids
TKN	Total Kjeldah Nitrogen
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TRPH	Total Recovered Petroleum Hydrocarbons
TP	Test Pit
UCL	Upper Confidence Level
μg/g	micrograms per gram
μg/kg	micrograms per kilogram
μg/mg	micrograms per milligram
μg/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
VOST	Volatile Organic Sampling Train
Vs	Volt Second

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

The purpose of this Remedial Investigation/Feasibility Study (RI/FS) Project Scoping Plan is to provide site specific information for the RI/FS project at the SEAD-16 and SEAD-17 operable unit at Seneca Army Depot Activity (SEDA) in Romulus, NY. This plan outlines work to be conducted at SEAD-16 and SEAD-17 based upon recommendations specified in the Draft Final Seven High Priority Expanded Site Inspection (ESI) Report (Parsons ES, May 1995).

The Generic Installation RI/FS Workplan that accompanies this document was designed to serve as a foundation for this RI/FS Project Scoping Plan and provides generic information that is applicable to all site activities at SEDA.

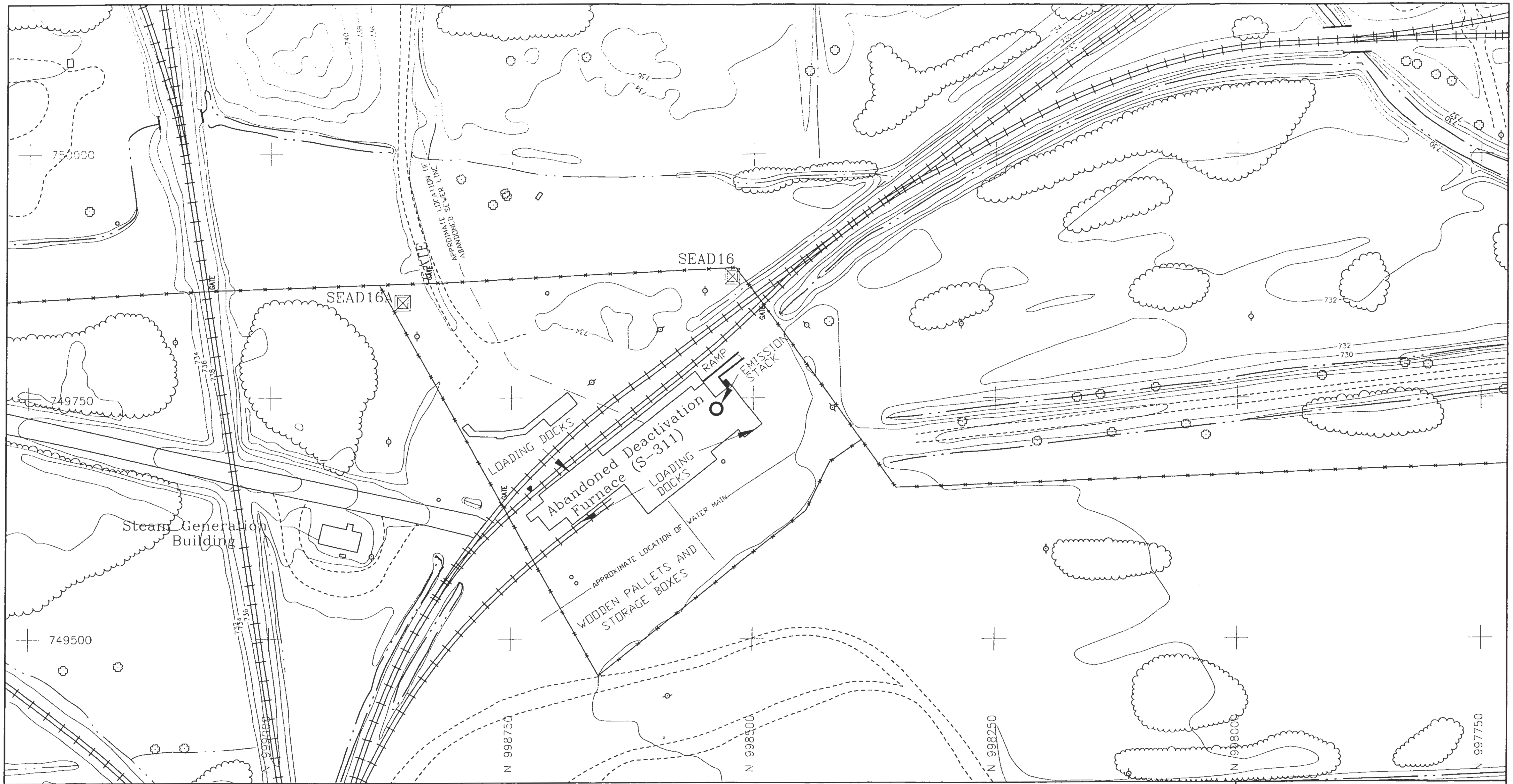
1.2 REPORT ORGANIZATION

The remaining sections of this report are organized to describe the overall site conditions, provide a scoping of the RI/FS, and to provide task plans for the RI and FS. Section 2.0 (Site Conditions) 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 (Plans and Management) discusses scheduling and staffing.

1.3 SITE BACKGROUND

SEAD-16 and SEAD-17 are two munition deactivation furnace buildings at SEDA in Romulus, NY. SEAD-16 is permanently closed and SEAD-17 is currently inactive while awaiting approval of the Resource Conservation and Recovery (RCRA) Part B permit. The location of the two sites within SEDA are shown in Figure 1-1 and the site maps are shown in Figure 1-2 and 1-3.

SEAD-16 and SEAD-17 are classified as High Priority SWMUs under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). In accordance with the decision process outlined in the Interagency Agreement between the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) Region II, and the



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

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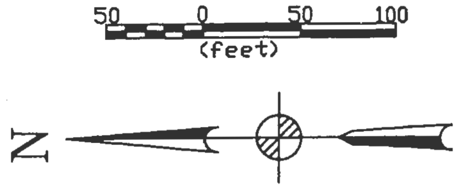


PARSONS

PARSONS ENGINEERING SCIENCE, INC.

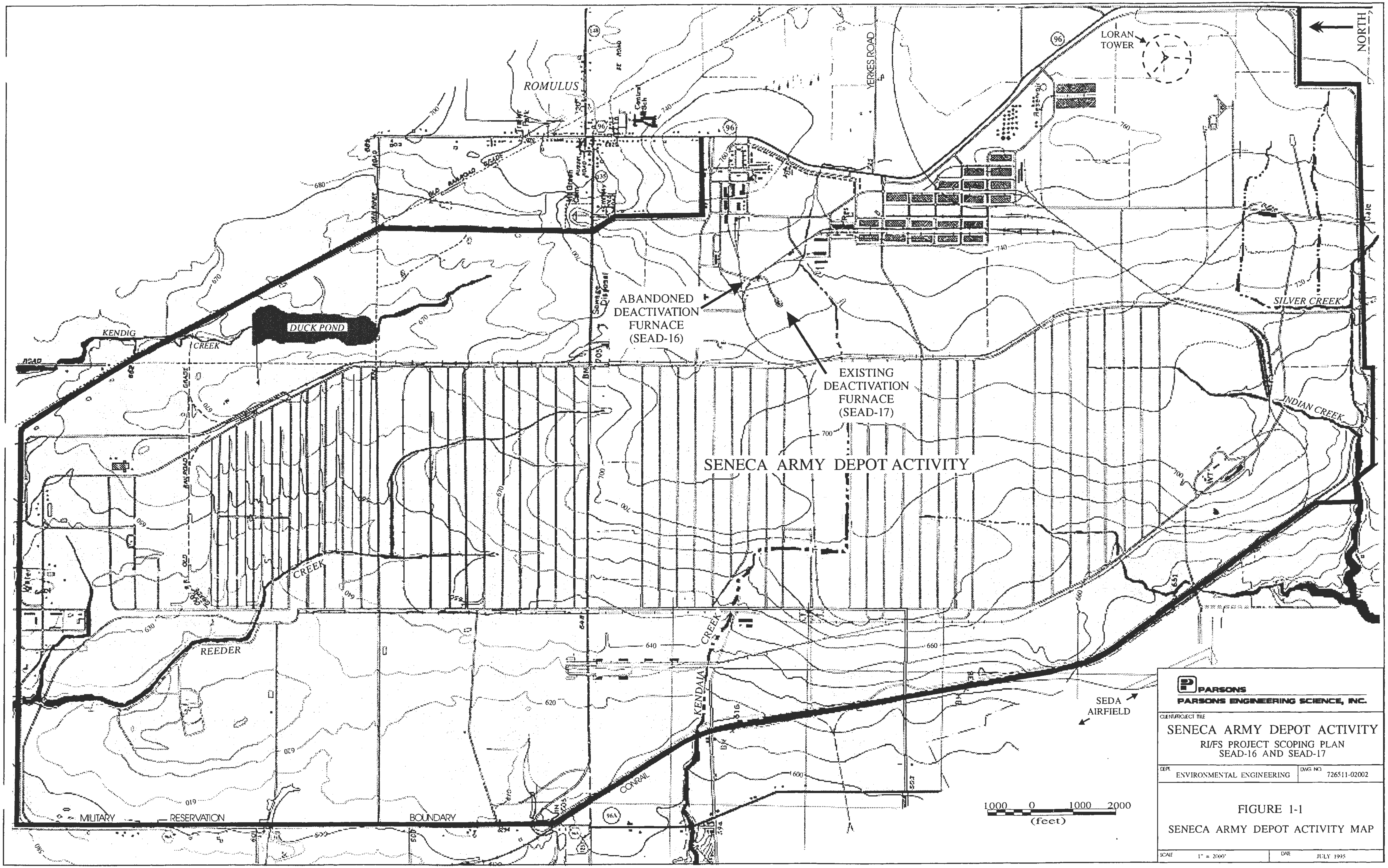
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 726511-02002

FIGURE 1-2
SITE PLAN

SCALE 1" = 100'
DATE JULY 1996
REV A



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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-16 AND SEAD-17

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 726511-02002

FIGURE 1-1
SENECA ARMY DEPOT ACTIVITY MAP

SCALE 1" = 2000'
DATE JULY 1995

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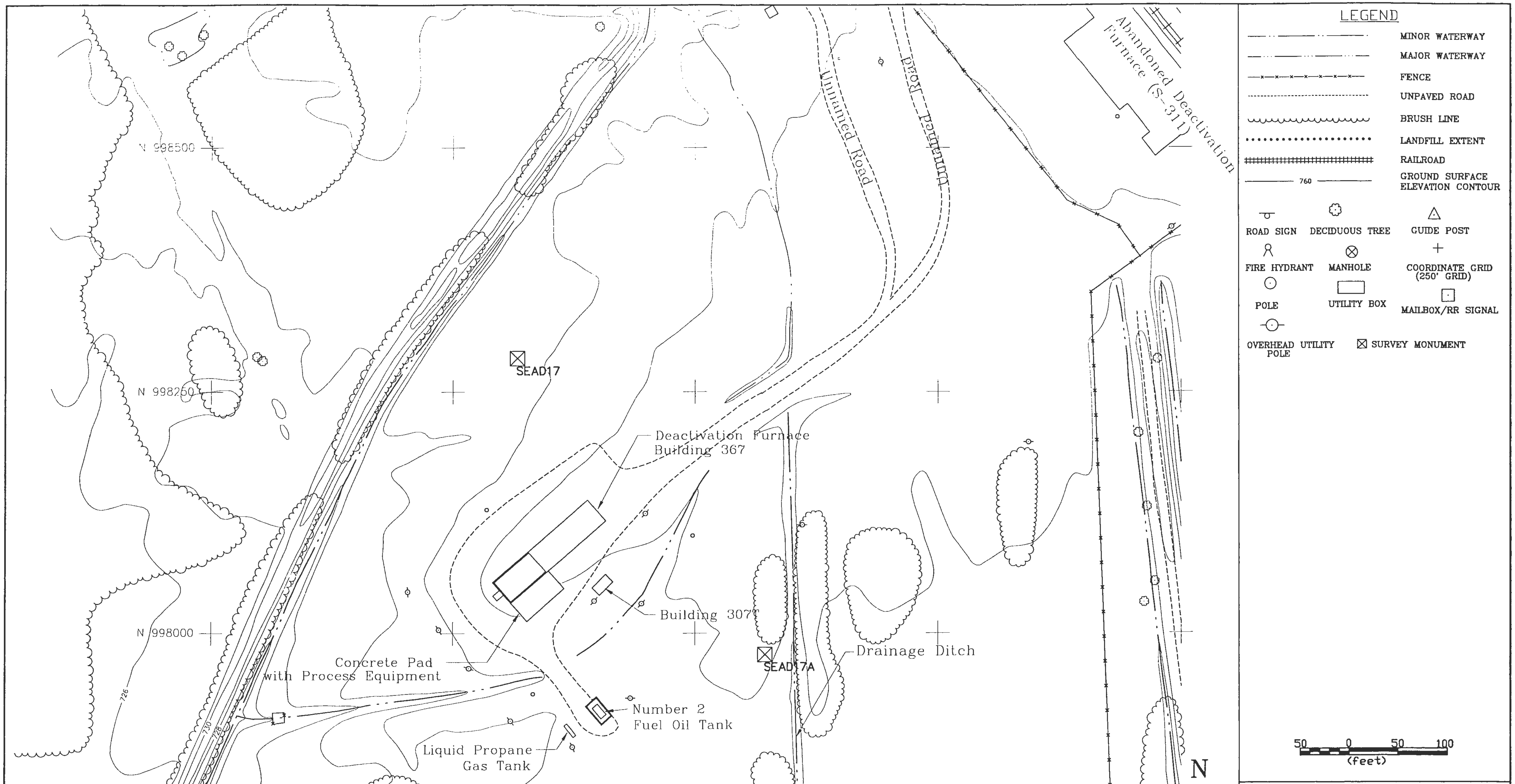

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SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-17 EXISTING DEACTIVATION FURNACE

DEPT	Dwg No.
ENVIRONMENTAL ENGINEERING	728511-02002

FIGURE 1-3
SITE PLAN

SCALE	DATE	REV
1" = 100'	JULY 1995	A

New York State Department of Environmental Conservation (NYSDEC), Expanded Site Inspections (ESIs) were conducted by Parsons Engineering Science, Inc. (Parsons ES) at SEAD-16 and SEAD-17 in November 1993. These investigations included sampling of soils and groundwater to identify hazardous constituents or wastes that may have been released to the environment. The sampling data was compared to state and federal guidelines and standards to determine whether these AOCs posed a potential threat or risk to human health and the environment. The results of the draft final ESI Report (Parsons ES, May 1995) indicate that impacts to soils and groundwater exceeding state and federal guidelines had occurred at SEAD-16 and SEAD-17.

As part of the draft final ESI Report, a CERCLA RI/FS was recommended to be performed at both SEAD-16 and SEAD-17. This RI/FS Project Scoping Plan along with the Generic Installation RI/FS Workplan outlines the recommended approach and methodologies for completion of an RI/FS at the two sites in accordance with EPA CERCLA guidelines.

2.0 SITE CONDITIONS

2.1 PHYSICAL SETTING

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

2.2 REGIONAL GEOLOGICAL SETTING

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

2.3 REGIONAL HYDROGEOLOGICAL SETTING

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

2.4 RESULTS OF PREVIOUS INVESTIGATIONS

2.4.1 SEAD-16 - Abandoned Deactivation Furnace (Building S-311)

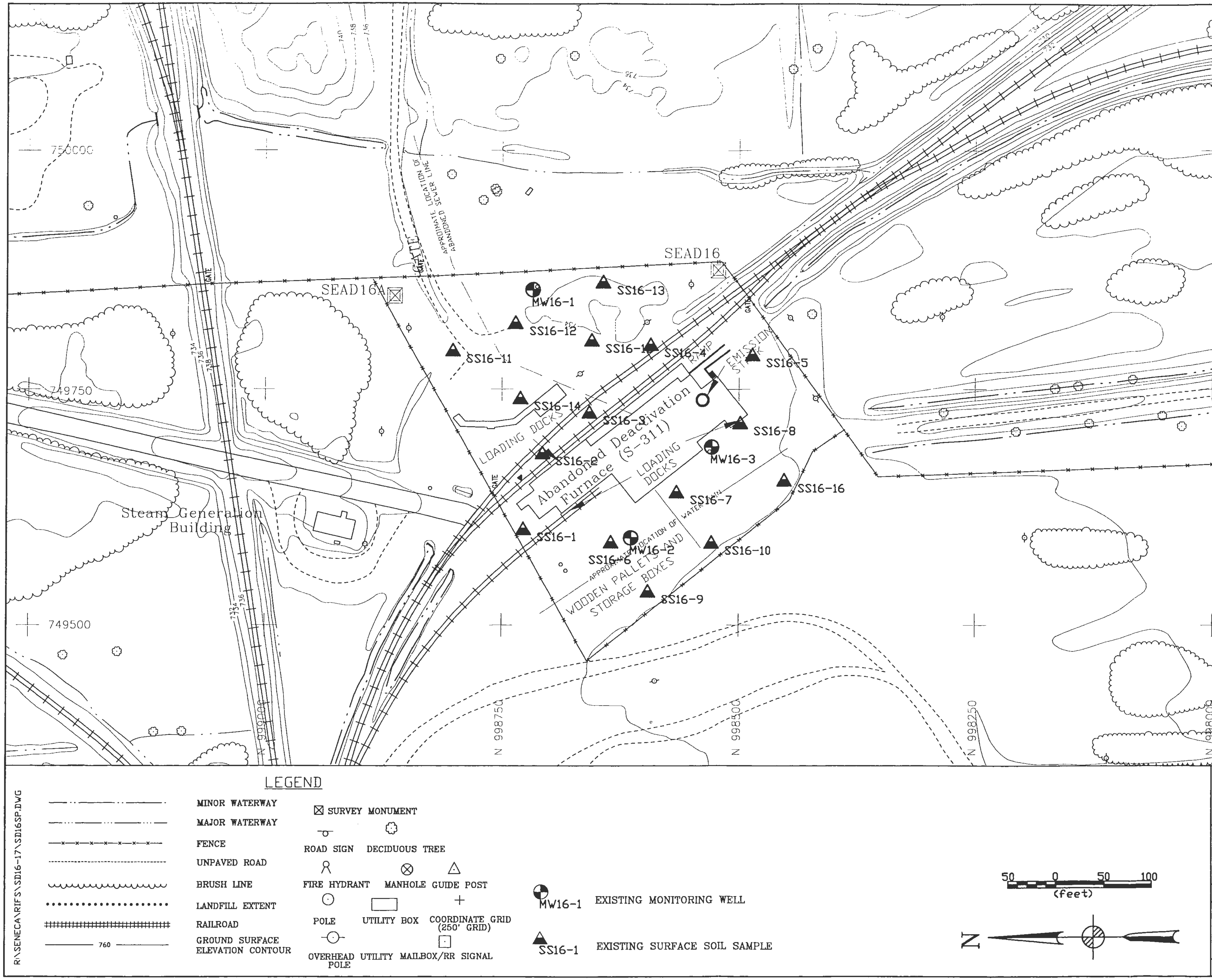
In September 1993, two underground storage tanks (USTs) were removed from SEAD-16. The tank removal activities and the confirmatory sampling records and chemical analyses are presented in the Final Closure Report for the Underground Storage Tank Removal at Seneca Army Depot Activity, Romulus New York (Science Applications International Corporation [SAIC], May 1994). Tank 311-A was located to the northwest of Building S-311, had a capacity of 1,000 gallons, and provided Number 2 fuel oil to the boiler that heated the building. Tank 311-B was located to the southeast of Building S-311, had a capacity of 2,000 gallons, and provided Number 2 fuel oil to the Deactivation Furnace.

During the removal of Tank 311-A, groundwater was not encountered. The tank that was removed was in good condition and did not appear to have leaked. Five samples were collected from the excavation pit (one from the floor and four from the walls of the pit) and analyzed for volatile aromatic hydrocarbons using EPA Method 8021 and base/neutral extractable hydrocarbons using EPA Method 8270. Three of the samples collected from the excavation pit (from the floor and the northwest wall) contained polynuclear aromatic hydrocarbon compounds (PAHs) at concentrations that exceeded both the guidance values for the protection of human health and the toxicity characteristic leaching procedure (TCLP) Alternative Guidance Values for the protection of groundwater. The Alternative Guidance Values are presented in the NYSDEC Spill Technology and Remediation Series Memo #1 (STARS Memo #1, August 1992). The excavation was backfilled with cinderblocks, debris from the building, and uncontaminated soil from the excavation. It was recommended in the Final Closure Report (SAIC, May 1994) that the tank should be considered closed.

During the removal of Tank 311-B, the tank was found to be filled with water and groundwater with an oily sheen seeped into the excavation pit. Eight hundred gallons of liquid was removed from the excavation before a water sample and three soil samples were collected from the pit. The samples were analyzed for volatile aromatic hydrocarbons using EPA Method 8021 and base/neutral extractable hydrocarbons using EPA Method 8270. Toluene was detected in the soil samples collected on the bottom and the north wall of the pit, but at concentrations that were well below the guidance values for the protection of human health and the TCLP Alternative Guidance Values for the protection of groundwater. PAHs were detected in the soil sample collected from the north wall of the pit at concentrations exceeding the guidance values for the protection of human health and the TCLP Alternative Guidance Values for the protection of groundwater. The water sample collected contained 1,2,4-Trimethylbenzene and three PAHs. No guidance values for the protection of human health have been defined for the compounds detected in the water sample. It was recommended in the Final Closure Report (SAIC, May 1994) that additional surface soil be removed from the area between the tank excavation and the building before the tank should be considered closed. The additional soil has been removed, and the excavation has been backfilled and recommended for closure.

As part of the ESI conducted at SEAD-16 in November 1993, soil, groundwater, standing water and interior portions of Building S-311 were sampled. The locations of the samples collected are shown in Figures 2-1 through 2-3. Sampling and analyses were based upon historical usage of the area for incineration of small arms munitions. In addition, a seismic survey was conducted to determine groundwater flow direction prior to the installation of monitoring wells. The results of this investigation were described in the Draft Final Seven High Priority Solid Waste Management Units Expanded Site Inspection Report (Parsons ES, May 1995).

During the investigation of SEAD-16 a total of 16 surface soil samples were collected from the area surrounding the Abandoned Deactivation Furnace Building. To evaluate the nature



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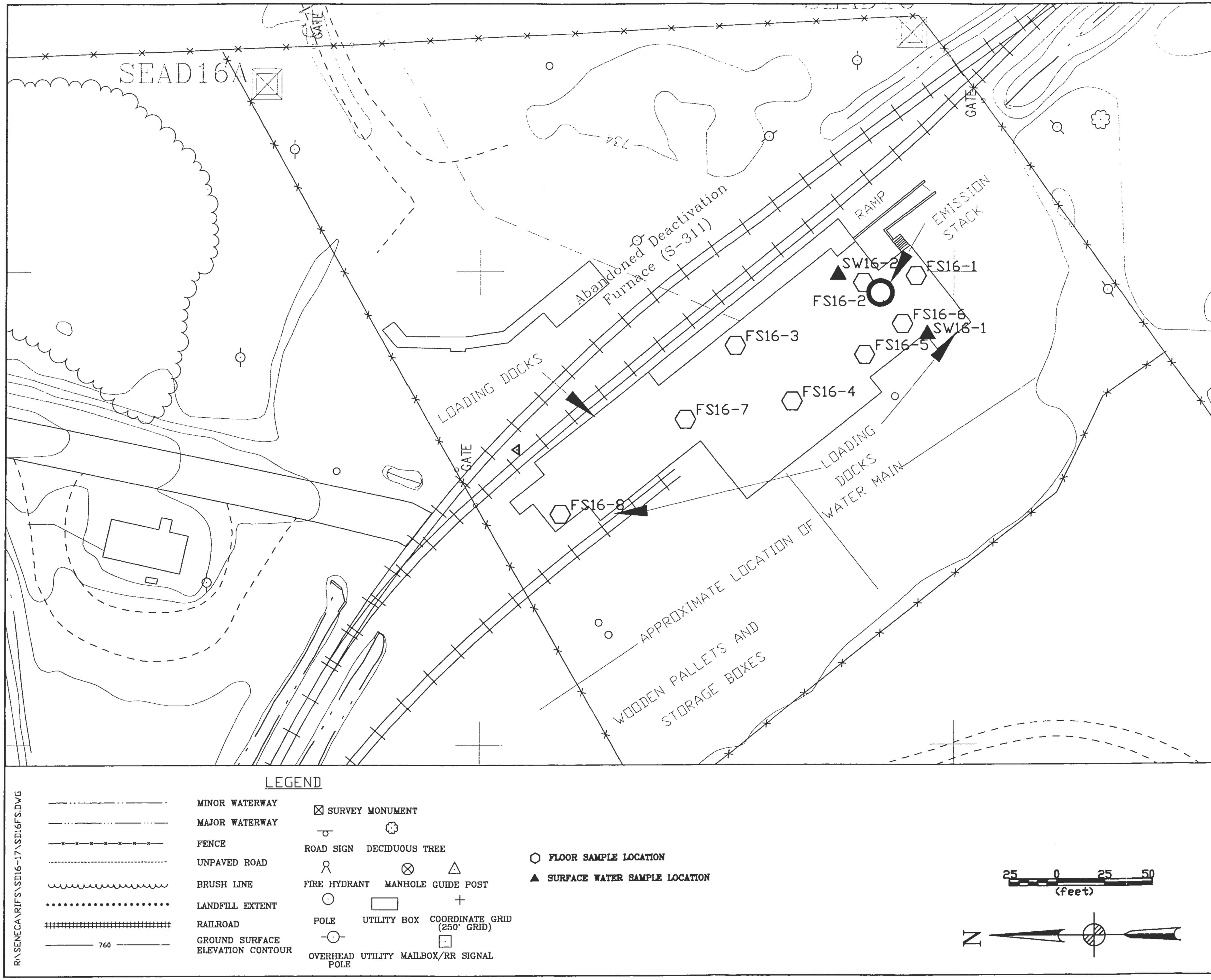
RI/FS PROJECT SCOPING PLAN
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 726511-02002

FIGURE 2-1
EXPANDED SITE INSPECTION
SAMPLE LOCATIONS

SCALE 1" = 100'
DATE JULY 1995
REV A



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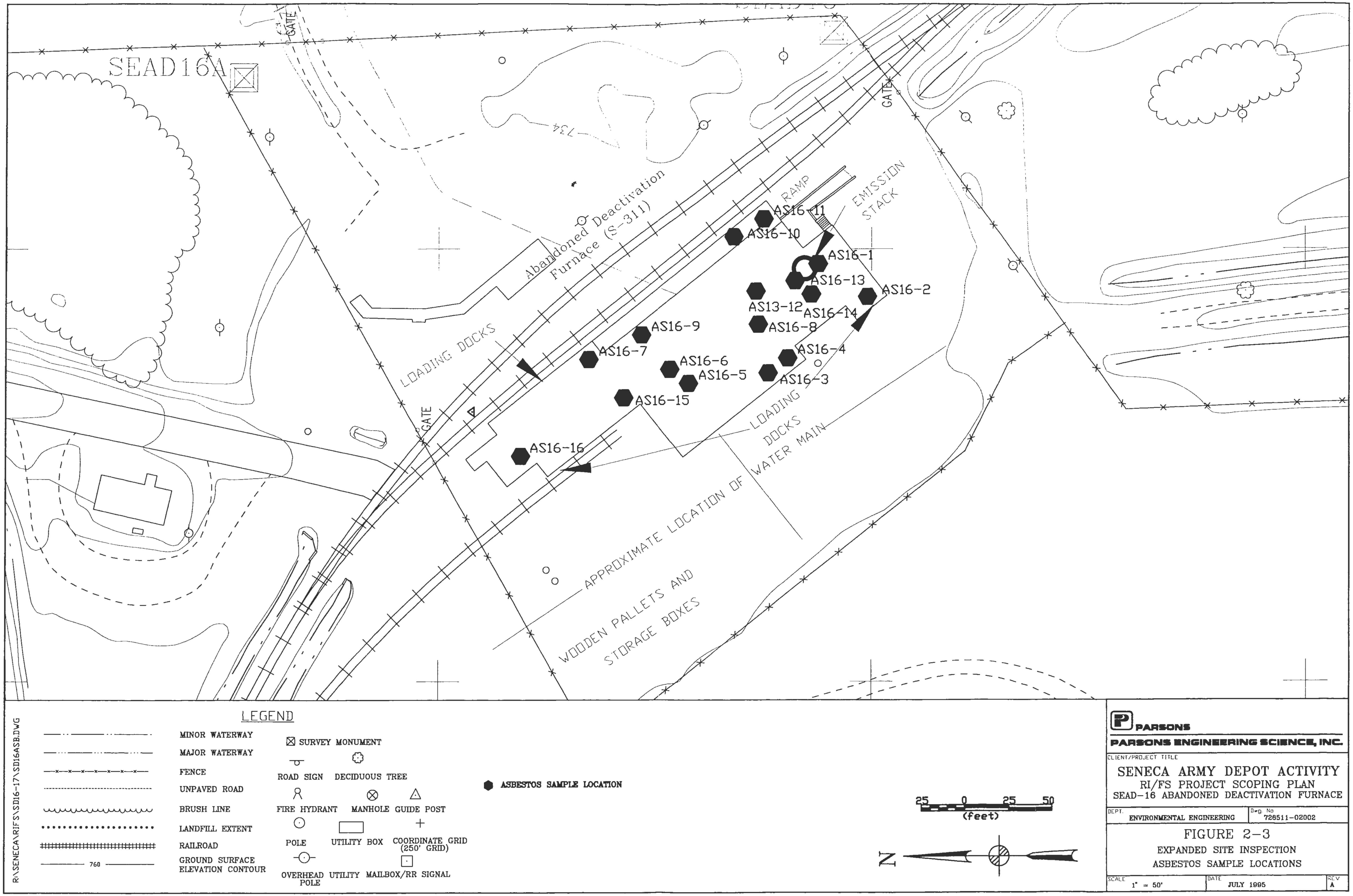
Dwg No 726511-02002

FIGURE 2-2
EXPANDED SITE INSPECTION
FLOOR SAMPLE LOCATIONS

SCALE 1" = 50'
DATE JULY 1995
REV A



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DEPT.	Dwg. No
ENVIRONMENTAL ENGINEERING	726511-02002

FIGURE 2-3
EXPANDED SITE INSPECTION
ASBESTOS SAMPLE LOCATIONS

SCALE	DATE	REV
1" = 50'	JULY 1995	A

and extent of contamination inside the building, 8 soil and debris samples, referred to as floor samples, were collected from soil materials which have been transported onto, or settled onto, the surfaces in the building. Two water samples were collected from standing water present in the building, and 9 building material and furnace scale samples were collected to determine if asbestos materials were present. Finally, 3 monitoring wells were installed and sampled to evaluate whether impacts to groundwater have occurred at the site. The following sections describe the nature and extent of contamination identified at SEAD-16. The results of the analyses are presented in Tables 2-1 through 2-4.

2.4.1.1 Soil Samples

Soil sampling at SEAD-16 focused upon surface soil (0-2") contamination in the immediate vicinity of Building S-311. This was based upon the premise that the principal source of contamination in this area were emissions from the deactivation furnace stack and subsequent dispersion and deposition to surrounding soil. Random sampling conducted in this area indicated impacts to surface soil from heavy metals and semivolatile organic compounds (SVOCs). The sample locations are shown in Figure 2-1 and the results of the analyses performed on the soil samples are presented in Table 2-1. The principal metals detected above NYSDEC TAGM values were lead, mercury, zinc and copper. Elevated levels of SVOCs, primarily PAHs, were reported for some samples, although there was no consistent pattern evident. This was also true for the metals contamination. The distribution of both metals and SVOCs appear to follow a similar distribution in soil.

Volatile Organic Compounds

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

Semivolatile Organic Compounds

A total of three SVOCs were found at concentrations above the associated TAGM values in one or more of the surface soil samples collected at SEAD-16. These three compounds were benzo(a)anthracene, chrysene and benzo(a)pyrene. For the 16 surface soil samples collected

TABLE 2-1

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 10/20/93 SS16-1 201880	SOIL SEAD-16 0-0.2 10/20/93 SS16-2 201881	SOIL SEAD-16 0-0.2 10/22/93 SS16-3 202032	SOIL SEAD-16 0-0.2 10/20/93 SS16-4 201882	SOIL SEAD-16 0-0.2 10/20/93 SS16-5 201883	SOIL SEAD-16 0-0.2 10/20/93 SS16-6 201884	SOIL SEAD-16 0-0.2 10/20/93 SS16-7 201885	SOIL SEAD-16 0-0.2 10/20/93 SS16-8 201886	SOIL SEAD-16 0-0.2 11/09/93 SS16-9 204033
VOLATILE ORGANICS														
Methylene Chloride	ug/kg	3	12.5%	100	0	11 U	12 U	11 U	11 U	2 J	10 U	53 U	10 U	11 U
Acetone	ug/kg	43	8.3%	200	0	11 U	12 U	11 U	17	11 U	10 U	53 U	10 U	11 U
Carbon Disulfide	ug/kg	1	4.2%	2700	0	11 U	1 J	11 U	11 U	11 U	10 U	53 U	10 U	11 U
Chloroform	ug/kg	2	4.2%	300	0	11 U	12 U	11 U	11 U	11 U	2 J	53 U	10 U	11 U
Toluene	ug/kg	5	25.0%	1500	0	11 U	12 U	4 J	11 U	5 J	3 J	53 U	2 J	11 U
HERBICIDES														
2,4-D	ug/kg	160	4.2%	500	0	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U	55 U
2,4-DB	ug/kg	130	4.2%	NA	NA	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U	55 U
2,4,5-T	ug/kg	13	16.7%	1900	0	5.4 U	6.3 U	7.2	5.5 U	5.7 U	5.3 U	5.3 U	5.3 U	5.5 U
2,4,5-TP (Silvex)	ug/kg	7.9	4.2%	700	0	5.4 U	6.3 U	6 U	5.5 U	5.7 U	5.3 U	5.3 U	5.3 U	5.5 U
Dichloroprop	ug/kg	61	4.2%	NA	NA	54 U	63 U	60 U	55 U	57 U	53 U	53 U	53 U	55 U
MCPA	ug/kg	6000	4.2%	NA	NA	5400 U	6300 U	6000 U	5500 U	5700 U	5300 U	5300 U	5300 U	5500 U
MCPP	ug/kg	22000	8.3%	NA	NA	5400 U	6300 U	6000 U	5500 U	16000	5300 U	5300 U	5300 U	5500 U
NITROAROMATICS														
Tetryl	ug/kg	220	4.2%	NA	NA	130 U	130 U	220 J	130 U	130 U	130 U	130 U	130 U	130 U
2,4,6-Trinitrotoluene	ug/kg	170	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
2-amino-4,6-Dinitrotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	430 J	130 U	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	ug/kg	3100	62.5%	NA	NA	320	500	1100	170	780 J	130 U	130 U	770	450 J
SEMIVOLATILE ORGANICS														
Phenol	ug/kg	37000	12.5%	30	3	710 U	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
Naphthalene	ug/kg	1600	25.0%	13000	0	710 U	230 J	320 J	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
2-Methylnaphthalene	ug/kg	19000	37.5%	36400	0	710 U	350 J	510 J	7200 U	97 J	14000 U	1300 U	1800 U	2700 U
Acenaphthylene	ug/kg	70	8.3%	4100	0	70 J	65 J	1100 U	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
2,6-Dinitrotoluene	ug/kg	370	16.7%	1000	0	180 J	410 U	310 J	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
Acenaphthene	ug/kg	4500	16.7%	50000 *	0	710 U	410 U	1100 U	7200 U	44 J	14000 U	1300 U	1800 U	2700 U
Dibenzofuran	ug/kg	1500	29.2%	6200	0	710 U	100 J	110 J	7200 U	82 J	14000 U	1300 U	1800 U	2700 U
2,4-Dinitrotoluene	ug/kg	7100	25.0%	NA	NA	2200 J	760	7100	7200 U	530 J	14000 U	1300 U	1800 U	2700 U
Diethylphthalate	ug/kg	530	4.2%	7100	0	710 U	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
Fluorene	ug/kg	6100	12.5%	50000 *	0	710 U	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
N-Nitrosodiphenylamine	ug/kg	1400	37.5%	50000 *	0	680 J	150 J	1400	7200 U	130 J	14000 U	1300 U	350 J	2700 U
Phenanthrene	ug/kg	22000	70.8%	50000 *	0	140 J	420	360 J	7200 U	410 J	14000 U	1300 U	1800 U	2700 U
Anthracene	ug/kg	2900	37.5%	50000 *	0	82 J	55 J	1100 U	7200 U	70 J	14000 U	1300 U	1800 U	2700 U
Carbazole	ug/kg	740	29.2%	50000 *	0	710 U	48 J	1100 U	7200 U	78 J	14000 U	1300 U	1800 U	2700 U
Di-n-butylphthalate	ug/kg	1400	41.7%	8100	0	1300 J	710	1200	7200 U	350 J	14000 U	1300 U	1400 J	510 J
Fluoranthene	ug/kg	3900	70.8%	50000 *	0	470 J	580	200 J	7200 U	710 J	14000 U	1300 U	1800 U	2700 U
Pyrene	ug/kg	5000	75.0%	50000 *	0	980 J	520	200 J	7200 U	550 J	14000 U	1300 U	1800 U	160 J
Benzo(a)anthracene	ug/kg	1600	66.7%	220	6	420 J	260 J	110 J	7200 U	240 J	14000 U	1300 U	1800 U	2700 U
Chrysene	ug/kg	1900	70.8%	400	5	500 J	470	200 J	7200 U	340 J	14000 U	1300 U	1800 U	2700 U
bis(2-Ethylhexyl)phthalate	ug/kg	5000	41.7%	50000 *	0	710 U	410 U	390 J	7200 U	450 J	14000 U	1300 U	1800 U	2100 J
Benzo(b)fluoranthene	ug/kg	1600	66.7%	1100	2	480 J	500	170 J	7200 U	350 J	14000 U	1300 U	1800 U	2700 U
Benzo(k)fluoranthene	ug/kg	1600	66.7%	1100	2	740 J	310 J	97 J	7200 U	330 J	14000 U	1300 U	1800 U	2700 U
Benzo(a)pyrene	ug/kg	1500	66.7%	61	10	560 J	300 J	120 J	7200 U	270 J	14000 U	1300 U	1800 U	2700 U
Indeno(1,2,3-cd)pyrene	ug/kg	1100	37.5%	3200	0	710 U	30 J	1100 U	7200 U	200 J	14000 U	1300 U	1800 U	2700 U
Dibenz(a,h)anthracene	ug/kg	5100	8.3%	14	2	710 U	410 U	1100 U	7200 U	750 U	14000 U	1300 U	1800 U	2700 U
Benzo(g,h,i)perylene	ug/kg	870	45.8%	50000 *	0	160 J	130 J	1100 U	7200 U	180 J	14000 U	1300 U	1800 U	2700 U

TABLE 2-1

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (i)	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 10/20/93 SS16-1 201880	SOIL SEAD-16 0-0.2 10/20/93 SS16-2 201881	SOIL SEAD-16 0-0.2 10/22/93 SS16-3 202032	SOIL SEAD-16 0-0.2 10/20/93 SS16-4 201882	SOIL SEAD-16 0-0.2 10/20/93 SS16-5 201883	SOIL SEAD-16 0-0.2 10/20/93 SS16-6 201884	SOIL SEAD-16 0-0.2 10/20/93 SS16-7 201885	SOIL SEAD-16 0-0.2 10/20/93 SS16-8 201886	SOIL SEAD-16 0-0.2 11/09/93 SS16-9 204033
PESTICIDES/PCB														
beta-BHC	ug/kg	39	4.2%	200	0	1.8 UJ	2.1 U	1.3 J	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U	1.8 UJ
gamma-BHC (Lindane)	ug/kg	39	4.2%	60	0	1.8 UJ	2.1 U	2 UJ	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U	1.8 UJ
Aldrin	ug/kg	39	4.2%	41	0	1.8 UJ	2.1 U	2.8 J	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U	1.8 UJ
Heptachlor epoxide	ug/kg	2.6	12.5%	20	0	1.8 UJ	2.1 U	2 UJ	19 U	9.7 U	1.8 UJ	1.8 U	3.6 U	1.8 UJ
Endosulfan I	ug/kg	39	29.2%	900	0	14 J	3.4 J	2 UJ	19 U	6.2 J	1.8 UJ	1.8 U	1.9 J	1.8 UJ
Dieldrin	ug/kg	28	8.3%	44	0	3.5 UJ	4.1 U	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U	3.5 UJ
4,4'-DDE	ug/kg	1400	91.7%	2100	0	19 J	9.4 J	32 J	1400	130	3.5 UJ	6.3	84 J	2.8 J
Endrin	ug/kg	76	4.2%	100	0	3.5 UJ	4.1 U	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U	3.5 UJ
Endosulfan II	ug/kg	76	25.0%	900	0	4.4 J	4.1 U	4.6 J	36 U	19 U	3.5 UJ	2.2 J	7 U	3.5 UJ
4,4'-DDD	ug/kg	76	16.7%	2900	0	5 J	4.1 U	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U	3.5 UJ
4,4'-DDT	ug/kg	870	95.8%	2100	0	12 J	8.1 J	18 J	180	29	1.8 J	5.6	79 J	2.9 J
Endrin ketone	ug/kg	76	8.3%	NA	NA	3.4 J	4.1 U	3.3 J	36 U	19 U	3.5 UJ	3.5 U	7 U	3.5 UJ
Endrin aldehyde	ug/kg	76	8.3%	NA	NA	3 J	4.1 U	3.9 UJ	36 U	19 U	3.5 UJ	3.5 U	7 U	3.5 UJ
alpha-Chlordane	ug/kg	47	37.5%	540	0	1.8 UJ	2.1 U	4.7 J	19 U	9.7 U	1.8 UJ	6.1	3.6 U	1.8 UJ
gamma-Chlordane	ug/kg	36	33.3%	540	0	1.8 UJ	2.1 U	4.7 J	19 U	9.7 U	1.8 UJ	7	3.6 U	1.8 UJ
Aroclor-1254	ug/kg	1400	29.2%	1000(a)	1	30 NJ	41 U	39 UJ	360 U	190 U	35 UJ	35 U	57 NJ	35 UJ
Aroclor-1260	ug/kg	630	41.7%	1000(a)	0	35 UN	41 U	110 J	360 U	190 U	35 UJ	35 U	70 UN	35 UJ
METALS														
Aluminum	mg/kg	17200	100.0%	15523	2	6550	6340	7250	11900	13600	9650	8670	7600	10700
Antimony	mg/kg	1560	50.0%	5	8	17.1	55.6	121 R	26.3	27.3	7.9 U	8.8 U	8.2 U	7 U
Arsenic	mg/kg	47.3	100.0%	7.5	6	4.9	16.6	23.6	11.3	10.8	5.1	5	5.2	4.2 J
Barium	mg/kg	15600	95.8%	300	5	102	1200	1540 R	227	630	45.1	41.2	72.2	53.6
Beryllium	mg/kg	1.1	100.0%	1	1	0.32 J	0.42 J	0.39 J	0.45 J	0.56 J	0.24 J	0.29 J	0.39 J	0.43 J
Cadmium	mg/kg	127	44.0%	1	8	0.44 U	1.6	2.5	0.55 U	2.8	0.49 U	0.55 U	0.52 U	0.43 U R
Calcium	mg/kg	215000	100.0%	120725	3	147000	11700	21400	55600	37100	25600	36600	107000	35400
Chromium	mg/kg	220	100.0%	24	6	12.6	16.5	33.3	24	43.3	12.9	11.9	15.9	17.6
Cobalt	mg/kg	40.6	100.0%	30	1	6.2 J	6.7 J	9.1	11.9	13.4	7.9	7.5 J	8.1	8.2
Copper	mg/kg	81400	100.0%	25	15	44	911	1730	399	635	26.2	28.9	88.9	31.4 J
Iron	mg/kg	49300	100.0%	28986	6	12300	25900	25700	27700	36500	22100	20000	16700	22400
Lead	mg/kg	527000	100.0%	30	14	269	3780	9140	2940	2860	8.5	81.2	1890	76.2
Magnesium	mg/kg	56000	100.0%	12308	5	34900	4400	4300	8690	7930	7710	13800	9940	15300
Manganese	mg/kg	4140	100.0%	759	1	355 J	178 J	4140	411 J	444 J	305 J	478 J	333 J	349
Mercury	mg/kg	39.3	91.7%	0.1	10	0.2	4	11.4 J	0.21	0.99	0.03 U	0.04 U	0.08	0.05 J
Nickel	mg/kg	148	100.0%	37	5	23	21.7	37.3	41.6	148	22.7	21.7	28.7	29.3
Potassium	mg/kg	10500	100.0%	1548	5	1290	673 J	886	1250	1410	720 J	794 J	1150	1160
Selenium	mg/kg	5.8	20.8%	2	1	0.15 UJ	0.4 J	0.22 UJ	0.2 UJ	0.22 UJ	0.13 UJ	0.13 UJ	0.21 UJ	0.19 UJ
Silver	mg/kg	22.7	8.3%	0.5	6	0.9 U	1.5 U	1.1 UJ	1.1 U	1 U	1 U	1.1 U	1 U	0.88 UJ
Sodium	mg/kg	3690	100.0%	114	10	213 J	121 J	147 J	128 J	132 J	79.6 J	109 J	170 J	125 J
Thallium	mg/kg	1.4	8.3%	0.3	2	1.6 U	0.19 U	0.24 U	0.22 U	0.24 U	0.14 U	0.14 U	0.23 U	0.21 UJ
Vanadium	mg/kg	61.9	100.0%	150	0	36.9	14.5	17.9	20.3	23.9	38.1	35.7	34.5	22.8
Zinc	mg/kg	35700	100.0%	90	12	219	478	929	416	562	65.8	66.1	105	78.8 J
Cyanide	mg/kg	4.4	16.7%	NA	NA	0.64 U	0.74 U	0.68 U	0.6 U	0.63 U	0.58 U	0.6 U	0.58 U	0.52 U
OTHER ANALYSES														
Nitrate/Nitrite-Nitrogen	mg/kg	151	95.8%	NA	NA	0.05	0.9	0.26	0.45	0.5	0.42	0.05	0.23	0.01 U
Total Solids	%W/W	96.3		NA	NA	92.9	80.3	84.4	90.6	88.3	94.5	94.2	94.2	92.6

TABLE 2-1

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

COMPOUND	MATRIX	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NUMBER ABOVE TAGM	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16	SEAD-16
	DEPTH (FEET)					0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	
	SAMPLE DATE					11/09/93	10/20/93	10/20/93	10/20/93	10/20/93	10/20/93	10/20/93
	ES ID					SS16-10	SS16-11	SS16-12	SS16-13	SS16-14	SS16-15	SS16-16
	LAB ID					204034	201889	201890	201891	201892	201893	201894
	UNITS											
VOLATILE ORGANICS												
Methylene Chloride	ug/kg	3	12.5%	100	0	11 U	13 U	3 J	11 UJ	3 J	11 UJ	11 U
Acetone	ug/kg	43	8.3%	200	0	11 U	13 U	11 UJ	11 UJ	11 U	43 J	11 U
Carbon Disulfide	ug/kg	1	4.2%	2700	0	11 U	13 U	11 UJ	11 UJ	11 U	11 UJ	11 U
Chloroform	ug/kg	2	4.2%	300	0	11 U	13 U	11 UJ	11 UJ	11 U	11 UJ	11 U
Toluene	ug/kg	5	25.0%	1500	0	11 U	13 U	2 J	11 UJ	1 J	11 UJ	11 U
HERBICIDES												
2,4-D	ug/kg	160	4.2%	500	0	54 U	67 U	55 U	57 U	56 U	54 U	56 U
2,4-DB	ug/kg	130	4.2%	NA	NA	54 U	67 U	55 U	57 U	56 U	54 U	56 U
2,4,5-T	ug/kg	13	16.7%	1900	0	5.4 U	6.7 U	5.5 U	5.7 U	8.3	5.4 U	5.6 U
2,4,5-TP (Silvex)	ug/kg	7.9	4.2%	700	0	5.4 U	6.7 U	5.5 U	5.7 U	5.6 U	5.4 U	5.6 U
Dichloroprop	ug/kg	61	4.2%	NA	NA	54 U	67 U	55 U	57 U	56 U	54 U	56 U
MCPA	ug/kg	6000	4.2%	NA	NA	5400 U	6700 U	5500 U	5700 U	5600 U	5400 U	5600 U
MCPP	ug/kg	22000	8.3%	NA	NA	5400 U	6700 U	5500 U	5700 U	5600 U	5400 U	5600 U
NITROAROMATICS												
Tetryl	ug/kg	220	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
2,4,6-Trinitrotoluene	ug/kg	170	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
2-amino-4,6-Dinitrotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	ug/kg	3100	62.5%	NA	NA	130 U	130 U	130 U	130 U	1200	130 U	150
SEMIVOLATILE ORGANICS												
Phenol	ug/kg	37000	12.5%	30	3	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
Naphthalene	ug/kg	1600	25.0%	13000	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
2-Methylnaphthalene	ug/kg	19000	37.5%	36400	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
Acenaphthylene	ug/kg	70	8.3%	4100	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
2,6-Dinitrotoluene	ug/kg	370	16.7%	1000	0	1800 U	440 U	360 U	750 U	56 J	350 U	1800 UJ
Acenaphthene	ug/kg	4500	16.7%	50000 *	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
Dibenzofuran	ug/kg	1500	29.2%	6200	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
2,4-Dinitrotoluene	ug/kg	7100	25.0%	NA	NA	1800 U	440 U	360 U	750 U	370	350 U	1800 UJ
Diethylphthalate	ug/kg	530	4.2%	7100	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
Fluorene	ug/kg	6100	12.5%	50000 *	0	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
N-Nitrosodiphenylamine	ug/kg	1400	37.5%	50000 *	0	1800 U	22 J	360 U	43 J	17 J	350 U	1800 UJ
Phenanthrene	ug/kg	22000	70.8%	50000 *	0	1800 U	130 J	45 J	81 J	36 J	25 J	1800 UJ
Anthracene	ug/kg	2900	37.5%	50000 *	0	1800 U	27 J	360 U	750 U	370 U	350 U	1800 UJ
Carbazole	ug/kg	740	29.2%	50000 *	0	1800 U	22 J	360 U	750 U	370 U	350 U	1800 UJ
Di-n-butylphthalate	ug/kg	1400	41.7%	8100	0	120 J	250 J	19 J	750 U	76 J	350 U	1800 UJ
Fluoranthene	ug/kg	3900	70.8%	50000 *	0	1800 U	240 J	83 J	120 J	68 J	23 J	1800 UJ
Pyrene	ug/kg	5000	75.0%	50000 *	0	1800 U	200 J	66 J	97 J	54 J	19 J	1800 UJ
Benzo(a)anthracene	ug/kg	1600	66.7%	220	6	1800 U	110 J	31 J	45 J	26 J	350 U	1800 UJ
Chrysene	ug/kg	1900	70.8%	400	5	1800 U	130 J	49 J	72 J	44 J	16 J	1800 UJ
bis(2-Ethylhexyl)phthalate	ug/kg	5000	41.7%	50000 *	0	1800 U	540 J	360 U	320 J	370 J	350 U	1800 UJ
Benzo(b)fluoranthene	ug/kg	1600	66.7%	1100	2	1800 U	100 J	31 J	49 J	33 J	350 U	1800 UJ
Benzo(k)fluoranthene	ug/kg	1600	66.7%	1100	2	1800 U	98 J	34 J	53 J	30 J	350 U	1800 UJ
Benzo(a)pyrene	ug/kg	1500	66.7%	61	10	1800 U	99 J	27 J	40 J	24 J	350 U	1800 UJ
Indeno(1,2,3-cd)pyrene	ug/kg	1100	37.5%	3200	0	1800 U	30 J	360 U	750 U	370 U	350 U	1800 UJ
Dibenz(a,h)anthracene	ug/kg	5100	8.3%	14	2	1800 U	440 U	360 U	750 U	370 U	350 U	1800 UJ
Benzo(g,h,i)perylene	ug/kg	870	45.8%	50000 *	0	1800 U	62 J	360 U	750 U	19 J	350 U	1800 UJ

TABLE 2-1

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NUMBER ABOVE TAGM	SOIL SEAD-16 0-0.2 11/09/93 SS16-10 204034	SOIL SEAD-16 0-0.2 10/20/93 SS16-11 201889	SOIL SEAD-16 0-0.2 10/20/93 SS16-12 201890	SOIL SEAD-16 0-0.2 10/20/93 SS16-13 201891	SOIL SEAD-16 0-0.2 10/20/93 SS16-14 201892	SOIL SEAD-16 0-0.2 10/20/93 SS16-15 201893	SOIL SEAD-16 10/20/93 SS16-16 201894
PESTICIDES/PCB												
beta-BHC	ug/kg	39	4.2%	200	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
gamma-BHC (Lindane)	ug/kg	39	4.2%	60	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
Aldrin	ug/kg	39	4.2%	41	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.8 U	1.8 U	3.8 U
Heptachlor epoxide	ug/kg	2.6	12.5%	20	0	1.8 UJ	2.3 U	1.6 J	2.1 J	3.8 U	1.8 U	3.8 U
Endosulfan I	ug/kg	39	29.2%	900	0	1.8 UJ	2.3 U	1.4 J	1.9 U	3.8 U	0.96 J	3.8 U
Dieldrin	ug/kg	28	8.3%	44	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
4,4'-DDE	ug/kg	1400	91.7%	2100	0	3.6 UJ	15 J	38	6	59	28 J	38
Endrin	ug/kg	76	4.2%	100	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
Endosulfan II	ug/kg	76	25.0%	900	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
4,4'-DDD	ug/kg	76	16.7%	2900	0	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
4,4'-DDT	ug/kg	870	95.8%	2100	0	3.6 UJ	6.3 J	5	2.6 J	19	2.1 J	89
Endrin ketone	ug/kg	76	8.3%	NA	NA	3.6 UJ	4.4 U	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
Endrin aldehyde	ug/kg	76	8.3%	NA	NA	3.6 UJ	6.5 J	3.6 U	3.7 U	7.3 U	3.5 U	7.4 U
alpha-Chlordane	ug/kg	47	37.5%	540	0	1.8 UJ	2.3 U	1.9 U	1.9 U	4.8	1.8 U	3.8 U
gamma-Chlordane	ug/kg	36	33.3%	540	0	1.8 UJ	2.3 U	1.9 U	1.9 U	3.4 J	1.8 U	3.8 U
Aroclor-1254	ug/kg	1400	29.2%	1000(a)	1	36 UJ	44 U	36 U	37 U	73 U	35 U	74 U
Aroclor-1260	ug/kg	630	41.7%	1000(a)	0	36 UJ	110	36 U	37 U	73 U	22 J	74 U
METALS												
Aluminum	mg/kg	17200	100.0%	15523	2	9720	17200	10400	14100	7680	7510	6310
Antimony	mg/kg	1560	50.0%	5	8	6.6 U	13.9 U	6.6 U	8.2 U	8.4	6.2 U	9 U
Arsenic	mg/kg	47.3	100.0%	7.5	6	5.2 J	7.7	5.2	6.8	9.9	4.8	3.8
Barium	mg/kg	15600	95.8%	300	5	33.6	195	52	88.2	211	35.1	56.6
Beryllium	mg/kg	1.1	100.0%	1	1	0.36 J	0.91 J	0.46 J	0.59 J	0.41 J	0.34 J	0.37 J
Cadmium	mg/kg	127	44.0%	1	8	0.41 U R	0.87 U	0.41 U	0.51 U	0.61 J	0.39 U	0.56 U
Calcium	mg/kg	215000	100.0%	120725	3	13800	9820	30300	28700	178000	26800	135000
Chromium	mg/kg	220	100.0%	24	6	13.9	25.5	19.2	26.7	14.4	15.6	14.1
Cobalt	mg/kg	40.6	100.0%	30	1	7.6	16.7	10.6	13.7	8.2	8.1	10.4
Copper	mg/kg	81400	100.0%	25	15	29 J	199	54.8	204	163	42.6	69.2
Iron	mg/kg	49300	100.0%	28986	6	23200	30600	22700	30400	16500	17500	11700
Lead	mg/kg	527000	100.0%	30	14	16.1	616	195	460	720	210	643
Magnesium	mg/kg	56000	100.0%	12308	5	5500	5200	5830	7350	5990	4770	56000
Manganese	mg/kg	4140	100.0%	759	1	342	706 J	329 J	417 J	270 J	227 J	310 J
Mercury	mg/kg	39.3	91.7%	0.1	10	0.02 U	0.73	0.24	1	0.07 J	0.05 J	0.04 J
Nickel	mg/kg	148	100.0%	37	5	22.4	35.2	39.5	50.8	29.4	30.5	28.5
Potassium	mg/kg	10500	100.0%	1548	5	813	1600	1080	1320	1100	802	2300
Selenium	mg/kg	5.8	20.8%	2	1	0.22 UJ	0.24 UJ	0.25 J	0.21 J	0.41 J	0.22 UJ	0.21 UJ
Silver	mg/kg	22.7	8.3%	0.5	6	0.84 UJ	1.8 U	0.84 U	1 U	0.93 U	0.79 U	1.1 U
Sodium	mg/kg	3690	100.0%	114	10	49.7 J	72.2 J	108 J	125 J	176 J	90.1 J	240 J
Thallium	mg/kg	1.4	8.3%	0.3	2	0.24 UJ	0.26 U	0.25 U	0.16 U	0.14 U	0.24 U	0.23 U
Vanadium	mg/kg	61.9	100.0%	150	0	16.9	28.8	15	21.1	13.4	10.8	61.9
Zinc	mg/kg	35700	100.0%	90	12	65.8 J	1270	89	128	104	68.6	93.8
Cyanide	mg/kg	4.4	16.7%	NA	NA	0.53 U	0.69 U	0.64 U	0.63 U	0.64 U	0.63 U	0.67 U
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/kg	151	95.8%	NA	NA	0.07	0.23	0.04	0.05	0.05	0.04	0.2
Total Solids	%W/W	96.3		NA	NA	91.7	75	90.9	88.3	90.5	93.4	88.9

TABLE 2-1

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NUMBER ABOVE TAGM	SOIL SEAD-16 12/06/93 FS16-1 206161	SOIL SEAD-16 12/06/93 FS16-2 206162	SOIL SEAD-16 12/06/93 FS16-3 206164	SOIL SEAD-16 0-0.2 12/06/93 FS16-4 206165	SOIL SEAD-16 12/06/93 FS16-5 206139	SOIL SEAD-16 12/06/93 FS16-6 206140	SOIL SEAD-16 12/06/93 FS16-7 206141	SOIL SEAD-16 12/06/93 FS16-8 206142
VOLATILE ORGANICS													
Methylene Chloride	ug/kg	3	12.5%	100	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Acetone	ug/kg	43	8.3%	200	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Carbon Disulfide	ug/kg	1	4.2%	2700	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Chloroform	ug/kg	2	4.2%	300	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
Toluene	ug/kg	5	25.0%	1500	0	11 U	10 U	11 U	18 U	11 U	11 U	25 UJ	21 UJ
HERBICIDES													
2,4-D	ug/kg	160	4.2%	500	0	55 U	52 U	69 U	94 U	58 U	55 U	120 UJ	160 J
2,4-DB	ug/kg	130	4.2%	NA	NA	130 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
2,4,5-T	ug/kg	13	16.7%	1900	0	3.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	13 J
2,4,5-TP (Silvex)	ug/kg	7.9	4.2%	700	0	7.9 J	5.2 U	6.9 U	9.4 U	5.8 U	5.5 U	12 UJ	12 UJ
Dichloroprop	ug/kg	61	4.2%	NA	NA	61 J	52 U	69 U	94 U	58 U	55 U	120 UJ	120 UJ
MCPA	ug/kg	6000	4.2%	NA	NA	6000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ
MCPP	ug/kg	22000	8.3%	NA	NA	22000 J	5200 U	6900 U	9400 U	5800 U	5500 U	12000 UJ	12000 UJ
NITROAROMATICS													
Tetryl	ug/kg	220	4.2%	NA	NA	190 U	130 U	130 U	130 U	130 U	130 U	130 UJ	130 UJ
2,4,6-Trinitrotoluene	ug/kg	170	4.2%	NA	NA	170 J	130 UJ	130 U	130 U	130 U	130 U	130 UJ	130 UJ
2-amino-4,6-Dinitrotoluene	ug/kg	430	4.2%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 UJ	130 UJ
2,4-Dinitrotoluene	ug/kg	3100	62.5%	NA	NA	130 U	72 J	130 U	2900	130 U	610	3100 J	610 J
SEMIVOLATILE ORGANICS													
Phenol	ug/kg	37000	12.5%	30	3	81 J	340 U	37000	150 J	380 U	360 U	2600 UJ	5100 UJ
Naphthalene	ug/kg	1600	25.0%	13000	0	360 U	43 J	1600 J	620 U	19 J	360 U	410 J	5100 UJ
2-Methylnaphthalene	ug/kg	19000	37.5%	36400	0	25 J	21 J	19000	49 J	40 J	360 U	180 J	5100 UJ
Acenaphthylene	ug/kg	70	8.3%	4100	0	360 U	340 U	5700 U	620 U	380 U	360 U	2600 UJ	5100 UJ
2,6-Dinitrotoluene	ug/kg	370	16.7%	1000	0	360 U	340 U	5700 U	620 U	380 U	370 J	2600 UJ	5100 UJ
Acenaphthene	ug/kg	4500	16.7%	50000 *	0	23 J	340 U	4500 J	620 U	380 U	360 U	560 J	5100 UJ
Dibenzofuran	ug/kg	1500	29.2%	6200	0	360 U	46 J	1500 J	620 U	22 J	360 U	390 J	5100 UJ
2,4-Dinitrotoluene	ug/kg	7100	25.0%	NA	NA	360 U	340 U	5700 U	620 U	380 U	2700	2600 UJ	5100 UJ
Diethylphthalate	ug/kg	530	4.2%	7100	0	360 U	340 U	530 J	620 U	380 U	360 U	2600 UJ	5100 UJ
Fluorene	ug/kg	6100	12.5%	50000 *	0	25 J	340 U	6100	620 U	380 U	360 U	560 J	5100 UJ
N-Nitrosodiphenylamine	ug/kg	1400	37.5%	50000 *	0	360 U	340 U	5700 U	620 U	380 U	450	2600 UJ	5100 UJ
Phenanthrene	ug/kg	22000	70.8%	50000 *	0	130 J	550	22000	120 J	100 J	110 J	4100 J	1400 J
Anthracene	ug/kg	2900	37.5%	50000 *	0	22 J	340 U	2900 J	620 U	22 J	360 U	670 J	300 J
Carbazole	ug/kg	740	29.2%	50000 *	0	24 J	340 U	5700 U	620 U	36 J	21 J	740 J	5100 UJ
Di-n-butylphthalate	ug/kg	1400	41.7%	8100	0	360 U	340 U	5700 U	620 U	720 UJ	710 UJ	2600 UJ	5100 UJ
Fluoranthene	ug/kg	3900	70.8%	50000 *	0	160 J	920	3100 J	140 J	140 J	210 J	3900 J	3200 J
Pyrene	ug/kg	5000	75.0%	50000 *	0	200 J	570	5000 J	120 J	140 J	160 J	3200 J	2300 J
Benzo(a)anthracene	ug/kg	1600	66.7%	220	6	81 J	40 J	1000 J	44 J	54 J	92 J	1600 J	1200 J
Chrysene	ug/kg	1900	70.8%	400	5	110 J	150 J	1400 J	74 J	120 J	110 J	1900 J	1400 J
bis(2-Ethylhexyl)phthalate	ug/kg	5000	41.7%	50000 *	0	360 U	340 U	5700 U	440 J	5000 J	52 J	270 J	1300 J
Benzo(b)fluoranthene	ug/kg	1600	66.7%	1100	2	91 J	130 J	500 J	73 J	78 J	99 J	1600 J	1200 J
Benzo(k)fluoranthene	ug/kg	1600	66.7%	1100	2	73 J	77 J	630 J	60 J	63 J	92 J	1600 J	1200 J
Benzo(a)pyrene	ug/kg	1500	66.7%	61	10	70 J	45 J	770 J	61 J	61 J	90 J	1500 J	1000 J
Indeno(1,2,3-cd)pyrene	ug/kg	1100	37.5%	3200	0	360 U	92 J	450 J	620 U	380 U	49 J	400 J	360 J
Dibenz(a,h)anthracene	ug/kg	5100	8.3%	14	2	360 U	26 J	500 J	620 U	380 U	360 U	2600 UJ	5100 UJ
Benzo(g,h,i)perylene	ug/kg	870	45.8%	50000 *	0	360 U	120 J	870 J	620 U	34 J	61 J	360 J	580 J

TABLE 2-1

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NUMBER ABOVE TAGM	SOIL SEAD-16 12/06/93 FS16-1 206161	SOIL SEAD-16 12/06/93 FS16-2 206162	SOIL SEAD-16 12/06/93 FS16-3 206164	SOIL SEAD-16 0-0.2 12/06/93 FS16-4 206165	SOIL SEAD-16 12/06/93 FS16-5 206139	SOIL SEAD-16 12/06/93 FS16-6 206140	SOIL SEAD-16 12/06/93 FS16-7 206141	SOIL SEAD-16 12/06/93 FS16-8 206142
PESTICIDES/PCB													
beta-BHC	ug/kg	39	4.2%	200	0	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
gamma-BHC (Lindane)	ug/kg	39	4.2%	60	0	0.93 J	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
Aldrin	ug/kg	39	4.2%	41	0	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
Heptachlor epoxide	ug/kg	2.6	12.5%	20	0	1.9 U	1.8 U	2.6 J	6.4 U	3.9 U	1.8 U	20 UJ	39 UJ
Endosulfan I	ug/kg	39	29.2%	900	0	1.9 U	1.8 U	4.7 U	6.4 U	3.9 U	1.8 U	22 J	39 UJ
Dieldrin	ug/kg	28	8.3%	44	0	4.2 J	3.4 U	9.2 U	12 U	7.5 U	3.6 U	28 J	76 UJ
4,4'-DDE	ug/kg	1400	91.7%	2100	0	13 J	17 J	73 J	17	750	6.3 J	97 J	180 J
Endrin	ug/kg	76	4.2%	100	0	3.6 U	3.4 U	9.2 J	12 U	7.5 U	3.6 U	39 UJ	76 UJ
Endosulfan II	ug/kg	76	25.0%	900	0	3.6 U	3.4 J	5.7 J	12 U	3.9 J	3.6 U	39 UJ	76 UJ
4,4'-DDD	ug/kg	76	16.7%	2900	0	5.2 J	3.1 J	9.2 U	12 U	35 J	3.6 U	39 UJ	76 UJ
4,4'-DDT	ug/kg	870	95.8%	2100	0	8.1 J	6.1 J	61 J	140	610	7.2	360 J	870 J
Endrin ketone	ug/kg	76	8.3%	NA	NA	3.6 U	3.4 U	9.2 U	12 U	7.5 U	3.6 U	39 UJ	76 UJ
Endrin aldehyde	ug/kg	76	8.3%	NA	NA	3.6 U	3.4 U	9.2 U	12 U	7.5 U	3.6 U	39 UJ	76 UJ
alpha-Chlordane	ug/kg	47	37.5%	540	0	1.2 J	2.1 J	3.8 J	6.4 U	3.1 J	1.8 U	13 J	47 J
gamma-Chlordane	ug/kg	36	33.3%	540	0	1.9 U	2.1 J	4.6 J	6.4 U	2.9 J	1.8 U	12 J	36 J
Aroclor-1254	ug/kg	1400	29.2%	1000(a)	1	36 J	56	130	120 U	75 U	36 U	360 J	1400 J
Aroclor-1260	ug/kg	630	41.7%	1000(a)	0	37	51	97	120 U	89	36 U	390 UJ	630 J
METALS													
Aluminum	mg/kg	17200	100.0%	15523	2	9540	16500	6610	9550	2960	11300	7960 J	13700 J
Antimony	mg/kg	1560	50.0%	5	8	4.6 U	1250	1560	31.5	11.9 J	11.2 J	21.8 J	93.2 J
Arsenic	mg/kg	47.3	100.0%	7.5	6	3.4	47.3	26.9	7.1	1.9	6.5	8 J	15.9 J
Barium	mg/kg	15600	95.8%	300	5	145	15600	6950	466	88.2	289	392 J	2110 J
Beryllium	mg/kg	1.1	100.0%	1	1	0.51 J	0.09 J	0.08 U	1.1 J	0.19 J	0.49 J	0.32 J	0.27 J
Cadmium	mg/kg	127	44.0%	1	8	22.2 R	36.8 R	156 R	1 J R	3	1.2	72.8 J	127 J
Calcium	mg/kg	215000	100.0%	120725	3	19800	13800	21200	23000	215000	41800	41600 J	67400 J
Chromium	mg/kg	220	100.0%	24	6	15.8	220	33.2	6.4	33.2 R	21.3 R	22.1 J R	174 J R
Cobalt	mg/kg	40.6	100.0%	30	1	15	20.9	9.7 J	3.3 J	5.6 J	9.9	6 J	40.6 J
Copper	mg/kg	81400	100.0%	25	15	211 J	38900 J	81400 J	129 J	90 J	198 J	593 J	757 J
Iron	mg/kg	49300	100.0%	28986	6	19700	49300	30500	8420	41300	25000	17200 J	48600 J
Lead	mg/kg	527000	100.0%	30	14	810	437000	527000	596	309	865	1560 J	12100 J
Magnesium	mg/kg	56000	100.0%	12308	5	4850	16400	19700	2470	15700	16400	10500 J	15700 J
Manganese	mg/kg	4140	100.0%	759	1	488 J	334 J	214 J	194 J	480	456	301 J	458 J
Mercury	mg/kg	39.3	91.7%	0.1	10	0.81	39.3	1.8	0.34	0.1	1.2	2.4 J	3.7 J
Nickel	mg/kg	148	100.0%	37	5	21.1	119	66.8	7.9 J	18.8	30.5	21.5 J	124 J
Potassium	mg/kg	10500	100.0%	1548	5	10500	1570	636 J	1550 J	704 J	1480	1430 J	1360 J
Selenium	mg/kg	5.8	20.8%	2	1	5.8 J	1.3 UJ	1.6 UJ	0.26 UJ	0.13 UJ	0.72 J	1.6 J	0.91 J
Silver	mg/kg	22.7	8.3%	0.5	6	0.9 U	13.4	22.7	1.5 U	0.73 U	0.8 U	1.3 UJ	1.7 UJ
Sodium	mg/kg	3690	100.0%	114	10	3690	2650	152 J	365 J	179 J	200 J	97.9 J	302 J
Thallium	mg/kg	1.4	8.3%	0.3	2	0.38 J	2.2 UJ	1.4 J	0.44 UJ	0.22 U	0.25 U	0.45 UJ	0.39 UJ
Vanadium	mg/kg	61.9	100.0%	150	0	17.7	12.9	6.2 J	7 J	8.3 J	18.3	20.6 J	44 J
Zinc	mg/kg	35700	100.0%	90	12	715 J	12400 J	35700 J	178 J	318	293	1310 J	11600 J
Cyanide	mg/kg	4.4	16.7%	NA	NA	1.1	1.4	0.74 U	1 U	0.61 U	0.58 U	2.3 J	4.4 J
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/kg	151	95.8%	NA	NA	151	13.7	0.21	0.27	2	104	0.89	0.05
Total Solids	%W/W	96.3		NA	NA	90.7	96.3	72.4	52.6	86.8	92.3	41.8	42.9

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b)* = As per proposed TAGM, total VOCs < 10 ppm; total Semi-VOCs < 500 ppm; individual semi-VOCs < 50ppm.
c) NA = Not Available
d) U = compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.
h) FS = Floor Sample
'j) NYSDEC Technical and Administrative Guidance Memorandum (TAGM). Soil cleanup objectives are based on a soil organic carbon content of 1%.

TABLE 2-2

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

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

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process

TABLE 2-3
SENECA ARMY DEPOT ACTIVITY
SEAD-16 EXPANDED SITE INSPECTION
STANDING WATER ANALYSIS RESULTS

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

TABLE 2-4
SENECA ARMY DEPOT ACTIVITY
SEAD-16 EXPANDED SITE INSPECTION
BULK SAMPLE ASBESTOS ANALYSIS RESULTS

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

outside the building, the maximum total SVOC concentrations were identified in sample SS16-3 where 12697 μg/kg of total SVOCs were reported. This sample was collected on the northeast side of the building in the area between the two sets of railroad tracks. Other samples with notably elevated total SVOC concentrations were SS16-1, 8962 μg/kg, SS16-2, 5988 μg/kg, and SS16-5, 5411 μg/kg. While only 3 of the 16 surface soil samples did not have any SVOCs detected, the remaining samples generally had low total SVOC concentrations. Based upon the distribution of these samples, the soil to the north and east of the building appears to be the most impacted by SVOC compounds.

Pesticide and PCB Compounds

A wide distribution of pesticide and PCB compounds were identified in the surface soil samples collected at SEAD-16. Pesticide compounds were detected in all but one (SS16-10) of the surface soil samples collected. The reported concentrations of pesticides ranged from 0.96 J μg/kg (of Endosulfan I) to 1400 μg/kg (of 4-4'-DDE). All of the reported concentrations of pesticides were below their respective TAGM values. Aroclor-1260 was the only PCB compound detected in the surface soil samples collected at SEAD-16. It was detected in three samples at concentrations ranging from 22 J to 110 μg/kg. The TAGM value for Aroclor-1260 is 1,000 μg/kg in surface soil.

Metals

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

Nitroaromatic Compounds

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

Herbicide Compounds

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

Indicator Compounds

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

2.4.1.2 Groundwater Samples

Three monitoring wells were installed and sampled during the ESI. The locations of the monitoring wells are shown in Figure 2-1 and the results of the analyses performed on the groundwater samples are presented in Table 2-2.

Volatile Organic Compounds

No VOCs were identified in the four groundwater samples collected at SEAD-16.

Semivolatile Organic Compounds

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

Pesticide and PCB Compounds

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

Herbicide Compounds

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

Metals

Groundwater concentrations for a variety of metals were found at concentrations above the criteria value in 2 of the 3 monitoring wells sampled. The highest concentrations of many of these metals were found in the groundwater sample collected from monitoring well MW16-3 where the sample was silty during sampling. While it is difficult to ascertain the extent to which particulate matter has impacted these results, it appears that the high metal concentrations are most likely due to the high sample turbidity.

Nitroaromatic Compounds

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

Indicator Compounds

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

2.4.1.3 Samples Collected Inside Building S-311

Floor samples, standing water samples and deactivation furnace samples were collected from inside the abandoned deactivation furnace building (Building S-311) as part of the SEAD-16 investigation. The locations of the samples are shown in Figure 2-2 and 2-3. The results of the analyses performed on the floor samples, standing water samples and the furnace samples are presented in Tables 2-1, 2-3 and 2-4, respectively.

FLOOR SAMPLES

A total of eight floor samples were collected inside Building S-311. The locations of the floor samples are shown in Figure 2-2 and Table 2-5 lists the matrix of each of the floor samples collected. The results of the analyses performed on the floor samples are presented in Table 2-1.

Volatile Organic Compounds

VOCs were not detected in the floor samples collected in the Abandoned Deactivation Furnace Building.

Semivolatile Organic Compounds

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

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

Pesticide and PCB Compounds

Pesticide compounds were detected in all eight of the floor samples collected from within the

TABLE 2-5

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

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION

ASBESTOS SAMPLE NUMBER	FLOOR SAMPLE NUMBER	MATERIAL DESCRIPTION
AS - 16 - 1	N.S.	Pipe insulation
AS - 16 - 2	N.S.	Sheetrock (2 layers)
AS - 16 - 3	N.S.	Pipe insulation
AS - 16 - 4	N.S.	Sheet rock
AS - 16 - 5	N.S.	Transite
AS - 16 - 6	N.S.	Duplicate of #5
AS - 16 - 7	N.S.	Roofing debris
AS - 16 - 8	FS - 16 - 4	Debris/dust from floor
AS - 16 - 9	FS - 16 - 3	Debris underneath flooring tile
AS - 16 - 10	N.S.	Furnace packing (scale)
AS - 16 - 11	N.S.	Stack mesh coating (scale)
AS - 16 - 12	N.S.	Building debris
AS - 16 - 13	FS - 16 - 6	Debris from floor
AS - 16 - 14	FS - 16 - 5	Debris from concrete floor
AS - 16 - 15	FS - 16 - 7	Debris from floor
AS - 16 - 16	FS - 16 - 8	Debris from bathroom floor
N.S.	FS - 16 - 1	Incinerated debris from conveyor
N.S.	FS - 16 - 2	Debris from top of furnace

Notes:

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

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

Herbicide Compounds

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

Metals

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

Nitroaromatic Compounds

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

Indicator Compounds

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

STANDING WATER

Two standing water samples were collected from the basement level within the Abandoned Deactivation Furnace Building as part of the SEAD-16 investigation. The locations of the standing water samples are shown in Figure 2-2 and the results of the analyses are presented in Table 2-3.

Volatile Organic Compounds

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

Semivolatile Organic Compounds

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

Pesticide and PCB Compounds

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

Herbicide Compounds

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

Metals

A variety of metals were found in one or both of the standing water samples collected from inside the building at SEAD-16. The sample SW16-2, which was collected from standing water present on the north side of the building, generally had the higher metal concentrations.

Nitroaromatic Compounds

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

Indicator Compounds

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

ABANDONED DEACTIVATION FURNACE SAMPLES

A total of 9 building material and furnace scale samples were collected from inside the Abandoned Deactivation Furnace Building and analyzed for the presence od asbestos as part of the SEAD-16 investigation. The asbestos analysis results are presented in Table 2-4. The building material sample locations are shown in Figure 2-3. The following section describes the results of this sampling program.

Asbestos

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

2.4.1.4 Tentatively Identified Compounds

Surface Soils

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

Floor Samples

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

2.4.2 SEAD-17 - Existing Deactivation Furnace (Building 367)

An ESI was conducted at SEAD-17 by Parsons ES in November 1993. During the ESI, a total of 27 surface soil samples were collected from the area surrounding the new Deactivation Furnace Building. In addition, 5 subsurface soil samples were collected from 4 soil borings installed at SEAD-17. No surface water or sediment samples were collected at SEAD-17. Four monitoring wells were installed and sampled. The following section describes the results of the chemical analyses of these samples. Sampling and analysis were based upon historical usage of the area for incineration of small arms munitions (Figure 2-4). The results of the investigation were described in detail in the Draft Final Seven High Priority SWMUs ESI Report (Parsons ES, May 1995).

The results of the investigation showed that concentrations of metals (primarily cadmium, copper, lead and zinc) exceeded NYSDEC TAGM values in surface soil (0-2"). Levels of several metals were also found at concentrations above New York AWQS in at least two of the four monitoring wells. A high turbidity value of 427 nephelometric turbidity units (NTUs) was also noted for the groundwater sample with the highest concentrations of metals present. The following sections describe the nature and extent of contamination identified at SEAD-16. The results of the analyses are presented in Tables 2-6 and 2-7.

2.4.2.1 Soil Samples

Soil sampling at SEAD-17 focused primarily on surface (0-2") soil based upon the premise that the primary mechanism for contaminants would be airborne emissions from the Building 367 furnace and subsequent dispersion and deposition to on-site soil. The sample locations are shown in Figure 2-4. The analytical results for the 23 surface, and 9 soil boring samples collected as part of the SEAD-17 investigation are presented in Table 2-5.

Volatile Organic Compounds

Surface Soil

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

Subsurface Soil

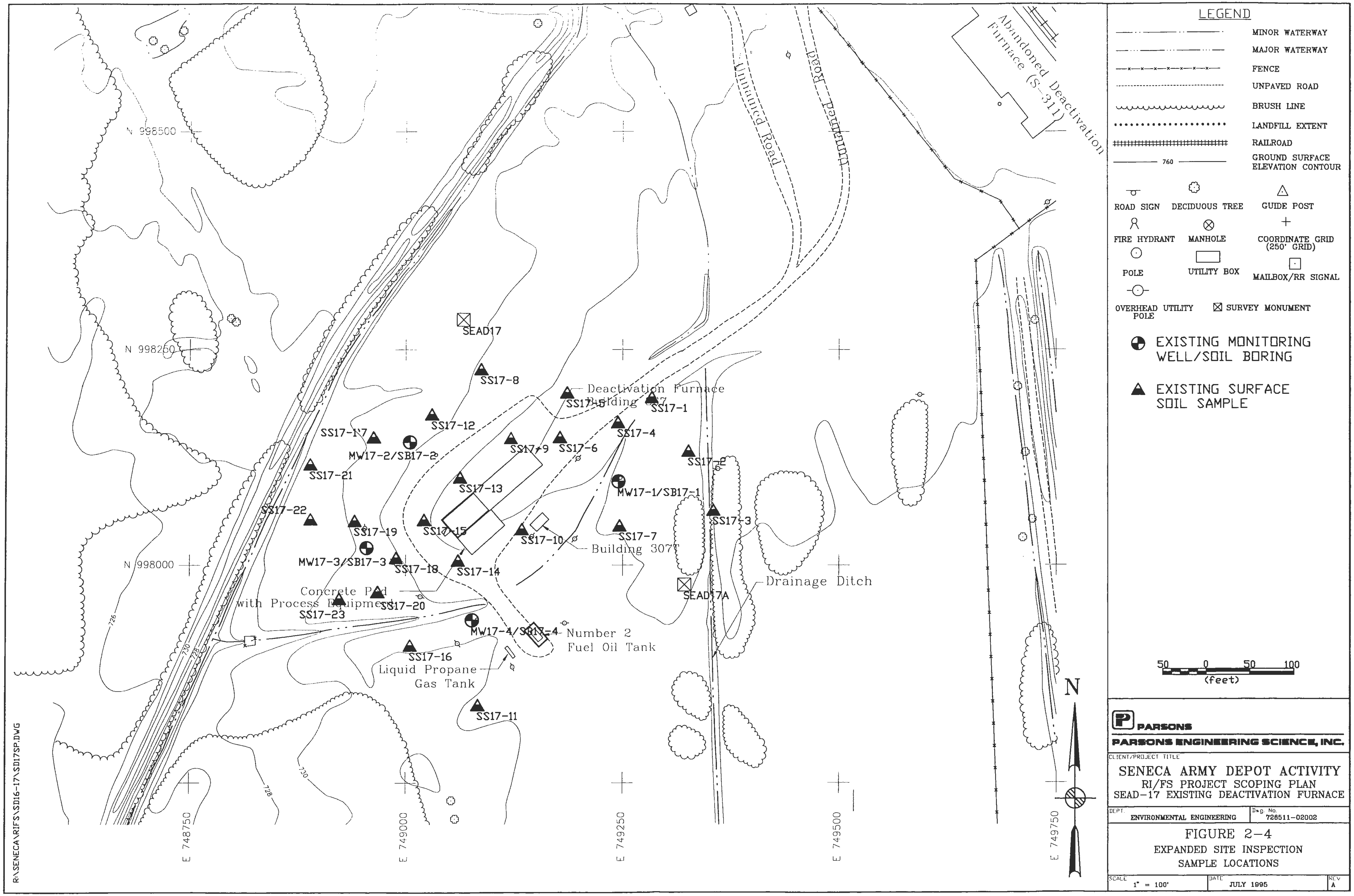
No VOCs were detected in the subsurface soil samples analyzed.

Semivolatile Organic Compounds

Surface Soil

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

Figure 2-4



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-17 EXISTING DEACTIVATION FURNACE

DEPT.	DWG. No.
ENVIRONMENTAL ENGINEERING	726511-02002

FIGURE 2-4
EXPANDED SITE INSPECTION
SAMPLE LOCATIONS

SCALE	DATE	REV
1" = 100'	JULY 1995	A

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/21/93 SS17-1 202037	SOIL SEAD-17 0-0.2 10/21/93 SS17-2 202038	SOIL SEAD-17 0-0.2 10/21/93 SS17-3 202039	SOIL SEAD-17 0-0.2 10/21/93 SS17-4 202040	SOIL SEAD-17 0-0.2 10/21/93 SS17-5 202041	SOIL SEAD-17 0-0.2 10/21/93 SS17-6 202042	SOIL SEAD-17 0-0.2 10/21/93 SS17-7 202043	SOIL SEAD-17 0-0.2 10/21/93 SS17-8 202044	SOIL SEAD-17 0-0.2 10/20/93 SS17-9 201895
VOLATILE ORGANICS														
Methylene Chloride	ug/kg	8	3.1%	100	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U	10 UJ
Acetone	ug/kg	15	3.1%	200	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U	10 UJ
Toluene	ug/kg	4	6.3%	1500	0	12 U	13 U	13 U	12 U	14 U	10 U	12 U	12 U	4 J
HERBICIDES														
MCPA	ug/kg	34000	12.5%	NA	NA	16000	6700 U	6500 U	6200 U	34000	5200 U	12000	6200 U	5200 U
NITROAROMATICS														
2,4-Dinitrotoluene	ug/kg	330	9.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	170	130 U	130 U	130 U
SEMIVOLATILE ORGANICS														
2,6-Dinitrotoluene	ug/kg	70	3.1%	1000	0	420 U	450 U	430 U	70 J	430 U	340 U	410 U	410 U	340 U
2,4-Dinitrotoluene	ug/kg	1400	9.4%	NA	NA	420 U	450 U	430 U	1400	430 U	340 U	410 U	410 U	340 U
N-Nitrosodiphenylamine	ug/kg	27	3.1%	50000 *	0	420 U	450 U	430 U	27 J	430 U	340 U	410 U	410 U	340 U
Phenanthrene	ug/kg	120	28.1%	50000 *	0	120 J	450 U	430 U	33 J	430 U	36 J	410 U	46 J	31 J
Anthracene	ug/kg	23	3.1%	50000 *	0	23 J	450 U	430 U	410 U	430 U	340 U	410 U	410 U	340 U
Di-n-butylphthalate	ug/kg	1200	59.4%	8100	0	51 J	76 J	45 J	89 J	87 J	60 J	97 J	35 J	340 U
Fluoranthene	ug/kg	190	43.8%	50000 *	0	190 J	47 J	430 U	54 J	33 J	48 J	21 J	71 J	41 J
Pyrene	ug/kg	170	40.6%	50000 *	0	170 J	47 J	430 U	44 J	33 J	43 J	410 U	63 J	37 J
Butylbenzylphthalate	ug/kg	46	6.3%	50000 *	0	420 U	450 U	430 U	410 U	430 U	37 J	410 U	410 U	340 U
Benzo(a)anthracene	ug/kg	72	28.1%	220	0	72 J	23 J	430 U	22 J	430 U	19 J	410 U	30 J	16 J
Chrysene	ug/kg	78	28.1%	400	0	75 J	29 J	430 U	32 J	430 U	31 J	410 U	36 J	28 J
bis(2-Ethylhexyl)phthalate	ug/kg	1300	56.3%	50000 *	0	530	330 J	290 J	390 J	600	340 U	650	410 U	340 U
Benzo(b)fluoranthene	ug/kg	70	28.1%	1100	0	70 J	28 J	430 U	28 J	430 U	26 J	410 U	27 J	17 J
Benzo(k)fluoranthene	ug/kg	49	21.9%	1100	0	49 J	450 U	430 U	410 U	430 U	18 J	410 U	23 J	17 J
Benzo(a)pyrene	ug/kg	58	18.8%	61	0	58 J	24 J	430 U	410 U	430 U	340 U	410 U	24 J	340 U
Indeno(1,2,3-cd)pyrene	ug/kg	62	12.5%	3200	0	62 J	30 J	430 U	410 U	430 U	340 U	410 U	410 U	340 U
Dibenz(a,h)anthracene	ug/kg	40	3.1%	14	1	40 J	450 U	430 U	410 U	430 U	340 U	410 U	410 U	340 U
Benzo(g,h,i)perylene	ug/kg	63	18.8%	50000 *	0	63 J	31 J	430 U	28 J	22 J	340 U	410 U	410 U	340 U

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/21/93 SS17-1 202037	SOIL SEAD-17 0-0.2 10/21/93 SS17-2 202038	SOIL SEAD-17 0-0.2 10/21/93 SS17-3 202039	SOIL SEAD-17 0-0.2 10/21/93 SS17-4 202040	SOIL SEAD-17 0-0.2 10/21/93 SS17-5 202041	SOIL SEAD-17 0-0.2 10/21/93 SS17-6 202042	SOIL SEAD-17 0-0.2 10/21/93 SS17-7 202043	SOIL SEAD-17 0-0.2 10/21/93 SS17-8 202044	SOIL SEAD-17 0-0.2 10/20/93 SS17-9 201895
PESTICIDES/PCB														
Heptachlor epoxide	ug/kg	1.1	3.1%	20	0	2.1 U	2.3 U	2.2 U	2.1 U	2.2 U	1.8 U	2.1 U	2.1 U	1.8 U
Endosulfan I	ug/kg	0.76	3.1%	900	0	2.1 U	2.3 U	2.2 U	2.1 U	2.2 U	1.8 U	2.1 U	2.1 U	1.8 U
Dieldrin	ug/kg	62	3.1%	44	1	4.1 U	4.4 U	4.3 U	4.1 U	4.3 U	3.4 U	4 U	4.1 U	3.4 U
4,4'-DDE	ug/kg	37	37.5%	2100	0	5.2	4.4 U	4.3 U	22	4.3 U	11	3.2 J	3.4 J	8.8
4,4'-DDD	ug/kg	15	6.3%	2900	0	4.7 J	4.4 U	4.3 U	4.1 U	4.3 U	3.4 U	4 U	4.1 U	3.4 U
4,4'-DDT	ug/kg	10	15.6%	2100	0	4.1 U	4.4 U	4.3 U	2.6 J	4.3 U	1.9 J	4 U	4.1 U	3.4 U
Aroclor-1254	ug/kg	61	3.1%	1000(a)	0	41 U	44 U	43 U	41 U	43 U	34 U	40 U	41 U	34 U
Aroclor-1260	ug/kg	38	9.4%	1000(a)	0	41 U	44 U	43 U	41 U	43 U	34 U	40 U	41 U	34 U
METALS														
Aluminum	mg/kg	19300	100.0%	15523	11	11800	14900	15200	10800	17300	10900	16600	14300	3790
Antimony	mg/kg	52	22.2%	5	3	12.9 U R	10.4 U R	13.6 U R	12.5 U R	10 U R	12.9 R	8.2 J R	7.4 J R	10.7
Arsenic	mg/kg	16.1	100.0%	7.5	7	6	5.4	5	6.6	7.4	16.1	8.2	8.5	4.8
Barium	mg/kg	447	53.1%	300	3	102 R	122 R	102 R	192 R	146 R	352 R	447 R	337 R	78.7
Beryllium	mg/kg	0.99	100.0%	1	0	0.5 J	0.58 J	0.42 J	0.52 J	0.81 J	0.5 J	0.76 J	0.69	0.18 J
Cadmium	mg/kg	14.3	59.4%	1	19	2.3	1.6	2.2	4.9	3.7	9.9	7.3	5.1	6.3
Calcium	mg/kg	209000	100.0%	120725	2	99300	2830	2180	117000	2740	89300	3780	110000	177000
Chromium	mg/kg	27.9	100.0%	24	4	16.6	19	16.8	18.3	23.6	22.5	23.4	23.9	10
Cobalt	mg/kg	21.9	100.0%	30	0	6.1 J	6.4 J	5.7 J	10.4 J	9.6	11.3	14.7	13.6	4.7 J
Copper	mg/kg	654	100.0%	25	28	81	54.4	39.3	249	73	362	423	654	136
Iron	mg/kg	38700	100.0%	28986	3	16400	20800	19300	19400	25000	24300	26400	27600	8020
Lead	mg/kg	3150	96.9%	30	25	594	371	375	1680	577	3150	2310	2190	1340
Magnesium	mg/kg	18100	100.0%	12308	2	7430	3110	2540	6900	3670	8840	4520	8380	17300
Manganese	mg/kg	1160	100.0%	759	4	430	319	277	431	737	399	431	590	270 J
Mercury	mg/kg	1	90.6%	0.1	3	0.07 J	1 J	0.07 J	0.07 J	0.9 J	0.06 J	0.1 J	0.09 J	0.04 J
Nickel	mg/kg	43.7	100.0%	37	7	19.8	18.3	14.1	28	24.9	37.7	29.1	43.7	16.4
Potassium	mg/kg	2260	100.0%	1548	10	1500	1080	1060 J	1380	1520	1420	1370	1520	1110
Selenium	mg/kg	1.6	43.8%	2	0	0.26 J	0.27 UJ	0.37 J	0.36 J	0.23 UJ	0.68 J	0.25 UJ	0.16 J	0.21 J
Silver	mg/kg	5.5	28.1%	0.5	8	1.6 UJ	1.3 UJ	1.7 UJ	1.6 UJ	1.3 UJ	2.8 J	1 UJ	4 J	5.5
Sodium	mg/kg	249	100.0%	114	15	147 J	33.7 J	33.5 J	144 J	53.1 J	168 J	66.9 J	144 J	247 J
Thallium	mg/kg	0.25	9.4%	0.3	0	0.24 U	0.3 U	0.26 U	0.25 U	0.25 U	2 U	0.27 U	0.22 J	0.17 U
Vanadium	mg/kg	30.7	100.0%	150	0	21	26.6	29.2	17.5	29.7	16.3	28.8	22.2	8.9
Zinc	mg/kg	1530	100.0%	90	23	200	136	129	324	237	497	437	613	120
OTHER ANALYSES														
Nitrate/Nitrite-Nitrogen	mg/kg	3.8	100.0%	NA	NA	0.21	0.67	0.13	0.51	0.17	3.8	0.15	0.08	3.5
Total Solids	%W/W	96.5				79.5	73.7	76.8	81.3	76.9	95.7	80.9	79.8	96.5

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 11/09/93 SS17-10 204035	SOIL SEAD-17 0-0.2 11/09/93 SS17-11 204037	SOIL SEAD-17 0-0.2 10/21/93 SS17-12 202047	SOIL SEAD-17 0-0.2 10/20/93 SS17-13 201896	SOIL SEAD-17 0-0.2 10/21/93 SS17-14 202048	SOIL SEAD-17 0-0.2 10/20/93 SS17-15 201897	SOIL SEAD-17 0-0.2 10/21/93 SS17-16 202049	SOIL SEAD-17 0-0.2 10/21/93 SS17-17 202050	SOIL SEAD-17 0-0.2 10/22/93 SS17-18 202051
VOLATILE ORGANICS														
Methylene Chloride	ug/kg	8	3.1%	100	0	11 U	13 U	12 U	4 J	11 U	11 U R	13 U	14 U	13 U
Acetone	ug/kg	15	3.1%	200	0	11 U	13 U	12 U	7 J	11 U	11 U R	13 U	72 U	13 U
Toluene	ug/kg	4	6.3%	1500	0	11 U	13 U	12 U	1 J	11 U	11 U R	13 U	14 U	13 U
HERBICIDES														
MCPA	ug/kg	34000	12.5%	NA	NA	5300 U	6300 U	5900 U	5400 U	5300 U	5300 U	6800 U	32000	6600 U
NITROAROMATICS														
2,4-Dinitrotoluene	ug/kg	330	9.4%	NA	NA	330 J	130 U	130 U	130	130 U	130 U	130 U	130 U	130 U R
SEMIVOLATILE ORGANICS														
2,6-Dinitrotoluene	ug/kg	70	3.1%	1000	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	430 U
2,4-Dinitrotoluene	ug/kg	1400	9.4%	NA	NA	61 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	24 J
N-Nitrosodiphenylamine	ug/kg	27	3.1%	50000 *	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	430 U
Phenanthrene	ug/kg	120	28.1%	50000 *	0	72 J	420 U	390 U	19 J	350 UJ	350 U R	450 U	430 U	48 J
Anthracene	ug/kg	23	3.1%	50000 *	0	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	430 U
Di-n-butylphthalate	ug/kg	1200	59.4%	8100	0	48 J	66 J	210 J	21 J	350 UJ	350 U R	340 J	480	500
Fluoranthene	ug/kg	190	43.8%	50000 *	0	150 J	420 U	390 U	19 J	350 UJ	350 U R	31 J	23 J	88 J
Pyrene	ug/kg	170	40.6%	50000 *	0	110 J	26 J	390 U	17 J	350 UJ	350 U R	28 J	430 U	73 J
Butylbenzylphthalate	ug/kg	46	6.3%	50000 *	0	46 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	430 U
Benzo(a)anthracene	ug/kg	72	28.1%	220	0	38 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	31 J
Chrysene	ug/kg	78	28.1%	400	0	78 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	55 J
bis(2-Ethylhexyl)phthalate	ug/kg	1300	56.3%	50000 *	0	810 U	1300	390 U	460 J	50 J	350 U R	450 U	430 U	1200
Benzo(b)fluoranthene	ug/kg	70	28.1%	1100	0	50 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	46 J
Benzo(k)fluoranthene	ug/kg	49	21.9%	1100	0	38 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	37 J
Benzo(a)pyrene	ug/kg	58	18.8%	61	0	32 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	31 J
Indeno(1,2,3-cd)pyrene	ug/kg	62	12.5%	3200	0	25 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	40 J
Dibenz(a,h)anthracene	ug/kg	40	3.1%	14	1	350 U	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	430 U
Benzo(g,h,i)perylene	ug/kg	63	18.8%	50000 *	0	27 J	420 U	390 U	350 U	350 UJ	350 U R	450 U	430 U	42 J

TABLE 2-6

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

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17
	DEPTH (FEET)					0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2
	SAMPLE DATE		FREQUENCY			11/09/93	11/09/93	10/21/93	10/20/93	10/21/93	10/20/93	10/21/93	10/21/93	10/22/93
	ES ID		OF		NO. ABOVE	SS17-10	SS17-11	SS17-12	SS17-13	SS17-14	SS17-15	SS17-16	SS17-17	SS17-18
	LAB ID	MAXIMUM	DETECTION	TAGM	TAGM	204035	204037	202047	201896	202048	201897	202049	202050	202051
COMPOUND	UNITS			(j)										
PESTICIDES/PCB														
Heptachlor epoxide	ug/kg	1.1	3.1%	20	0	1.8 U	2.2 U	2 U	1.8 UJ	1.8 U	1.8 U	2.3 U	2.2 U	1.1 J
Endosulfan I	ug/kg	0.76	3.1%	900	0	1.8 U	2.2 U	2 U	0.76 J	1.8 U	1.8 U	2.3 U	2.2 U	2.2 U
Dieldrin	ug/kg	62	3.1%	44	1	3.5 U	62	3.9 U	3.5 UJ	3.5 U	3.5 U	4.5 U	4.3 U	4.3 U
4,4'-DDE	ug/kg	37	37.5%	2100	0	37	4.2 U	2.9 J	11 J	2.7 J	3.5 U	4.5 U	4.3 U	17
4,4'-DDD	ug/kg	15	6.3%	2900	0	3.5 U	4.2 U	3.9 U	3.5 UJ	3.5 U	3.5 U	4.5 U	4.3 U	4.3 U
4,4'-DDT	ug/kg	10	15.6%	2100	0	10	4.2 U	3.9 U	4.9 J	3.5 U	3.5 U	4.5 U	4.3 U	7
Aroclor-1254	ug/kg	61	3.1%	1000(a)	0	35 U	42 U	39 U	35 UJ	35 U	35 U	45 U	43 U	43 U
Aroclor-1260	ug/kg	38	9.4%	1000(a)	0	35 U	42 U	39 U	35 UJ	35 U	35 U	45 U	43 U	43 U
METALS														
Aluminum	mg/kg	19300	100.0%	15523	11	9990 J	14200	13100	10700	4660	12600	17300	14100	14400
Antimony	mg/kg	52	22.2%	5	3	52 J	12.4 U	10.8 U R	39.2	11.4 J R	9.8 U	12.4 U R	11.6 U R	15.3 R
Arsenic	mg/kg	16.1	100.0%	7.5	7	7 J	4.5 J	6.5	6.7	10.6	6.1	6.5	5.7	8.4
Barium	mg/kg	447	53.1%	300	3	357 J	189	203 R	343	199 R	122	210 R	132 R	452 R
Beryllium	mg/kg	0.99	100.0%	1	0	0.48 J	0.73 J	0.59 J	0.5 J	0.34 J	0.54 J	0.82 J	0.74 J	0.71
Cadmium	mg/kg	14.3	59.4%	1	19	21.7 R	1.2 R	4.5	8.3	10.8	0.93 J	2.3	2	14.3
Calcium	mg/kg	209000	100.0%	120725	2	113000 J	4670	88400	104000	209000	37800	4760	3400	39800
Chromium	mg/kg	27.9	100.0%	24	4	21.3 J	19.7	20	23.8	9.8	23.1	23	19.7	23.9
Cobalt	mg/kg	21.9	100.0%	30	0	9.9 J	9.3 J	12.3	8 J	5.6 J	12	7.7 J	21.9	11.9
Copper	mg/kg	654	100.0%	25	28	546 J	60.7 J	202	404	499	94.5	182	47.8	409
Iron	mg/kg	38700	100.0%	28986	3	21600 J	23100	23600	19500	11100	27500	24200	23400	25300
Lead	mg/kg	3150	96.9%	30	25	6340 R	329	1210	2940	1310	472	595	373	2780
Magnesium	mg/kg	18100	100.0%	12308	2	9830 J	3640	6600	8890	8330	8880	4170	3520	7590
Manganese	mg/kg	1160	100.0%	759	4	392 J	685	595	314 J	221	324 J	613	880	525
Mercury	mg/kg	1	90.6%	0.1	3	0.03 UJ	0.07 J	0.07 J	0.03 J	0.1 J	0.05 J	0.36 J	0.07 J	0.09 J
Nickel	mg/kg	43.7	100.0%	37	7	34.6 J	21.3	33.9	31.9	28.5	43.5	25.2	23.5	39.5
Potassium	mg/kg	2260	100.0%	1548	10	1350 J	1210	1260	1610	1370	1810	1810	1070 J	1570
Selenium	mg/kg	1.6	43.8%	2	0	1.6 J	0.64 J	0.23 UJ	0.47 J	0.34 J	0.2 J	0.25 UJ	0.25 UJ	0.19 J
Silver	mg/kg	5.5	28.1%	0.5	8	4.6 J	1.6 UJ	1.4 UJ	5.2	3.8 J	1.2 U	1.6 UJ	1.5 UJ	4.7 J
Sodium	mg/kg	249	100.0%	114	15	197 J	49.8 J	121 J	249 J	179 J	167 J	56.6 J	71.3 J	109 J
Thallium	mg/kg	0.25	9.4%	0.3	0	0.22 UJ	0.22 UJ	0.25 U	0.21 U	1.3 U	0.21 U	0.27 U	0.28 U	0.19 U
Vanadium	mg/kg	30.7	100.0%	150	0	15.3 J	25.9	20	17.7	10.2 J	18.3	29.8	25.5	23.6
Zinc	mg/kg	1530	100.0%	90	23	620 J	110 J	574	315	480	155	150	140	1530
OTHER ANALYSES														
Nitrate/Nitrite-Nitrogen	mg/kg	3.8	100.0%	NA	NA	0.1	2.4	0.06	0.81	1.1	0.84	0.21	0.14	0.13
Total Solids	%W/W	96.5				93.7	78.8	85	92.6	93.8	94.2	73.5	75.7	76.2

TABLE 2-6

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

COMPOUND	MATRIX	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17	SEAD-17
	DEPTH (FEET)					0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-0.2	0-2	2-4	4-6
	SAMPLE DATE					10/22/93	10/21/93	10/21/93	10/21/93	10/21/93	10/21/93	12/01/93	12/01/93	12/01/93
	ES ID					SS17-24	SS17-19	SS17-20	SS17-21	SS17-22	SS17-23	SB17-1.1	SB17-1.2	SB17-1.3
	LAB ID					202077	202053	202054	202055	202075	202076	205914	205915	205916
	UNITS					SS17-18DUP								
VOLATILE ORGANICS														
Methylene Chloride	ug/kg	8	3.1%	100	0	8 J	16 U	12 U	14 U	14 U	14 U	12 U	12 U	11 U
Acetone	ug/kg	15	3.1%	200	0	15 J	41 U	12 U	14 U	14 U	14 U	12 U	12 U	11 U
Toluene	ug/kg	4	6.3%	1500	0	13 UJ	16 U	12 U	14 U	14 U	14 U	12 U	12 U	11 U
HERBICIDES														
MCPA	ug/kg	34000	12.5%	NA	NA	6600 U	6900 U	6500 U	6600 U	6500 U	6600 U	6400 U	5800 U	5400 U
NITROAROMATICS														
2,4-Dinitrotoluene	ug/kg	330	9.4%	NA	NA	72 J	130 U	130 U	130 U	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANICS														
2,6-Dinitrotoluene	ug/kg	70	3.1%	1000	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
2,4-Dinitrotoluene	ug/kg	1400	9.4%	NA	NA	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
N-Nitrosodiphenylamine	ug/kg	27	3.1%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
Phenanthrene	ug/kg	120	28.1%	50000 *	0	34 J	2300 U	420 U	430 U	20 J	430 U	420 U	380 U	360 U
Anthracene	ug/kg	23	3.1%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
Di-n-butylphthalate	ug/kg	1200	59.4%	8100	0	430 U	1200 J	510	760	430 U	430 U	420 U	380 U	360 U
Fluoranthene	ug/kg	190	43.8%	50000 *	0	52 J	2300 U	420 U	430 U	49 J	430 U	420 U	380 U	360 U
Pyrene	ug/kg	170	40.6%	50000 *	0	38 J	2300 U	420 U	430 U	40 J	430 U	420 U	380 U	360 U
Butylbenzylphthalate	ug/kg	46	6.3%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
Benzo(a)anthracene	ug/kg	72	28.1%	220	0	430 U	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	360 U
Chrysene	ug/kg	78	28.1%	400	0	38 J	2300 U	420 U	430 U	28 J	430 U	420 U	380 U	360 U
bis(2-Ethylhexyl)phthalate	ug/kg	1300	56.3%	50000 *	0	1300	2300 U	420 U	200 J	430 U	430 U	42 J	380 U	21 J
Benzo(b)fluoranthene	ug/kg	70	28.1%	1100	0	32 J	2300 U	420 U	430 U	28 J	430 U	420 U	380 U	360 U
Benzo(k)fluoranthene	ug/kg	49	21.9%	1100	0	24 J	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	360 U
Benzo(a)pyrene	ug/kg	58	18.8%	61	0	430 U	2300 U	420 U	430 U	21 J	430 U	420 U	380 U	360 U
Indeno(1,2,3-cd)pyrene	ug/kg	62	12.5%	3200	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
Dibenz(a,h)anthracene	ug/kg	40	3.1%	14	1	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U
Benzo(g,h,l)perylene	ug/kg	63	18.8%	50000 *	0	430 U	2300 U	420 U	430 U	430 U	430 U	420 U	380 U	360 U

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-0.2 10/22/93 SS17-24 202077 SS17-18DUP	SOIL SEAD-17 0-0.2 10/21/93 SS17-19 202053	SOIL SEAD-17 0-0.2 10/21/93 SS17-20 202054	SOIL SEAD-17 0-0.2 10/21/93 SS17-21 202055	SOIL SEAD-17 0-0.2 10/21/93 SS17-22 202075	SOIL SEAD-17 0-0.2 10/21/93 SS17-23 202076	SOIL SEAD-17 0-2 12/01/93 SB17-1.1 205914	SOIL SEAD-17 2-4 12/01/93 SB17-1.2 205915	SOIL SEAD-17 4-6 12/01/93 SB17-1.3 205916
PESTICIDES/PCB														
Heptachlor epoxide	ug/kg	1.1	3.1%	20	0	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	1.9 U	1.8 U
Endosulfan I	ug/kg	0.76	3.1%	900	0	2.2 U	2.3 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	1.9 U	1.8 U
Dieldrin	ug/kg	62	3.1%	44	1	4.3 U	4.5 U	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.6 U
4,4'-DDE	ug/kg	37	37.5%	2100	0	17	2.5 J	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.6 U
4,4'-DDD	ug/kg	15	6.3%	2900	0	4.3 U	15	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.6 U
4,4'-DDT	ug/kg	10	15.6%	2100	0	7.4	4.5 U	4.2 U	4.3 U	4.3 U	4.3 U	4.2 U	3.8 U	3.6 U
Aroclor-1254	ug/kg	61	3.1%	1000(a)	0	43 U	45 U	42 U	43 U	43 U	43 U	42 U	61	36 U
Aroclor-1260	ug/kg	38	9.4%	1000(a)	0	43 U	45 U	21 J	28 J	43 U	43 U	42 U	38 U	36 U
METALS														
Aluminum	mg/kg	19300	100.0%	15523	11	18400	15500	13900	14400	18100	15700	13700	18100	8700
Antimony	mg/kg	52	22.2%	5	3	17.4 J	9 U R	8.7 U R	11 U R	12.8 UJ	13.1 UJ	11.7 UJ	11.8 UJ	9 UJ
Arsenic	mg/kg	16.1	100.0%	7.5	7	9.1	6.3	6.5	8.9	5.9	5.3	4.3	5.2	3.4
Barium	mg/kg	447	53.1%	300	3	447	149 R	96.2 R	96.5 R	127	92.6	107	114	59.4
Beryllium	mg/kg	0.99	100.0%	1	0	0.87 J	0.83 J	0.71 J	0.74 J	0.8 J	0.72 J	0.7 J	0.9 J	0.42 J
Cadmium	mg/kg	14.3	59.4%	1	19	14.3	2.9	0.54 U	0.69 U	1.5	0.82 U	0.73 U	0.74 U	0.56 U
Calcium	mg/kg	209000	100.0%	120725	2	27600	4210	6230	3910	6900	2510	2870	20900	72800
Chromium	mg/kg	27.9	100.0%	24	4	27.2	22.9	21.4	23.2	23.8	20.3	17.6	25.1	13.9
Cobalt	mg/kg	21.9	100.0%	30	0	12.5	10.2	11.1	12.4	9.9 J	9.4 J	9.9 J	13.3	8.8
Copper	mg/kg	654	100.0%	25	28	378 J	81.7	26.9	25.9	52 J	22.6 J	46.4	26.9	20
Iron	mg/kg	38700	100.0%	28986	3	28000	25500	28700	28800	24700	22700	25100	29900	18800
Lead	mg/kg	3150	96.9%	30	25	2310	402	69.2	44.9	226	111	266	11.4 J	7.5 J
Magnesium	mg/kg	18100	100.0%	12308	2	6910	4260	4770	4930	4880	3720	3330	8490	18100
Manganese	mg/kg	1160	100.0%	759	4	611	741	602	857	662	598	547	487	391
Mercury	mg/kg	1	90.6%	0.1	3	0.07	0.07 J	0.08 J	0.06 J	0.06 J	0.04 J	0.05 J	0.06 J	0.03 UJ
Nickel	mg/kg	43.7	100.0%	37	7	40.4	30.2	31	35.6	27	22.6	19.1	42	25.2
Potassium	mg/kg	2260	100.0%	1548	10	2260	1610	1270	1410	1960	1430	628 J	1560	1090
Selenium	mg/kg	1.6	43.8%	2	0	0.45 J	0.23 UJ	0.18 UJ	0.2 UJ	0.24 UJ	0.26 UJ	0.25 UJ	0.24 UJ	0.14 UJ
Silver	mg/kg	5.5	28.1%	0.5	8	3.2	1.1 UJ	1.1 UJ	1.4 UJ	1.6 U	1.7 U	1.5 U	1.5 U	1.1 U
Sodium	mg/kg	249	100.0%	114	15	129 J	59.5 J	40.4 J	36.3 J	87 J	46 J	46.2 J	74.6 J	137 J
Thallium	mg/kg	0.25	9.4%	0.3	0	0.27 U	0.25 U	0.2 U	0.22 U	0.26 U	0.29 U	0.28 UJ	0.26 UJ	0.15 UJ
Vanadium	mg/kg	30.7	100.0%	150	0	30	26.3	24	24.1	30.1	26.4	23.1	27	13.9
Zinc	mg/kg	1530	100.0%	90	23	1420	351	71.6	83.9	196	75.5	93.4	80.2	57.1
OTHER ANALYSES														
Nitrate/Nitrite-Nitrogen	mg/kg	3.8	100.0%	NA	NA	0.08	0.2	0.22	0.24	0.09	0.07	0.15	0.33	0.24
Total Solids	%W/W	96.5				75.6	73.3	78.3	76.4	75.8	76.2	78.4	86.6	92.2

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-2 10/27/93 SB17-2.1 202502	SOIL SEAD-17 2-4 10/27/93 SB17-2.2 202503	SOIL SEAD-17 2-4 10/27/93 SB17-2.10 202505 SS17-2.2DUP	SOIL SEAD-17 0-2 11/30/93 SB17-3.1 205877	SOIL SEAD-17 2-4 11/30/93 SB17-3.2 205878	SOIL SEAD-17 0-2 11/30/93 SB17-4.1 205879	SOIL SEAD-17 2-4 11/30/93 SB17-4.2 205880
VOLATILE ORGANICS												
Methylene Chloride	ug/kg	8	3.1%	100	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
Acetone	ug/kg	15	3.1%	200	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
Toluene	ug/kg	4	6.3%	1500	0	12 UJ	12 U	13 U	12 U	13 U	12 U	12 U
HERBICIDES												
MCPA	ug/kg	34000	12.5%	NA	NA	6000 U	5800 U	5800 U	6100 U	5900 U	5900 U	5400 U
NITROAROMATICS												
2,4-Dinitrotoluene	ug/kg	330	9.4%	NA	NA	130 U	130 U	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANICS												
2,6-Dinitrotoluene	ug/kg	70	3.1%	1000	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
2,4-Dinitrotoluene	ug/kg	1400	9.4%	NA	NA	390 U	380 U	380 U	400 U	390 U	390 U	360 U
N-Nitrosodiphenylamine	ug/kg	27	3.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Phenanthrene	ug/kg	120	28.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Anthracene	ug/kg	23	3.1%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Di-n-butylphthalate	ug/kg	1200	59.4%	8100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Fluoranthene	ug/kg	190	43.8%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Pyrene	ug/kg	170	40.6%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Butylbenzylphthalate	ug/kg	46	6.3%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Benzo(a)anthracene	ug/kg	72	28.1%	220	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Chrysene	ug/kg	78	28.1%	400	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
bis(2-Ethylhexyl)phthalate	ug/kg	1300	56.3%	50000 *	0	390 U	490	480	93 J	72 J	59 J	27 J
Benzo(b)fluoranthene	ug/kg	70	28.1%	1100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Benzo(k)fluoranthene	ug/kg	49	21.9%	1100	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Benzo(a)pyrene	ug/kg	58	18.8%	61	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Indeno(1,2,3-cd)pyrene	ug/kg	62	12.5%	3200	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Dibenz(a,h)anthracene	ug/kg	40	3.1%	14	1	390 U	380 U	380 U	400 U	390 U	390 U	360 U
Benzo(g,h,i)perylene	ug/kg	63	18.8%	50000 *	0	390 U	380 U	380 U	400 U	390 U	390 U	360 U

TABLE 2-6

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (j)	NO. ABOVE TAGM	SOIL SEAD-17 0-2 10/27/93 SB17-2.1 202502	SOIL SEAD-17 2-4 10/27/93 SB17-2.2 202503	SOIL SEAD-17 2-4 10/27/93 SB17-2.10 202505 SS17-2.2DUP	SOIL SEAD-17 0-2 11/30/93 SB17-3.1 205877	SOIL SEAD-17 2-4 11/30/93 SB17-3.2 205878	SOIL SEAD-17 0-2 11/30/93 SB17-4.1 205879	SOIL SEAD-17 2-4 11/30/93 SB17-4.2 205880
PESTICIDES/PCB												
Heptachlor epoxide	ug/kg	1.1	3.1%	20	0	2 U	2 U	1.9 U	2.1 U	2 U	2 U	1.8 U
Endosulfan I	ug/kg	0.76	3.1%	900	0	2 U	2 U	1.9 U	2.1 U	2 U	2 U	1.8 U
Dieldrin	ug/kg	62	3.1%	44	1	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
4,4'-DDE	ug/kg	37	37.5%	2100	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
4,4'-DDD	ug/kg	15	6.3%	2900	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
4,4'-DDT	ug/kg	10	15.6%	2100	0	3.9 U	3.8 U	3.8 U	4 U	3.9 U	3.9 U	3.6 U
Aroclor-1254	ug/kg	61	3.1%	1000(a)	0	39 U	38 U	38 U	40 U	39 U	39 U	36 U
Aroclor-1260	ug/kg	38	9.4%	1000(a)	0	39 U	38 U	38 U	40 U	39 U	39 U	36 U
METALS												
Aluminum	mg/kg	19300	100.0%	15523	11	15900	15600	14100	19300	13200	15100	11600
Antimony	mg/kg	52	22.2%	5	3	12.1 UJ	11.8 UJ	9.6 UJ	6.9 UJ	11.9 UJ	6.9 UJ	6.1 UJ
Arsenic	mg/kg	16.1	100.0%	7.5	7	5.2	6.9	6.3	4.1	5.4	4.9	5.7
Barium	mg/kg	447	53.1%	300	3	158	68.5	71.4	104	73.7	89.2	51.6
Beryllium	mg/kg	0.99	100.0%	1	0	0.62 J	0.56 J	0.58 J	0.99	0.63 J	0.72	0.56 J
Cadmium	mg/kg	14.3	59.4%	1	19	2.8	0.74 U	0.6 U	0.43 U	0.74 U	0.43 U	0.38 U
Calcium	mg/kg	209000	100.0%	120725	2	48200	44200	115000	2620	4920	3640	18100
Chromium	mg/kg	27.9	100.0%	24	4	27.1	23.3	20.3	27.9	20.1	21.6	18.4
Cobalt	mg/kg	21.9	100.0%	30	0	10.8 J	9.4 J	9.6	21.7	9 J	9.5	11
Copper	mg/kg	654	100.0%	25	28	85.1	18.5	21.5	25.9	26.9	24	22.7
Iron	mg/kg	38700	100.0%	28986	3	38700	26700	24900	36100	25800	27700	25600
Lead	mg/kg	3150	96.9%	30	25	686	13	11.2	24.6 J	21.2 J	12 J	11.7 J
Magnesium	mg/kg	18100	100.0%	12308	2	6630	8380	8370	5820	4600	5170	7890
Manganese	mg/kg	1160	100.0%	759	4	673	409	1160	1080	338	274	403
Mercury	mg/kg	1	90.6%	0.1	3	0.04 U	0.04 J	0.04 J	0.06 J	0.04 J	0.04 U	0.03 J
Nickel	mg/kg	43.7	100.0%	37	7	34.7	30.8	27.4	37.2	31.5	28.6	30.8
Potassium	mg/kg	2260	100.0%	1548	10	1630	1720	1750	1540	1350	1220	960
Selenium	mg/kg	1.6	43.8%	2	0	0.25 UJ	0.21 UJ	0.25 UJ	0.26 UJ	0.17 UJ	0.18 UJ	0.23 UJ
Silver	mg/kg	5.5	28.1%	0.5	8	1.5 UJ	1.5 UJ	1.2 UJ	0.88 U	1.5 U	0.87 U	0.77 U
Sodium	mg/kg	249	100.0%	114	15	145 J	177 J	239 J	70.8 J	80.2 J	65.6 J	75.9 J
Thallium	mg/kg	0.25	9.4%	0.3	0	0.27 U	0.23 U	0.27 U	0.28 UJ	0.18 UJ	0.2 UJ	0.25 UJ
Vanadium	mg/kg	30.7	100.0%	150	0	27.3	23.9	21.8	30.7	21.1	26.1	18.6
Zinc	mg/kg	1530	100.0%	90	23	172	63	76.7	69.7	69	64.2	85.1
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/kg	3.8	100.0%	NA	NA	0.51	0.05	0.01 U	0.22	0.19	0.41	0.22
Total Solids	%W/W	96.5				83.8	85.8	87.2	82	85.2	83.6	91.9

Notes:
a) The TAGM value for PCBs is 1000 ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10ppm; total Semi-VOCs <500ppm; individual semi-VOCs < 50 ppm.
c) NA = Not Available
d) U = Compound was not detected.
e) J = the reported value is an estimated concentration.
f) R = the data was rejected in the data validating process.
g) UJ = the compound was not detected; the associated reporting limit is approximate.
j) NYSDEC Technical and Administrative Guidance Memorandum (TAGM). Soil cleanup objectives are based ona soil organic carbon content of 1%.

TABLE 2-7

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

	MATRIX				WATER	WATER	WATER	WATER
	LOCATION				SEAD-17	SEAD-17	SEAD-17	SEAD-17
	SAMPLE DATE		NY AWQS	NO. ABOVE	01/25/94	11/18/93	01/26/94	01/25/94
	ES ID	MAXIMUM	CLASS GA	CRITERIA	MW17-1	MW17-2	MW17-3	MW17-4
	LAB ID		(a)		209339	205059	209944	209340
COMPOUND	UNITS							
NITROAROMATICS								
Tetryl	ug/L	0.08	NA	NA	0.13 U	0.08 J	0.13 U	0.13 U
METALS								
Aluminum	ug/L	10800	NA	NA	10800	7220	1070	774
Arsenic	ug/L	5.8	25	0	5.8 J	3.2 J	1.4 U	0.87 J
Barium	ug/L	147	1000	0	147 J	77.9 J	24.4 J	33.4 J
Beryllium	ug/L	0.52	3	0	0.52 J	0.4 J	0.4 U	0.4 U
Calcium	ug/L	170000	NA	NA	170000	149000	110000	113000
Chromium	ug/L	17.3	50	0	17.3	12.9	2.6 U	2.6 U
Cobalt	ug/L	11.4	NA	NA	11.4 J	7 J	4.4 U	4.4 U
Copper	ug/L	11.7	200	0	18 J	11.7 J	3.1 U	3.1 U
Iron	ug/L	18300	300	4	18300	12200	1870	1100
Lead	ug/L	NA	25	1	8.7	32.3	0.52 J	1.9 J
Magnesium	ug/L	40200	35000	1	40200	24400	17800	17800
Manganese	ug/L	550	300	3	473	459	164	550
Mercury	ug/L	0.07	2	0	0.05 J	0.07 UJ	0.04 U	0.07 J
Nickel	ug/L	24.4	NA	NA	24.4 J	15.4 J	4 U	4 U
Potassium	ug/L	5820	NA	NA	4740 J	4280 J	3590 J	5820
Selenium	ug/L	2	10	0	2 J	0.79 U	0.69 U	0.7 U
Sodium	ug/L	46100	20000	2	8270	44300	46100	17200
Vanadium	ug/L	19.9	NA	NA	19.9 J	12.8 J	3.7 U	3.7 U
Zinc	ug/L	NA	300	0	100	33	16.4 J	13 J
OTHER ANALYSES								
Nitrate/Nitrite-Nitrogen	mg/L	0.26	10	0	0.26	0.13	0.09	0.05
pH	standard units	7.59			7.43	7.46	7.59	7.53
Specific Conductivity	umhos/cm	675			390	675	420	370
Turbidity	NTU	427			427	176	47	5.4

NOTES:

a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = compound was not detected
d) J = the report value is an estimated concentration
e) UJ = the compound was not detected; the associated reporting limit is approximate
f) R = the data was rejected in the data validating process

dibenz(a,h)anthracene was detected in the sample SS17-1 at an estimated concentration of 40 J μg/kg, which is above the TAGM value of 14 μg/kg. This was the only SVOC identified in SEAD-17 soil samples above the TAGM value. The sample with the highest total SVOC concentration, SS17-18 (2215 μg/kg) was collected from the area southwest of the building. This is well below the Total SVOC TAGM guideline concentration of 500,000 μg/kg. In general, the samples collected from this area of the site appear to have the highest on-site SVOC concentrations.

Subsurface Soil

The phthalate compound bis(2-ethylhexyl) phthalate was the only SVOC detected in the subsurface soil samples analyzed. Phthalates are common laboratory contaminants. The maximum reported concentration of 490 μg/kg is well below the 50,000 μg/kg TAGM value.

Pesticide and PCB Compounds

Surface Soil

A wide distribution of pesticide compounds were identified in the surface soil samples collected at SEAD-17. Only the compound Dieldrin was detected in a single sample, SS17-11, at a concentration of 62 μg/kg that exceeded the TAGM value of 44 μg/kg. The PCB Aroclor-1260 was the only PCB compound detected in the surface soil samples analyzed. The maximum reported concentration of 28 J μg/kg is well below the 1000 μg/kg TAGM level.

Subsurface Soil

No pesticide compounds were detected in the subsurface soil samples analyzed. Aroclor-1254 was the only PCB compound which was detected in one subsurface soil sample at a concentration of 61 μg/kg. The TAGM value for Aroclor-1254 in subsurface soil is 10,000 μg/kg.

Herbicide Compounds

Surface Soil

The herbicide MCPA was identified in four of the 27 surface soil samples collected at SEAD-

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No pesticide compounds were detected in the subsurface soil samples analyzed. Aroclor-1254 was the only PCB compound which was detected in one subsurface soil sample at a concentration of 61 μg/kg. The TAGM value for Aroclor-1254 in subsurface soil is 10,000 μg/kg.

Herbicide Compounds

Surface Soil

The herbicide MCPA was identified in four of the 27 surface soil samples collected at SEAD-17. The maximum concentration of MCPA, 34000 μg/kg, was found in the surface soil sample SS17-5, collected from the area northeast of the building. Other samples with elevated concentrations of MCPA included SS17-1 (16000 μg/kg), SS17-7 (12000 μg/kg), and SS17-17 (32000 μg/kg). There is no TAGM value for MCPA in soil. There appears to be no spatial correlation to where this compound was detected at the site.

Subsurface Soil

Herbicides were not detected in the subsurface soil samples collected from SEAD-17.

Metals

Surface Soil

Eighteen of the 24 analyzed metals were found in one or more of the SEAD-17 soil samples at concentrations exceeding the associated TAGM values. Elevated levels of cadmium, copper, lead, and zinc were identified in more than half of the 27 soil samples analyzed. Figure 4.3-2 shows the concentrations of lead in the surface soil samples. The highest concentrations of cadmium (14.3 mg/kg) and zinc (1530 mg/kg) were identified in the surface soil sample SS17-18. The highest lead concentration was reported for the surface soil sample SS17-6 (3150 mg/kg), while the highest concentration of copper was reported for the surface soil sample SS17-8 (654 mg/kg). Other samples with elevated lead levels include SS17-7 (2310 mg/kg), SS17-8 (2190 mg/kg), SS17-13 (2940 mg/kg), and SS17-18 (2780 mg/kg). In general, these same samples also show elevated levels of copper and zinc.

Subsurface Samples

Eight metals were detected at elevated concentrations in various subsurface samples. The extent of elevated metals appears to be limited to the surface soil at the site and does not appear to have migrated deeper into the subsurface soil as evidenced by the following concentration ranges detected in the subsurface soil samples: 18 to 30 mg/kg copper, 7.5 J to 25 mg/kg lead, 50 to 90 mg/kg zinc, and no cadmium detected in any subsurface samples.

Nitroaromatic Compounds

Surface Soil

The nitroaromatic compound 2,4-dinitrotoluene was detected in three of the 27 surface soil samples collected at SEAD-17. The maximum concentration of 2,4-dinitrotoluene, 330 J μg/kg, was found in the surface soil sample SS17-10, collected near the southwest side of the building. Other surface soil samples with 2,4-dinitrotoluene concentrations were SS17-6 (170 μg/kg), and SS17-13 (130 μg/kg). There is no TAGM value for this compound.

Subsurface Soil

No nitroaromatic compounds were detected in subsurface soil samples collected at SEAD-17.

Indicator Compounds

Surface Soil

The surface soil samples at SEAD-17 were analyzed for nitrate/nitrite-nitrogen. The concentrations detected ranged from 0.06 mg/kg to a maximum of 3.8 mg/kg in sample SS17-6.

Subsurface Soil

Nitrate/nitrite-nitrogen was detected at concentrations ranging from 0.05 to 0.33 μg/kg in all 5 of the subsurface soil samples analyzed.

2.4.2.2 Groundwater Samples

Four monitoring wells were installed as part of the SEAD-17 investigation. The locations of the monitoring wells are shown in Figure 2-4 and the results of the analyses are presented in Table 2-7.

Volatile Organic Compounds

No VOCs were identified in the four groundwater samples collected at SEAD-17.

Semivolatile Organic Compounds

No SVOCs were identified in the four groundwater samples collected at SEAD-17.

Pesticide and PCB Compounds

No pesticides or PCB compounds were identified within the four groundwater samples collected at SEAD-17.

Herbicide Compounds

No herbicide compounds wee detected in the four groundwater samples collected at SEAD-17.

Metals

Groundwater concentrations for five metals were found above the criteria value in one or more of the 4 monitoring wells sampled. The highest concentrations of many of these metals were found in the groundwater sample collected from monitoring well MW17-1. This sample also had the highest turbidity measured of 427 NTUs. While it is difficult to ascertain the extent to which particulate matter has impacted these results, it appears that the high metal concentrations are most likely due to the high sample turbidity.

Nitroaromatic Compounds

The nitroaromatic compound Tetryl was detected in the groundwater sample collected from MW17-2 at an estimated concentration of 0.08 J μg/L. This concentration is below the method detection limit of 0.13 μg/L. No other nitroaromatic compounds were detected.

Indicator Compounds

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

2.4.2.3 Tentatively Identified Compounds

Total TIC concentrations exceeding 50 mg/kg were found in only one sample, surface soil sample SS17-19. A total TIC concentration of 93.6 mg/kg was reported in this sample. The primary TIC identified was limonene.

3.0 SCOPING OF THE RI/FS

This section describes the current understanding of SEAD-16 and SEAD-17 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-16 and SEAD-17. 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

Conceptual site models were developed for both SEAD-16 and SEAD-17 and presented in the draft final ESI Report (Parsons ES, May 1995). These models identified potential source areas and release mechanisms and potential exposure pathways and receptors. They were based upon an understanding of historical usage, physical site characteristics and current site usage. No previous environmental sampling data was available for SEAD-16 prior to the ESI. Limited sampling data were available for SEAD-17 prior to the ESI.

Using the additional sampling data gathered during the ESI, the conceptual site models were re-evaluated for both SEAD-16 and SEAD-17. The conceptual site model for SEAD-16 and SEAD-17 takes into account both site conditions and accepted pollutant behavior to formulate an understanding of the sites. These will serve as a basis for determining necessary additional studies for the RI. The following sections describe potential source areas, release mechanisms, exposure pathways and receptors for the various media investigated during the ESI. The model was developed by evaluating the following aspects:

- **Historical usage and waste disposal practices.**
- **Physical site characteristics:** This considers the physical aspects of environmental conditions and the effect these conditions may have on potential pollutant migration. These include soil characteristics, topography, subsurface geology, groundwater characteristics and local terrain.

- **Environmental fate of constituents**: This considers the fate and transport of residual materials in the environment based upon known chemical and physical properties.

The known disposal of military ordnance by incineration has been conducted at SEAD-16 from 1945 to the mid-1960s and at SEAD-17 from 1962-1989. The munitions which were incinerated typically contained metals (as organometallic compounds and metallic components of munitions, e.g.,iron, copper, aluminum, arsenic, barium, lead, tin, zinc), inorganic elements and compounds (e.g., phosphorus, nitrobarite) and organic compounds (usually nitrated hydrocarbons, e.g., TNT). These constituents are the potential pollutants of concern at SEAD-16 and SEAD-17.

3.1.1 Physical Site Characterization

3.1.1.1 SEAD-16, Abandoned Deactivation Furnace (Building S-311)

The Abandoned Deactivation Furnace, Building S-311, is located in the east-central portion of SEDA. Directly to the northwest of Building S-311 and separated by two sets of SEDA railroad tracks which pass through the site, is a smaller abandoned building, shown in Figure 1-2. The entire site is enclosed by a chain-link fence with a second gate. Access to the area is restricted. The site is composed of grasslands to the north, east, and west and by a general storage area for empty boxes and wooden debris and an unpaved roadway to the south. SEAD-17 is located approximately 800 feet southwest of SEAD-16.

The Abandoned Deactivation Furnace is an elongated building and contains stacks on the eastern end and western end and is surrounded by loading docks on the southwestern and northwestern sides. The building condition is poor with localized flooding in the basement. A sloping concrete ramp leads to the base of the building.

Two underground storage tanks (USTs) formerly existed at Building S-311. One of the USTs (Tank 311-A) had a capacity of 1,000 gallons, was installed in 1953, was located to the northwest of the building, and provided Number 2 fuel oil to the boiler used to heat the building. The second UST (Tank 311-B) had a 2,000 gallon capacity, was installed in 1953, was located to the southwest of the building, and provided Number 2 fuel oil to the deactivation furnace. Both of the tanks were removed in September of 1992. The tank removal activities and the confirmatory sampling records and chemical analyses are presented in the Final Closure Report for the Underground Tank Removal at Seneca Army Depot

Activity, Romulus New York (Science Applications International Corporation, May 1994).

The site is generally flat and slopes gently to the west. The northeastern portion of the site is vegetated with low grass and the southwestern portion is paved with asphalt. There is little topographic relief on the site with no water bodies evident. Surface water run-off is directed off-site to the southeast and southwest by small drainage swales. A water main traverses the southwestern portion of the site with a service line leading to the northwestern side of the large building. An abandoned sewer line enters the site from the northeast, approximately 50 feet south of the access gate, and connects to the central portion of Building S-311.

3.1.1.1.1 Local Geology

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

In the unpaved eastern portion of the site, a thin layer of fill (from 0 to 0.4 feet) was observed in soil boring MW16-1. Coal chips and brick shards were also present in the split spoon sample. The till in this soil boring was light brown to yellow-brown and composed of fine sand, silt, and clay, with some black shale fragments (up to 0.25 inches in diameter): however, larger shale fragments (rip-up clasts) were observed near the till/weathered shale contact. Some areas of oxidized till were noted in the upper portion of the till strata.

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

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

3.1.1.1.2 Local Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the grass-covered eastern portion of the site, surface water likely accumulates in local topographic low areas. Near the survey monuments SEAD16 and SEAD16A, surface water is directed off-site to the southeast and northwest, respectively, via small drainage swales. In the paved western portion of the site, the asphalt provides an impenetrable surface which results in an increased amount of surface water runoff on the site. Based on topographic expression, surface water flow on the asphalt is to the west.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3-1 and Figure 3-1). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and, in most instances, the deeper weathered shale horizons are saturated. Recharge of water to the monitoring wells during sampling was generally good.

3.1.1.2 SEAD-17, Existing Deactivation Furnace (Building 367)

The Existing Deactivation Furnace is located in the east-central portion of SEDA approximately 800 feet to the southwest of SEAD-16. Access to this site is restricted due to its location in the ammunition storage area. It is characterized by an elongated deactivation furnace building that is surrounded by a crushed shale road (Figure 1-3). Beyond the crushed shale road is grassland. Two small sheds are located in the eastern portion of the site. There is vehicular access to the site within SEDA from a road to the north. Both vehicular and pedestrian access to the site is restricted.

The actual deactivation furnace is a steel rotary kiln incinerator and is enclosed by an eight foot high uncovered reinforced concrete wall. The concrete wall is designed to contain the effects of a detonation. The deactivation furnace building contains an emission stack and air pollution control devices including an afterburner, 2 gas coolers, a cyclone and a baghouse on the southwestern side. The building appears to be in good condition and structurally sound.

Number 2 fuel oil was used to fire the burners in both the kiln and the afterburner, and

TABLE 3-1
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT ACTIVITY
SEAD-16

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)
MW16-1	735.54	11/5/93	4.4	731.14	11/19/93	3.40	732.14	4/4/94	3.52	732.02
MW16-2	734.56	11/5/93	3.72	730.84	11/17/93	3.54	731.02	4/4/94	3.65	730.91
MW16-3	735.48	11/4/93	4.52	730.96	11/17/93	4.22	731.26	4/4/94	4.60	730.88

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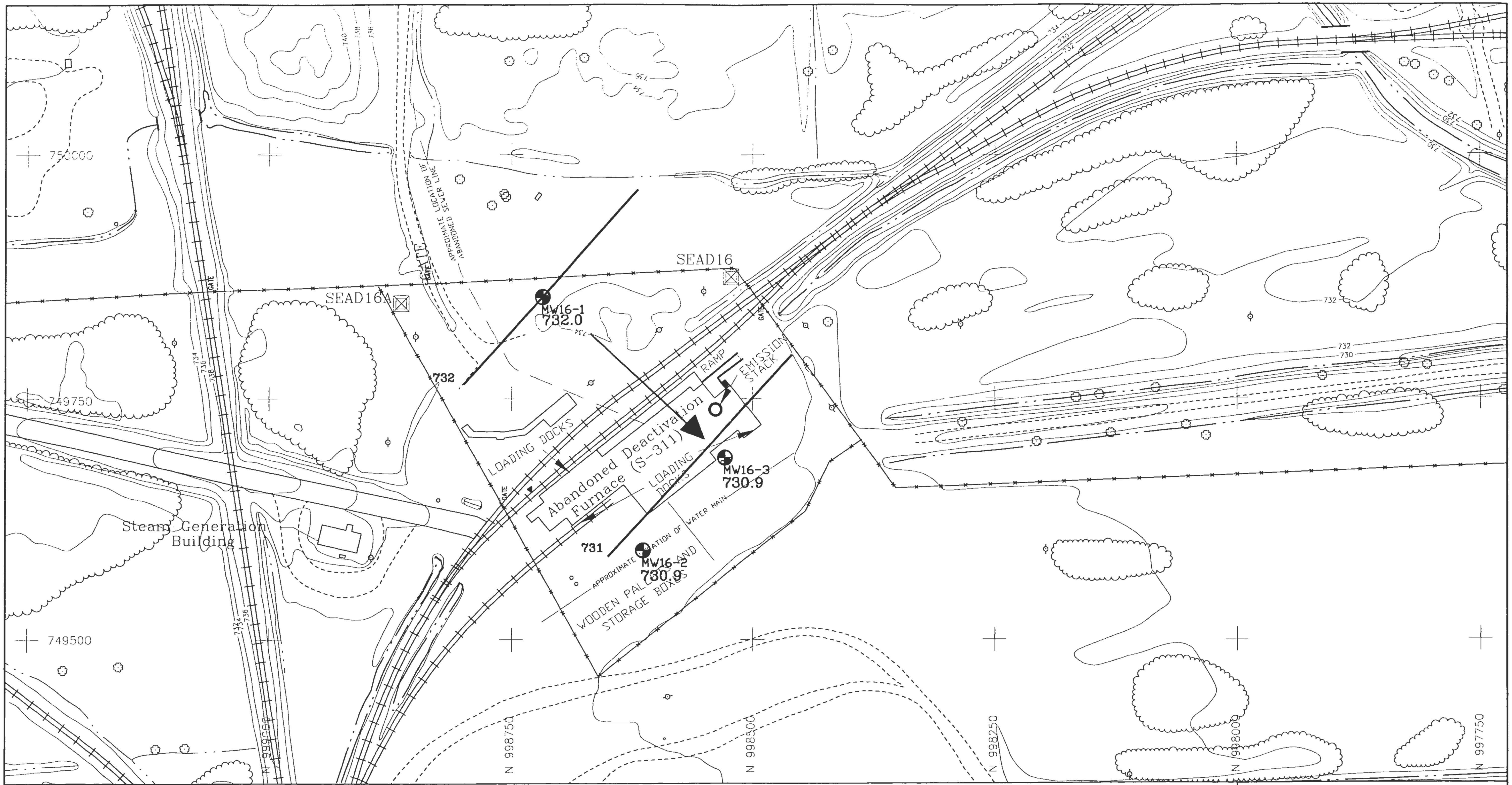

LEGEND

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 POLE
UTILITY
MAILBOX/RR SIGNAL

MW16-1 732.0 MONITORING WELL WITH WATER TABLE ELEVATION

732 GROUNDWATER ELEVATION CONTOUR

(ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 4/4/94 - ELEVATION DATUM IS NAD OF 1983

50 0 50 100
(feet)

N

R:\SENECA\RIFS\SD16-17\SD16GW.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg No. 726511-02002

FIGURE 3-1
GROUNDWATER ELEVATION MAP
APRIL 1994

SCALE 1" = 100'
DATE JULY 1995
REV A

propane is used as a pilot fuel for the afterburner burner. The liquid propane storage tank and the Number 2 fuel oil tank are located approximately 100 feet to the southeast of the deactivation furnace building, as shown in Figure 1-3. The propane and fuel oil piping from the storage and pumping area to the incinerator area is installed in a concrete ditch for leak containment. The propane storage tank is a 1000 gallon horizontal drum mounted on a concrete pad. The appropriate valves, fittings, regulators and piping are installed for propane pressure reduction and transportation to the afterburner burner pilot train.

The fuel oil storage tank is a 4000 gallon drum mounted on a 24 by 14-foot concrete pad. The fuel oil storage tank pad has a 30-inch-high wall on all sides for secondary containment. A pump, with the required valves and piping, is used to transport the fuel oil to the incinerator area.

The site is generally flat and slopes gently to the southwest. A small drainage ditch is located approximately 100 feet east of the furnace and transports surface water to the west past the southern end of the building. This ditch intersects with a well-defined ditch which flows south and ultimately flows into Kendaia Creek. In the extreme northern portion of the site, a small swale drains to the north.

3.1.1.2.1 Local Geology

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

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

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

3.1.1.2.2 Local Hydrology and Hydrogeology

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

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on the groundwater elevations measured in three monitoring wells on April 4, 1994 (Table 3-2 and Figure 3-2). The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil and in some instances the deeper weathered shale horizons were saturated. Recharge of water to the monitoring wells during sampling was generally poor to fair.

3.1.2 Environmental Fate of Constituents at SEAD-16 and SEAD-17

The constituents of concern at SEAD-16 and SEAD-17 are heavy metals, SVOCs and explosives and their environmental fate is discussed below. The discussion is meant to present general information on the fate of the selected constituents of concern, and where possible, site-specific characteristics are presented. A summary of fate and transport characteristics for the constituents of concern is presented in Table 3-3.

3.1.2.1 Metals

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

Leaching of heavy metals from soil is controlled by numerous factors. The most important consideration for leaching of heavy metals is the chemical form of the metal (base metal or cation) present in the soil. The leaching of metals from soil is substantial if the metal exists as a soluble salt. Metallic salts have been identified as a component of such items as tracer

TABLE 3-2
MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT ACTIVITY
SEAD-17

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)
MW17-1	736.33	1/6/94	4.76	731.57	1/25/94	4.98	731.35	4/4/94	2.80	733.53
MW17-2	733.75	1/6/94	3.26	730.49	11/18/94	3.18	730.57	4/4/94	3.19	730.56
MW17-3	732.15	1/6/94	4.08	728.07	1/25/94	5.37	726.78	4/4/94	2.38	729.77
MW17-4	734.59	1/6/94	4.43	730.16	1/25/94	4.78	729.81	4/4/94	3	731.59

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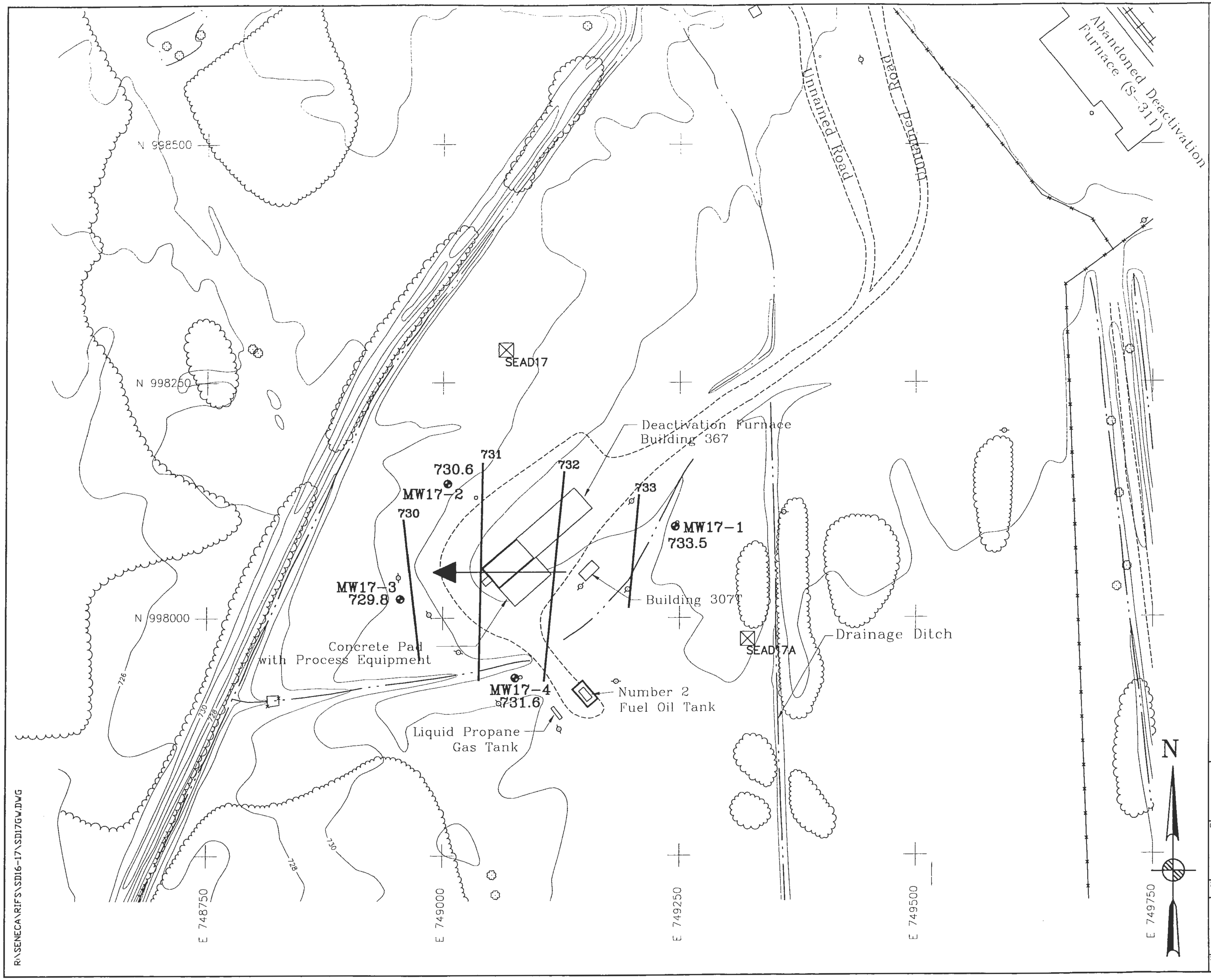


LEGEND

MINOR WATERWAY
MAJOR WATERWAY
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

MW17-1 733.5 MONITORING WELL WITH WATER TABLE ELEVATION

733 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 4/4/94 - ELEVATION DATUM IS NAD OF 1983

50 0 50 100 (feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-17 EXISTING DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg No. 726511-02002

FIGURE 3-2
GROUNDWATER ELEVATION MAP
APRIL 1994

SCALE 1" = 100'
DATE JULY 1995
REV A

TABLE 3 - 3

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

SENECA ARMY DEPOT ACTIVITY

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m³/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
Semivolatile Organic Compounds							
Phenol	93000	0.341	4.54E-07	1.42E+01	2.88E+01	3-5	1.4-2
2-Methylphenol	25000	0.24	1.50E-06	2.74E+02	8.91E+01	1-3	
4-Methylphenol		0.11	4.43E-07	2.67E+02	8.51E+01	1-3	
2,4-Dimethylphenol	4200	0.0573	2.38E-06	2.22E+02	2.63E+02	1-3	9.5-150
Benzoic Acid	2700			2.48E+02	7.41E+01		
Naphthalene	31.7	0.23	1.15E-03	1.30E+03	2.76E+03	1-110	44-95
2-Methylnaphthalene	25.4	0.0083	5.80E-05	8.50E+03	1.30E+04	1-3	
2-Chloronaphthalene	6.74	0.017	4.27E-04	4.16E+03	1.32E+04		
2,6-Dinitrotoluene	1320	0.018	3.27E-06	9.20E+01	1.00E+02	4	4.6
Acenaphthene	3.42	0.00155	9.20E-05	4.60E+03	1.00E+04		
Dibenzofuran				4.16E+03	1.32E+04		
2,4-Dinitrotoluene	240	0.0051	5.09E-06	4.50E+01	1.00E+02	5	
Diethylphthalate	896	0.0035	1.14E-06	1.42E+02	3.16E+02	1-3	14-117
Fluorene	1.69	0.00071	6.42E-05	7.30E+03	1.58E+04		
N-Nitrosodiphenylamine	113		1.40E-06	6.50E+02	1.35E+03	4	65-217
Hexachlorobenzene	0.006	0.000019	6.81E-04	3.90E+03	1.70E+05		
Phenanthrene	1	0.00021	1.59E-04	1.40E+04	2.88E+04	1-200	
Anthracene	0.045	0.000195	1.02E-03	1.40E+04	2.82E+04		
Di-n-butylphthalate	13	0.00001	2.82E-07	1.70E+05	3.98E+05	1-3	89-1800
Fluoranthene	0.206	0.0177	6.46E-06	3.80E+04	7.94E+04	140-440	
Pyrene	0.132	2.50E-06	5.04E-06	3.80E+04	7.59E+04	9-1900	
Butylbenzylphthalate	2.9	8.60E-06	1.20E-06	2.84E+04	5.89E+04		663
Benzo(a)anthracene	0.0057	1.50E-07	1.16E-06	1.38E+06	3.98E+05	240-680	
Chrysene	0.0018	6.30E-09	1.05E-06	2.00E+05	4.07E+05	160-1900	
Bis(2-Ethylhexyl)phthalate	0.285	2.00E-07	3.61E-07	5.90E+03	9.50E+03	Neg. Deg.	
Di-ni-octylphthalate	3			2.40E+06	1.58E+09		
Benzo(b)fluoranthene	0.014	5.00E-07	1.19E-05	5.50E+05	1.15E+06	360-610	
Benzo(k)fluoranthene	0.0043	5.10E-07	3.94E-05	5.50E+05	1.15E+06	910-1400	
Benzo(a)pyrene	0.0012	0.000568	1.55E-06	5.50E+06	1.15E+06	220-530	
Indeno(1,2,3-cd)pyrene	0.00053	1.00E-10	6.86E-08	1.60E+06	3.16E+06	600-730	
Dibenz(a,h)anthracene	0.0005	5.20E-11	7.33E-08	3.30E+06	6.31E+06	750-940	
Benzo(g,h,i)perylene	0.0007	1.03E-10	5.34E-08	1.60E+06	3.24E+06	590-650	

TABLE 3 - 3

SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

SENECA ARMY DEPOT ACTIVITY

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m^3/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
Explosives							
HMX	66	3.90E-09		5.08E+02	1.30E-01		
RDX	50	4.10E-09	2.00E-05	5.38E+02	7.80E-01		
1,3,5-Trinitrobenzene	35	2.20E-04	1.30E+00	5.20E+02			
1,3-Dinitrobenzene	470			1.50E+02	4.17E+01		
Tetryl							
2,4,6-Trinitrotoluene	130	0.0001	1.37E-06	5.34E+02	1.90E+00		
4-amino-2,6-Dinitrotoluene							
2-amino-4,6-Dinitrotoluene							
2,6-Dinitrotoluene	182	0.018	3.27E-06	2.49E+02	1.00E+02	4	4.6
2,4-Dinitrotoluene	270	0.0051	5.09E-06	2.01E+02	1.00E+02	5	

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).

ammunition, ignitor compositions, incendiary ammunition, flares, colored smoke and primer explosive compositions. In particular, barium nitrate, lead stearate, lead carbonate, and mercury fulminate are potential heavy metal salts or complexes which are components of ammunition that may have been tested or disposed of at SEDA. During the burning of these materials, a portion of these salts oxidize to their metallic oxide forms. In general, metal oxides are considered less likely to leach metallic ions than metallic salts. Upon contact with surface water or precipitation, the heavy metal salts may be dissolved, increasing their mobility and increasing the potential for leaching to the groundwater.

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

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

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

A RI was performed at the Open Burning (OB) Grounds at SEDA in 1992 for which over 50 surface soil samples and over 300 subsurface soil samples were collected. The pH values of the surface soil samples ranged from 5 to 8.4, and the subsurface soil samples had values ranging from 7 to 9 (Parsons ES, 1994). The soil at the OB Grounds is lithologically similar to the soil at both SEAD-16 and SEAD-17, therefore, metals in the soil at SEAD-16 and SEAD-17 are expected to be primarily present in insoluble forms. A detailed evaluation of select metals (barium, copper, lead, mercury and zinc) is given below.

Barium is a highly reactive metal that occurs naturally only in the combined state. Most barium released to the environment from industrial sources is in forms that do not become widely dispersed. Barium in soil may be taken up to a small extent either by vegetation, or transported through soil with infiltration of precipitation. Barium is not very mobile in most soil systems. The higher the level of organic matter, the greater the adsorption. The presence of calcium carbonate will also limit mobility, since barium will form $BaCO_3$, an insoluble carbonate. In aquatic media, barium is likely to precipitate out of solution as an insoluble salt, or adsorb to suspended particulate matter. Sedimentation of suspended solids removes a large portion of the barium from surface waters. Barium in sediment is found largely in the form of barium sulfate. Bioconcentration in freshwater aquatic organisms is minimal.

Copper is considered to be among the more mobile of the heavy metals in surface environments. Seasonal fluctuations have been observed in surface water copper concentrations, with higher levels in fall and winter, and lower levels in the spring and summer. Copper is not expected to volatilize from water. Since copper is an essential nutrient, it is strongly accumulated by all plants and animals, but is probably not biomagnified. The degree of persistence of copper in soil depends on the soil characteristics and the forms of copper present. For example, in soil of low organic content, soluble copper compounds may move into groundwater at a significant rate. On the other hand, the presence of organic complexing agents may restrict movement in soil, and copper may be immobilized in the form of various inorganic complexes. Copper is not expected to volatilize from soil. Several processes determine the fate of copper in aquatic environments, these being: formation of complexes, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. Organic complexes of copper are more easily adsorbed on clay and other surfaces than the free form. The aquatic fate of copper is highly dependent on factors such as pH, oxidation-reduction potential, concentration of organic matter, and the presence of other metals. With regard to the latter, it has been demonstrated that co-precipitation of copper with hydrous oxides of iron effectively scavenges copper from solution, although in most surface waters organic materials prevail over inorganic ions in complexing copper.

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

Elemental mercury is insoluble in water and binds tightly to soil particles giving it a relatively low mobility. Bacterial and fungal organisms in sediment are capable of methylating mercury. Methyl mercury, which is soluble in water, is a mobile substance and can then be ingested or absorbed. Until altered by biological processes, the primary transport method for mercury is the erosion and transportation of soil and sediment (Gough, et al., 1979). Mercury most likely exists at SEDA in the elemental state as a result of the testing or demolition of munitions containing mercury fuzes. Although a mercury salt, mercury fulminate, was used in the past as a priming explosive, it has not been commonly used since 1925 (Dunstan and Bell, 1972), and its environmental fate will not be considered at the site.

Zinc is stable in dry air, but upon exposure to moist air will form a white coating composed of basic carbonate. Zinc loses electrons (oxidizes) in aqueous environments. In the environment, zinc is found primarily in the +2 oxidation state. Elemental zinc is insoluble; most zinc compounds show negligible solubility as well, with the exception of elements (other than fluoride) from Group VII of the Periodic Table compounded with zinc (i.e., $ZnCl_2$, ZnI_2) showing a general 4:1 compound to water solubility level. In contaminated waters, zinc often complexes with a variety of organic and inorganic ligands. Therefore, the overall mobility of zinc in an aqueous environment, or through moist-to-wet soil, may be accelerated by compounding/complexing reactions.

Zinc has a tendency to adsorb to soil, sediment and suspended solids in water. Adsorption to sediments and suspended solids is the primary fate for zinc in aqueous environments, and will greatly limit the amount of solubilized zinc. Zinc is an essential element and, therefore, is accumulated by all organisms. Zinc concentrations in air are relatively low except near industrial sources. Volatilization is not an important process from soil or water.

3.1.2.2 Explosive Compounds

Table 3-3 presents the information which will serve as a basis for understanding the likely environmental fate of explosives at SEDA. Explosive compounds are considered to be semivolatile organic compounds (SVOCs). This is based upon the high molecular weights of these compounds and their low vapor pressures, typical of most SVOCs. The most volatile of the five explosives considered at this site is 2,6-dinitrotoluene (2,6 DNT), with a vapor pressure of 0.018 millimeters mercury (mm Hg). Compared to benzene, a volatile compound, which has a vapor pressure of 95.2 mm Hg it is apparent that volatilization of this compound is expected to be low, especially in soil which have a high clay content. Soil with a high clay content generally has a high, i.e. >50%, ratio of water filled to air filled porosity, therefore, there is a small amount of air space through which vapor can migrate. Compounds such as RDX and HMX have extremely low vapor pressures and would not volatilize through the soil. Consequently, volatilization of RDX and HMX are not expected to represent a significant environmental pathway.

The potential for explosives to leach to the groundwater is a complicated consideration and influenced by many factors such as solubility, cation exchange capacity, clay content and percolation rate. For this evaluation, solubility has been considered as the most representative parameter for leaching potential. Of the six explosives considered, the most soluble of the explosives are the di- and trinitrotoluenes. Their solubilities range from approximately 130 mg/l to 270 mg/l. These are similar to the solubilities of organic hydrocarbons such as toluene, (500 mg/l), or the xylenes, (150 mg/l). This range of solubilities is considered to represent a moderate degree of leaching potential. Compounds which would represent a high degree of leachibility, i.e., high solubility, would be methylene chloride, (20,000 mg/l), benzene (1780 mg/l) and TCE, (1100 mg/l). The solubilities of HMX and RDX are approximately four times less than that for the di- and trinitrotoluenes and therefore represent a smaller potential for leaching.

A review of the melting points of these compounds indicates that explosives are solids at room temperature and therefore would not migrate through soil as separate liquid phases. Instead, as precipitation interacts with these solid residues a small portion would dissolve or erode away. Complete leaching would require a long interaction period.

Field studies have confirmed the long-term potential for leaching of explosives into the groundwater. An evaluation of the critical parameters affecting the migration of explosives through soil indicated that at a former propellant manufacturing facility, 2,4-DNT leached from soil contaminated with smokeless powder for over 35 years after cessation of operations (USATHAMA, 1985). At another facility, leaching of 2,4-DNT into groundwater from former burning grounds has been documented to occur for as long as 10 years after operations had been discontinued.

Another factor to examine is the tendency of explosives compounds to adsorb to the soil. The compounds considered in this evaluation show K_{oc} values which range from approximately 100 to 500 mL/g. The SEDA site soil has been shown to possess a high percentage of fines including clay, thereby increasing the sorption potential of these compounds to the soil. As shown in Table 3-2, for the range of K_{oc} exhibited by explosives, i.e., 100-500 mL/g, these compounds would be considered intermediately mobile.

Environmental degradation of these parent organic compounds has been shown to occur by various investigators. The information available on this subject is substantial and a detailed discussion is beyond the scope of this document. However, a review of the available information indicates that nitroaromatics and nitroamines are susceptible to environmental transformations. Since some of the byproducts of these transformations may be environmentally persistent, there is a potential for concern.

Much of the available research has been conducted on the environmental transformation of TNT. A summary of the identified breakdown products resulting from environmental degradation of TNT and 2,4-DNT is presented in Figures 3-2 and 3-3 in the Generic Installation RI/FS Workplan. The environmental fate of RDX is less defined than that of the other two compounds previously mentioned. An overview of the expected degradation pathways and the byproducts produced as a result of the environmental degradation of RDX is also presented in Figure 3-4 in the Generic Installation RI/FS Workplan. The breakdown byproducts which have been identified are diverse. Analytical methods have only recently been developed which are capable of accurately detecting these compounds. The widespread application of these analytical techniques are greatly limited by the availability of standards which are essential for the analyses. Responding to the need for accurate analytical procedures and recognizing that standards for every breakdown product are not available, USATHAMA has developed Method 8330 (A copy of this method is included in Appendix C). This method is intended for the analysis of explosive residues in water, soil and sediment.

3.1.2.3 Semivolatile Organic 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.

Polynuclear aromatic hydrocarbon (PAH) compounds are the SVOCs that were detected the most frequently in the samples collected from SEAD-16 and SEAD-17 for the ESI. 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 sediment, 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 soil, 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.

3.1.3 Data Summary and Conclusions

The ESI investigations at SEAD-16 and SEAD-17 included soil borings, surface and subsurface soil sampling, installation of groundwater monitoring wells, overburden and bedrock characterization, seismic surveys, sampling of building insulation and furnace materials (SEAD-16 only), and groundwater sampling. No previous sampling data were available for SEAD-16 prior to the ESI. Sampling was conducted at SEAD-17 as part of the RCRA Part B interim closure activities prior to the ESI. The results of the ESI at both SEAD-16 and SEAD-17 were documented in the draft final ESI Report (Parsons ES, May 1995). This section will summarize the data collected to date and draw conclusions as to the likely environmental impacts those constituents have made to the site.

3.1.3.1 SEAD-16, Abandoned Deactivation Furnace (Building S-311)

3.1.3.1.1 Soil Data

Soil sampling at SEAD-16 focused upon surface soil (0-2") contamination in the immediate vicinity of Building S-311. This was based upon the premise that the principle source of the contamination in this area were emissions from the deactivated furnace stack and subsequent dispersion and deposition to surrounding soil. Random sampling conducted in this area indicated impacts to surface soil from heavy metals and SVOCs (Table 2-1). The principal metals detected above NYSDEC TAGM values were lead, mercury, zinc, and copper. Elevated level of SVOCs (primarily PAHs) were reported for some samples, although there was no consistent pattern evident. This was also true for the metals contamination. The distribution of both metals and SVOCs appear to follow a similar distribution in soil.

Nitroaromatic compounds, and in particular 2,4-dinitrotoluene, were identified in the majority of the soil samples collected at SEAD-16 at low concentrations. No TAGM values or other cleanup criteria currently exists for this compound.

3.1.3.1.2 Groundwater Data

Three monitoring wells were installed during the ESI. The results of the groundwater investigation showed levels of selective metals which exceeded AWQS for class GA (drinking water) groundwater. These metals included lead, chromium, copper and zinc. The highest concentrations were detected in MW16-3 which is one of two downgradient monitoring wells based upon the established groundwater flow direction. There were no volatile organic compounds, pesticides/PCBs, or herbicides detected in any groundwater samples. Only one SVOC, diethyphthalate, was found at 0.5 ug/l in one groundwater sample.

3.1.3.1.3 Building Material and Standing Water Data from Inside Building S-311

A total of 9 building material and furnace scale samples were collected from inside the abandoned deactivation furnace building as part of the ESI at SEAD-16. Within the building, elevated metals and SVOCs were identified. Asbestos was also identified within some of the building materials samples. Asbestos was detected in 5 of the 15 building material samples analyzed. Both chrysotile and amosite asbestos were present in two samples, while only chrysotile was present in the other 3 samples.

Two standing water samples were collected from the basement level within the abandoned deactivation furnace building as part of the ESI at SEAD-16. The analysis of the standing water present in the building does not suggest that constituents have partitioned into the surface water within the building.

3.1.3.1.4 Data Summary

Based upon the results of the ESI conducted at SEAD-16, a threat to human health and the environment may exist due to the presence of heavy metals and SVOCs in surface soil within Building S-311 and in groundwater. While these data indicate that the likelihood of infiltration of surface soil contamination to groundwater is small, additional data is required to further evaluate these pathways in the overall evaluation of risks.

3.1.3.2 SEAD-17, Existing Deactivation Furnace (Building 367)

3.1.3.2.1 Soil Data

Soil sampling at SEAD-17 focused primarily on surface soil (0-2") based upon the premise that the primary transport mechanism for contaminant would be airborne emissions from the building 367 furnace and subsequent dispersion and deposition to on-site soil.

The ESI conducted at SEAD-17 indicates that impacts to the surface soil, from the release of heavy metals and SVOCs has occurred at the site (Table 2-6). Copper, lead, and zinc were consistently identified in surface soil samples at concentrations above the TAGM values. The distribution of both SVOCs and heavy metals appears to be random.

3.1.3.2.2 Groundwater Data

Four monitoring wells were installed as part of the SEAD-17 investigation. The results of the groundwater investigation at SEAD-17 indicates that no adverse impacts to the groundwater have occurred.

3.1.3.2.3 Data Summary

The results of the ESI suggests that a threat to human health and the environment may exist due to the presence of heavy metals and SVOCs in surface soil. It appears unlikely that infiltration of surface soil contaminants is occurring based upon groundwater sampling results and sub-surface soil sampling results.

3.2 PRELIMINARY IDENTIFICATION OF POTENTIAL RECEPTORS AND EXPOSURE SCENARIOS

This section will identify the source areas, release mechanisms, potential exposure pathways and the likely human and environmental receptors at SEAD-16 and SEAD-17 based upon the results of their conceptual site models, which were described in the previous section.

Section 3.2 discusses the current understanding of site risks for SEAD-16 and SEAD-17 based upon the data gathered from the ESI. This information is used to assess whether sources of contamination, release mechanisms, exposure routes and receptor pathways developed in the conceptual site models for SEAD-16 and SEAD-17 are valid, or if they may be eliminated from further consideration prior to conducting a risk assessment. Additionally, this information will determine what additional data are necessary to develop a better conceptual understanding of the sites in order that risk to human health and the environment can be determined, Applicable or Relevant and Appropriate Requirements (ARARs) can be defined and appropriate remedial actions can be developed.

This is a generic discussion. The future use scenario and the required degree of cleanup will be proposed on a site-by-site basis as part of each feasibility study. 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. In 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, the installation will remain open.

The President must approve the entire list 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.

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.

3.2.1 Potential Source Areas and Release Mechanisms

SEAD-16

The primary contaminant source at SEAD-16 was the Deactivation Furnace stack. The primary release mechanism of contaminants was particulate emissions from the stack and the deposition of particulates in the surrounding surface soil. A second primary contaminant source at SEAD-16 is the interior of Building S-311. A secondary source of contamination is surface soil where particulate emissions from the stack have been deposited. Secondary release mechanisms from the surface soil are runoff and erosion to surface water and sediment, infiltration to groundwater and fugitive dust emissions.

SEAD-17

The primary contaminant source at SEAD-17 was the Deactivation Furnace stack. The primary release mechanism of contaminants was particulate emissions from the stack and the deposition of particulates in the surrounding surface soil. A secondary source of contaminants is surface soil where particulate emissions from the stack have been deposited. Secondary release mechanisms from the surface soil are runoff and erosion to surface water and sediment, infiltration to groundwater and fugitive dust emissions.

3.2.2 Potential Exposure Pathways and Receptors for SEAD-16 - Current Uses

The potential exposure pathways from sources to receptors based upon current and future use scenarios are shown in Figure 3-3. The potential for human exposure is directly affected by the accessibility to the site with the exception of fugitive dust. Within SEDA, human and vehicular access to the site is restricted by a chain-link fence with a locking gate. Since SEAD-16 is within the ammunition storage area, further access is restricted. There are two primary receptor populations for potential releases of contaminants from SEAD-16:

- Current site workers or visitors
- Terrestrial biota on or near the site

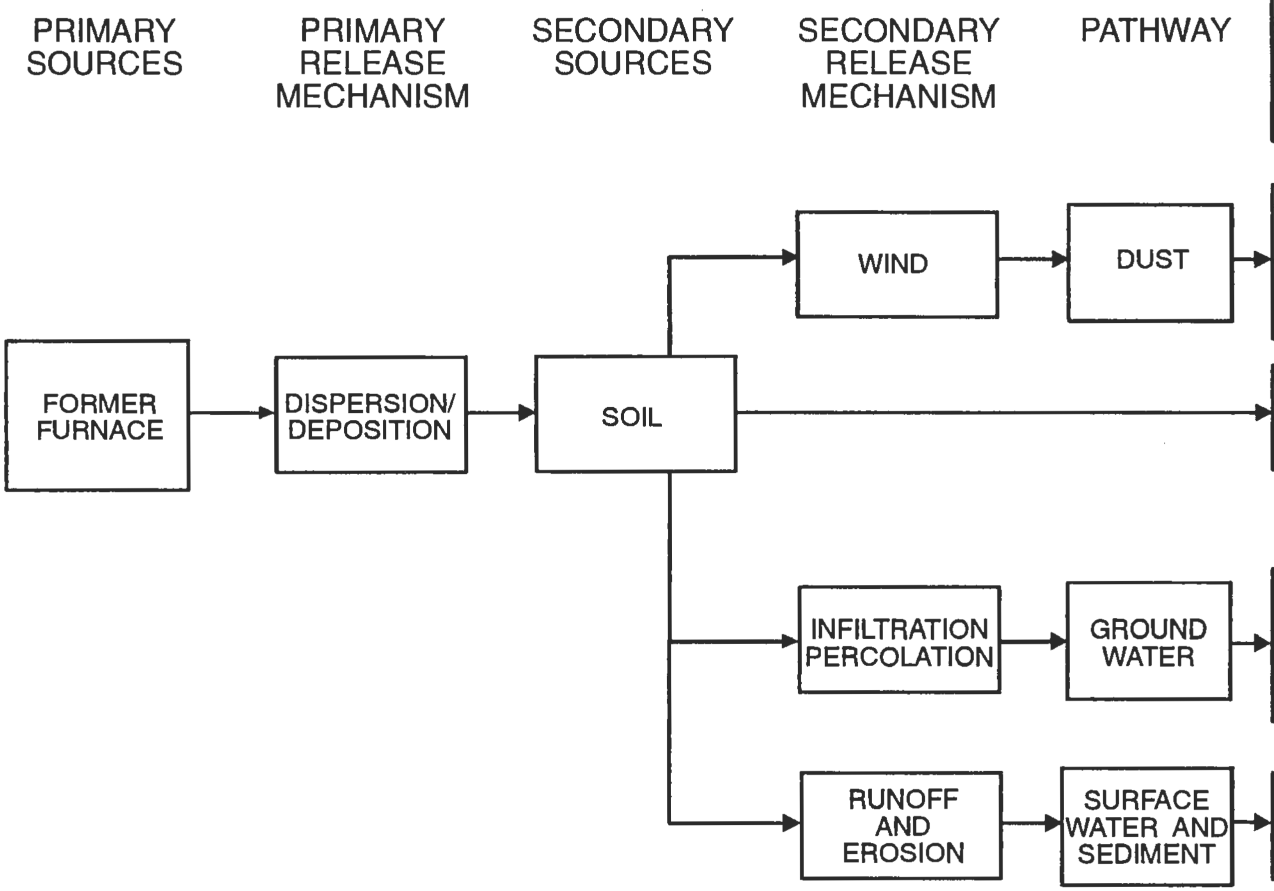
Aquatic biota are not considered as a receptor due to the absence of any water bodies on or near SEAD-16. The exposure pathways and media of exposure are described below as they may affect the various receptors.

3.2.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Current site workers, visitors, or terrestrial biota may be exposed to water in the building or in the two drainage swales in the eastern portion of the site.

3.2.2.2 Dust Inhalation and Dermal Contact

Contaminated fugitive dusts may be released from SEAD-16 due to high winds, vehicle traffic through the area, or disturbance of the soil during site use. The primary human receptors of



EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	FUTURE RESIDENT	CURRENT SITE WORKERS AND VISITORS	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	●	●	●	NA
DERMAL CONTACT	●	●	●	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-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING	DWG NO. 720477-01002

FIGURE 3-3

EXPOSURE PATHWAY SUMMARY

SCALE	DATE JULY 1995

H:\ENG\SENECA\SCOPING\SEAD1617\16EXP.CDR fugitive dust emissions are current site workers who may be working at SEAD-16 or in surrounding areas. The strict controls on access to the SEAD-16 facility limits potential exposure of other people to fugitive dust emissions. Fugitive dusts would not be expected to be transported in significant quantities beyond the SEDA facility boundaries. The nearest off-site receptor is approximately 3,500 feet to the northeast. Additional soil data will be collected to determine deposition of contaminants to downwind surface soil from SEAD-16.

3.2.2.3 Incidental Soil Ingestion and Dermal Contact

Ingestion and dermal contact with soil is a potential exposure pathway for current site workers, visitors and terrestrial biota.

3.2.2.4 Ingestion of Groundwater

The groundwater at SEAD-16 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to current site workers, visitors or terrestrial biota.

3.2.3 Potential Exposure Pathways and Receptors for SEAD-16 - Future Uses

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

For future uses of SEAD-16, 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; dermal contact with soil is a potential exposure pathway for future on-site adults and children; ingestion of groundwater is a potential route of exposure to all future on-site residents assuming on-site groundwater is used as their water supply; and inhalation and dermal contact of fugitive dust is also a potential route of exposure for all on-site future residents.

3.2.4 Potential Exposure Pathways and Receptors for SEAD-17-Current Uses

The potential exposure pathways from sources to receptors based upon current and future use scenarios are shown in Figure 3-4. The potential for human exposure is directly affected by the accessibility to the site. Human and vehicular access to SEAD-17 is restricted by a chain-link fence with a locking gate. Additional site restrictions exist as the site is located within the ammunition storage area.

There are two primary receptor populations for potential releases of contaminants from the Existing Deactivation Furnace:

- Current site workers or visitors
- Terrestrial biota on or near the site

Aquatic biota are not considered to be a receptor due to the absence of ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

3.2.4.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Current site workers, visitors, or terrestrial biota may be exposed to surface water or sediment at the site.

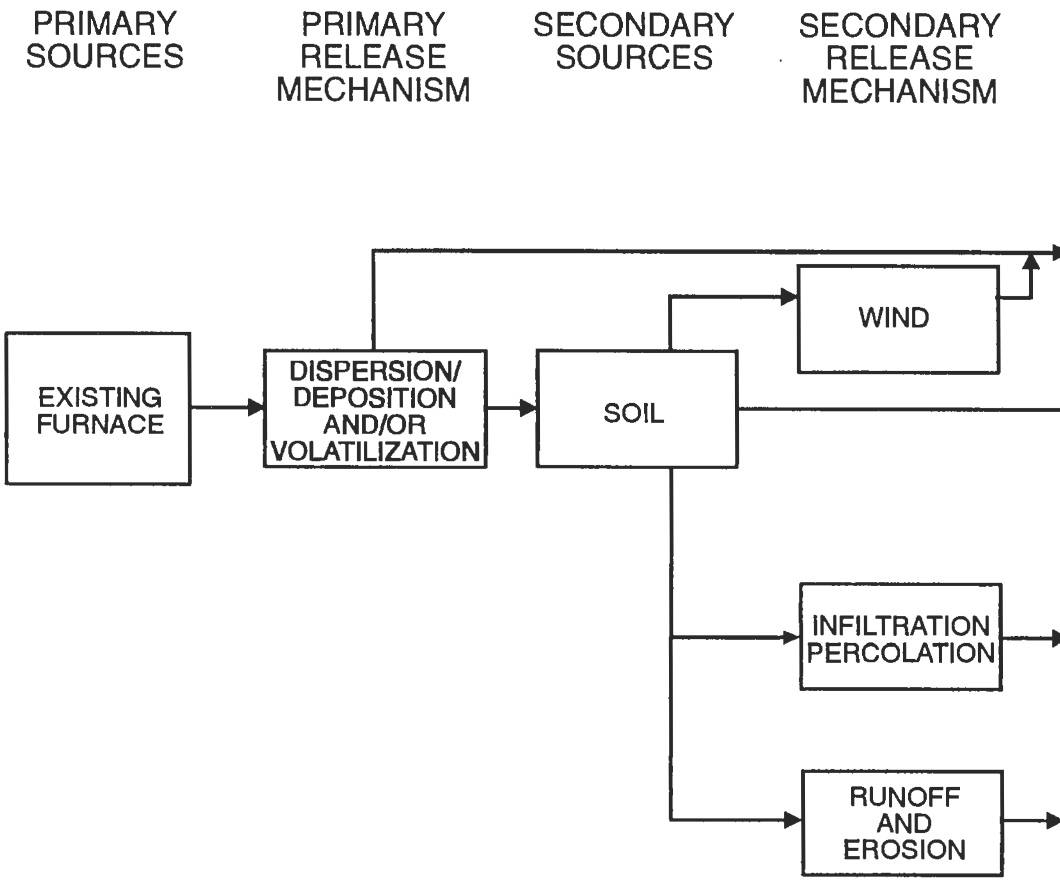
3.2.4.2 Dust Inhalation and Dermal Contact

The Existing Deactivation Furnace is currently inactive pending RCRA permit approval. This facility is expected to eventually become an active facility. Impacted dust may be released from surface soil on-site due to vehicle traffic through the area, wind erosion or disturbance of the soil during site use. Inhalation of dust will be considered for SEDA workers and visitors, and terrestrial biota under the current scenarios.

Fugitive dusts would not be expected to have been transported beyond the SEDA facility boundary during the operation of the Existing Deactivation Furnace. The nearest off-site receptor is approximately 3,500 feet to the northeast. Additional soil data will be collected to determine deposition of contaminants to downwind surface soil from SEAD-17.

3.2.4.3 Incidental Soil Ingestion and Dermal Contact

Ingestion and dermal contact with soil is a potential exposure pathway for current site workers, visitors and terrestrial biota.



PATHWAY	EXPOSURE ROUTE	RECEPTOR: HUMAN FUTURE RESIDENT	RECEPTOR: HUMAN CURRENT SITE WORKERS	RECEPTOR: BIOTA TERR.	RECEPTOR: BIOTA AQUATIC
DUST	INHALATION	●	●	●	NA
	DERMAL CONTACT	●	●	●	NA
	INGESTION	●	●	●	NA
	DERMAL CONTACT	●	●	●	NA
GROUND WATER	INGESTION	●	NA	NA	NA
	INHALATION	●	NA	NA	NA
	DERMAL CONTACT	●	NA	NA	NA
SURFACE WATER AND SEDIMENT	INGESTION	●	●	●	NA
	DERMAL CONTACT	●	●	●	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-17 EXISTING DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 720477-01002

FIGURE 3-4

EXPOSURE PATHWAY SUMMARY

SCALE
DATE JULY 1995

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3.2.4.4 Ingestion of Groundwater

The groundwater beneath the Existing Deactivation Furnace is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to current site workers, visitors and terrestrial biota.

3.2.5 Potential Exposure Pathways and Receptors for SEAD-17 - Future Uses

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

For future uses of SEAD-17, 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; dermal contact with soil is a potential exposure pathway for future on-site adults and children: ingestion of groundwater is a potential route of exposure to all future on-site residents assuming on-site groundwater is used as their water supply; and inhalation and dermal contact of fugitive dust is also a potential route of exposure for all on-site future residents.

3.2.6 Exposure Assessment Assumptions

The public health evaluation involves characterization of potential exposure pathways and receptors. The potential populations at risk, most likely exposure routes, and potential future land uses was presented in Section 3.2, Preliminary Identification of Potential Receptors and Exposure Scenarios.

The identification of potentially exposed populations has considered the surrounding land-use, locations of nearby residences, and sensitive subpopulations. Receptors evaluated in the risk assessment for the current use scenario will include: on-site industrial workers, on-site hunters and off-site residents. Receptors that will be evaluated for future use scenario will be on-site residents, and on-site construction workers. Exposure frequencies for people at the site would be increased, based on the assumption that future workers would be on the site daily, rather than the occasional on-site visits which characterize current use exposures. In this human health risk assessment, for the purposes of worst case considerations, the future land use of these sites will be considered to be residential.

The upper 95% confidence limit of the arithmetic mean will be used to estimate exposure point concentrations.

Exposure point concentrations for the chemicals of concern in the various environmental media will be determined from results of direct measurements (e.g. surface water concentrations are exposure concentrations for the surface water body) or from the application of environmental fate and transport models. For each medium and each receptor, exposure concentrations will be developed and combined with upper tendency (e.g., 90th or 95th percentile) exposure parameters to produce reasonable maximum exposure estimates (RME). The general basis and guidelines used for exposure projections will be in accordance with the Risk Assessment Guidance for Superfund (RAGs) and the Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors (U.S. EPA, 1991). The Superfund Exposure Assessment Manual (USEPA, 1988a) and the Exposure Factors Handbook (USEPA, 1990) will only be used for scenarios not included in the Supplemental Guidance.

The exposure concentrations will be used to determine chemical intakes for each of the receptors for individual media and to determine total chemical intakes for receptors exposed to multiple contaminated media. The chemical intakes will be calculated using standard USEPA assumptions for inhalation, ingestion, and dermal contact with contaminated media (USEPA. 1988a). These parameters are listed in Table 3-4. Exposure during childhood will be determined using chemical intake calculations and childhood activity patterns (e.g., wading in offsite portions of a surface water body). These estimates will be incorporated into lifetime average intake estimates. Potential noncarcinogenic effects for both adults and children will be defined separately.

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-16 and SEAD-17 for protection of human health and the environment and compliance with ARARs are:

TABLE 3-4
STANDARD ASSUMPTIONS FOR CALCULATION OF CHEMICAL INTAKE

SENECA ARMY DEPOT

PATHWAY	RISK EVALUATION	INTAKE ASSUMPTIONS
DERMAL WATER	CARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (children 1-6 years) AT = Averaging Time = 70 years x 365 days/year
DERMAL SOIL	CARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average) AT = Averaging Time = 70 years x 365 days/year AF = Soil to Skin Adherence = 2.77 mg/cm^2(Soil Std.)
	NONCARCINOGENIC	SA = Skin surface area for contact adult = 1940 sq. cm SA = Skin surface area for contact child = 866 sq. cm EF = Exposure Frequency = 350 days/year ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (children 1-6 years) AT = Averaging Time = ED x 365 days/year AF = Soil to Skin Adherence = 2.77 mg/cm^2(Soil Std.)
INHALATION	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Inhilation Rate = 20 m^3/day (adult average) ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Inhilation Rate = 20 m^3/day (adult average) BW = Body weight = 70 Kg (adult average), 15 Kg (child average)
INGESTION WATER	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 2 liters/day (adult 90%) ED = Exposure Duration = 30 years BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 2 liters/day (adult 90 %) BW = Body weight = 70 Kg (adult average), 15 Kg (child average)
INGESTION SOIL	CARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Ingestion Rate = 100mg/day (adult average) ED = Exposure Duration adult = 30 years ED = Exposure Duration child = 6 years (child), 24 years (adult) BW = Body weight = 70 Kg (adult average), 15 Kg (child average) AT = Averaging Time = 70 years x 365 days/year
	NONCARCINOGENIC	EF = Exposure Frequency = 350 days/year IR = Inhalation Rate = 200 mg/day (child) BW = Body weight = 15 Kg (child average)

Notes:

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

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

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

- surface soil (0-2") containing heavy metals and SVOCs
- groundwater containing heavy metals
- building contamination (SEAD-16 only)

Human health concerns for both SEAD-16 and SEAD-17 would focus primarily on inhalation and dermal contact of surface soil for current site usage. For future site usage, groundwater ingestion would be an additional human health concern as well as compliance with ARARs.

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

A comprehensive list of ARARs is 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 are 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)

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

Any further investigations conducted at both SEAD-16 and SEAD-17, either as part of this RI or additional work, will conform with all the stated DQOs. Additional sampling of groundwater, soil, sediment and surface water will generally require Level IV quality data.

3.6 DATA GAPS AND DATA NEEDS

Investigations conducted during the ESI at SEAD-16 and SEAD-17 were conducted to gain a preliminary understanding of the nature and extent of contamination. These data were to be used to evaluate the potential for risks to human health and the environment. A conceptual site model was also developed identifying potential source area release mechanisms and receptor pathways. The result of the investigations at SEAD-16 and SEAD-17 were used to refine the conceptual site model and determine additional data requirements for a complete evaluation of risks to human health and the environment, compliance with ARARs and the development of preliminary remedial action alternatives.

The data needs for SEAD-16 and SEAD-17 are a direct result of the need to meet the DQOs identified in the Generic Installation RI/FS Workplan. By media, these data needs are:

SEAD-16

Groundwater Data

- Verify the results from the monitoring wells already established at SEAD-16. This will entail the re-development and sampling of 3 existing monitoring wells.
- Install and sample 4 additional overburden monitoring wells. Collected data will establish contaminant concentrations in the aquifer.
- In addition to assessing the ground water quality, determine the hydraulic conductivity of the aquifer to assess contaminant migration and potential remedial actions.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Surface Water/Sediment Data

- Determine nature and extent of contamination for on-site surface waters and sediment.
- Establish potential for contamination of off-site surface water and sediment.
- Total organic carbon (TOC) and grain size analysis will be performed on sediment samples to assess the sorptive potential of the sediment.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Soil Data

- Determine the nature and extent of contamination across the site. Number and depth of soil borings are more completely described in section 4, the Task Plan for the RI. There will be 4 soil boring locations across SEAD-16. Collection of samples for risk evaluation is necessary.
- Establish potential for soil contamination to infiltrate groundwater.
- Establish surface soil hot spots on-site, and determine off-site downwind contamination in surface soils.
- TOC and grain size analysis will be performed at two soil boring locations to assess the sorptive potential of the soil.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Building Inspection Data

- Determine the nature and extent of hazardous materials in the two on-site buildings.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Ecological Data

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

SEAD-17

Groundwater Data

- Verify the results from the monitoring wells already established at SEAD-17. This will entail the re-development and sampling of 4 existing monitoring wells.
- Install and sample one additional monitoring well immediately downgradient of the tank.
- In addition to assessing the ground water quality, determine hydraulic conductivity of the aquifer to assess contaminant migration and potential remedial actions.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Surface Water/Sediment Data

- Determine nature and extent of contamination for on-site surface waters and sediment.
- Establish potential for contamination of off-site surface water and sediment.
- Total organic carbon (TOC) and grain size analysis will be performed on sediment samples to assess the sorptive potential of the sediment.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Soil Data

- Determine the nature and extent of contamination across the site. Collection of samples is necessary for risk assessment.
- Establish potential for soil contamination to infiltrate groundwater.

- Establish surface soil hot spots on-site, and determine off-site downwind contamination in surface soils.
- Grain size analysis will be performed to assess the sorptive potential of the soil.
- Establish database to determine compliance with ARARs, to perform baseline risk assessment and to develop remedial action alternatives.

Ecological Data

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

4.0 TASK PLAN FOR THE REMEDIAL INVESTIGATION (RI)

This section describes the tasks required for completion of the Remedial Investigation (RI) at both SEAD-16 and SEAD-17. These include the following:

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

4.1 PRE-FIELD ACTIVITIES

The pre-field activities include the following:

- A site inspection to familiarize key project personnel with site conditions and finalize direction and scope of field activities
- A comprehensive review of Health & Safety Plan with field team members to ensure that site hazards and preventive and protective measures are completely understood
- Inspection and calibration of all equipment necessary for field activities to ensure proper functioning and usage
- A comprehensive review of sampling and work procedures with field team members
- Site clearance if required

4.2 FIELD INVESTIGATIONS AT SEAD-16

The Remedial Investigation program at SEAD-16 consists of the following:

- Soil Investigation
- Surface Water and Sediment Investigation
- Groundwater Investigation
- Ecological Investigation
- Building Interior Investigation

These investigations are described in the following sections.

4.2.1 Soil Investigation

The purpose of the soil investigation program at SEAD-16 is to:

- Determine the extent of surface soil impacts exceeding TAGM values
- Locate areas for potential removal actions
- Provide database for baseline risk assessment
- Provide database for feasibility study and scoping of remedial actions

The sampling program will consist of surface soil sampling and subsurface soil sampling using soil borings.

The results of the ESI soil investigation which were summarized previously in the ESI Report and in Section 3.1.3 of this report support the following conclusions:

1) The principle impacts to surface soil, both exterior of the Building S-311 and in the interior of Building S-311 are from heavy metals, SVOCs and potentially explosives.

2) VOCs, herbicides and pesticides/PCBs are of secondary concern in surface soil, due to the infrequency of detections or low concentrations (i.e., below applicable guidelines) encountered.

Distribution maps of total SVOCs and lead in surface soil were shown in the ESI Report. The data generally shows a random distribution of concentrations about the site with localized areas of higher concentration. The maps provide a general distribution profile and were used to determine the location of additional soil samples.

The highest concentration of both metals and SVOCs were found in the surface soil to the north and northeast of Building S-311. This portion of the site is intersected by railroad tracks. The portion of this site which is paved (west-southwest of Building S-311) exhibited the lowest concentration of metals and SVOCs in surface soil beneath the asphalt layer. Consequently, the locations of additional soil samples are concentrated in the north and northeast portion of the site. Additional soil samples will be collected in the western perimeter of the site beyond the paved areas to assess the potential for deposition of metals and SVOCs from surface runoff and fugitive dust in this area.

4.2.1.1 Soil Boring Program

Five soil borings will be performed at the locations shown in Figure 4-1 to assess subsurface contaminant levels at SEAD-16. Subsurface soil samples were not collected during the ESI. As a result, the vertical extent of soil contaminants has not been determined. This data will also assess the potential for infiltration to groundwater as part of the groundwater receptor pathway.

Two of the soil borings (SB16-5 and SB16-6) are proposed to be performed at the former Number 2 fuel oil UST locations. The confirmatory sampling conducted after the tanks were removed showed that the subsurface soil was impacted with PAHs. One soil boring will be performed at each former UST location to delineate the vertical extent of the impacts.

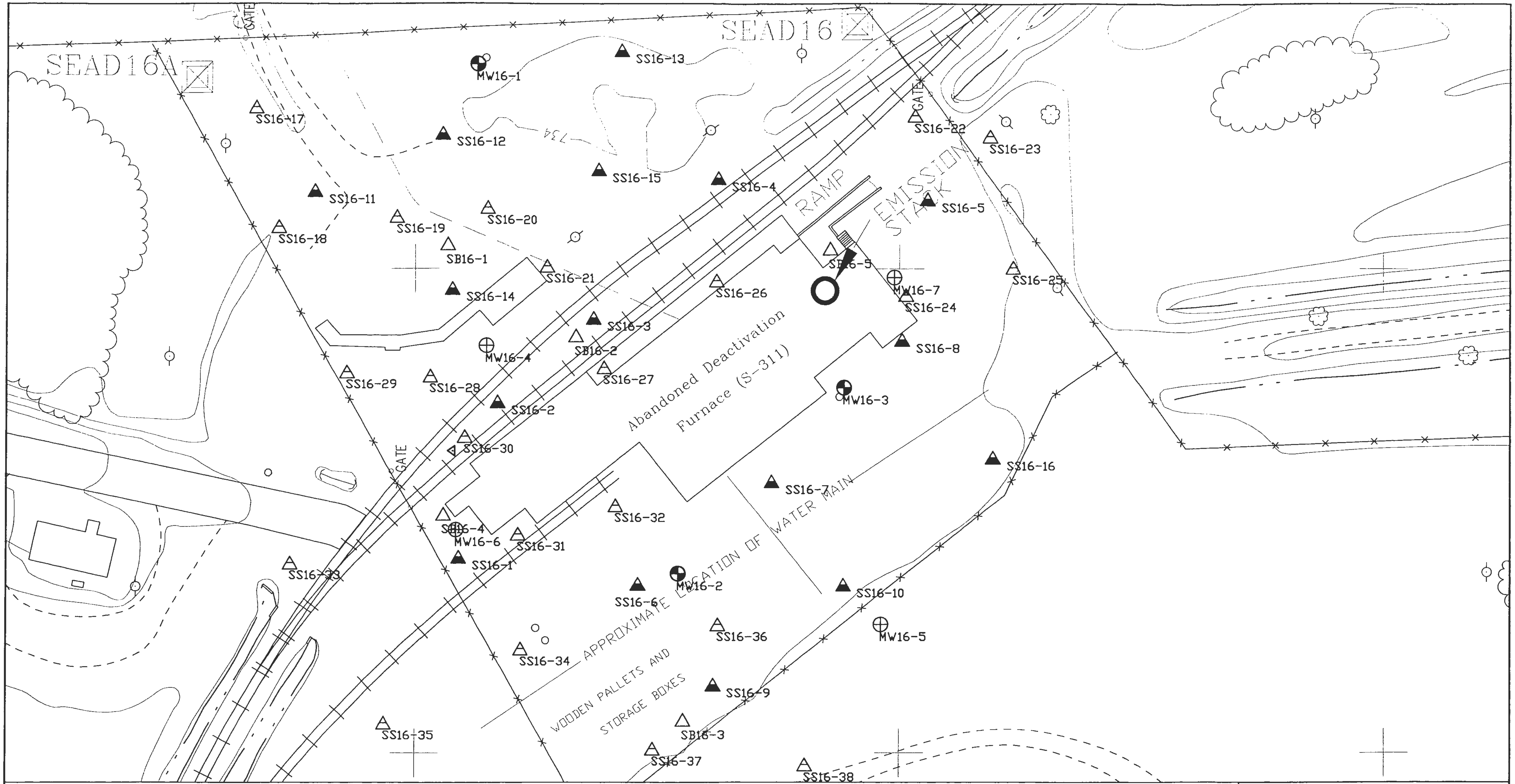
Three soil samples will be collected from each soil boring: a surface soil sample (0-2 inches below the surface organic material) and two subsurface soil samples. The two subsurface samples will be selected and sampled according to the criteria in Appendix A, Field Sampling and Analysis Plan. Each sample collected will be tested according to the analyses specified in Section 4.2.6, Analytical Program.

Additionally, at two soil borings, three subsurface samples (one near the surface, one below the water table and one intermediate) will be collected and analyzed for total organic carbon (TOC) content and grain size (including the silt and clay size distribution).

The soil sampling will be performed until split-spoon refusal is encountered. This is expected to be at relatively shallow depths across the site (less than 10 feet). The soil boring will continue to auger refusal. Auger refusal for this project is defined in Appendix A, Field Sampling and Analysis Plan.

4.2.1.2 Surface Soil Program

Figure 4-1 shows the proposed surface soil sample locations (0-2 inches below the surface organic material). A total of 22 additional soil samples will be collected. These samples are intended to delineate the extent of metals and SVOCs in surface soil. These data will provide the information necessary for completion of a baseline risk assessment and development of remedial action alternatives. The locations of additional surface soil samples are centered around sampling points which exhibited the higher concentrations of metals and SVOCs from



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LEGEND

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

☒ 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 SOIL BORING

◐ EXISTING MONITORING WELL

⊕ PROPOSED MONITORING WELL

▲ EXISTING SURFACE SOIL SAMPLE

△ PROPOSED SURFACE SOIL SAMPLE

25 0 25 50
(feet)

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	728511-02002

FIGURE 4-1
EXISTING AND PROPOSED
SAMPLE LOCATIONS

SCALE	DATE	REV
1" = 50'	JULY 1995	A

the ESI. They will also serve to establish the outer boundaries of surface contamination at SEAD-16 and assess the surface run-off potential at the western boundary of the site. Two of the 22 surface soil samples will be tested for grain size distribution. The grain size distribution will be used for modeling fugitive dusts releases from surface soil to assess potential risks for this exposure pathway.

Surface soil sampling procedures are described in Appendix A, Field Sampling and Analysis Plan. The samples will be tested according to the analyses specified in Section 4.2.6 Analytical Program.

4.2.1.3 Downwind Surface Soil Samples

Fugitive dust emissions and stack emissions from SEAD-16 may have resulted in deposition of heavy metals and SVOCs to surface soil downwind of the site. This includes the period during which the deactivation furnace was in operation (1945-1960) and the period following to the present. In order to access this transport and exposure pathway, surface soil samples will be collected at 500 feet from SEAD-16 in the two primary wind directions. Samples will also be collected 1000, 2000 3000 and 3500 feet away from a point between SEAD-16 and SEAD-17 in the two primary wind directions. The primary wind directions at SEDA are to the north-northwest and the south-southeast.

The data gathered for the samples collected at 1000, 2000, 3000, and 3500 feet along both sides of the downwind transect will be used to assess the downwind transportation of contaminants for both SEAD-16 and SEAD-17. All of the downwind sample locations along the north-northwest/south-southeast azimuth and the wind rose used to determine the primary wind direction are shown in Figure 4-2. The wind rose data, which is representative of the wind patterns at SEDA, was gathered from the airport in Ithaca, New York.

For SEAD-16 five samples will be collected to the north-northwest of the area and five samples will be collected to the south-southeast. These samples include two samples collected at 500 feet from SEAD-16 and eight samples along the downwind transect. The two additional samples shown in Figure 4-2 will be collected and analyzed to assess the downwind transportation of contaminants from SEAD-17. All samples will be collected from 0-2 inches below the surface organic material. Surface soil sample collection procedures are described in Appendix A, Field Sampling and Analysis Plan. The downwind surface soil samples will be tested according to the analyses specified in section 4.2.6, Analytical Program.

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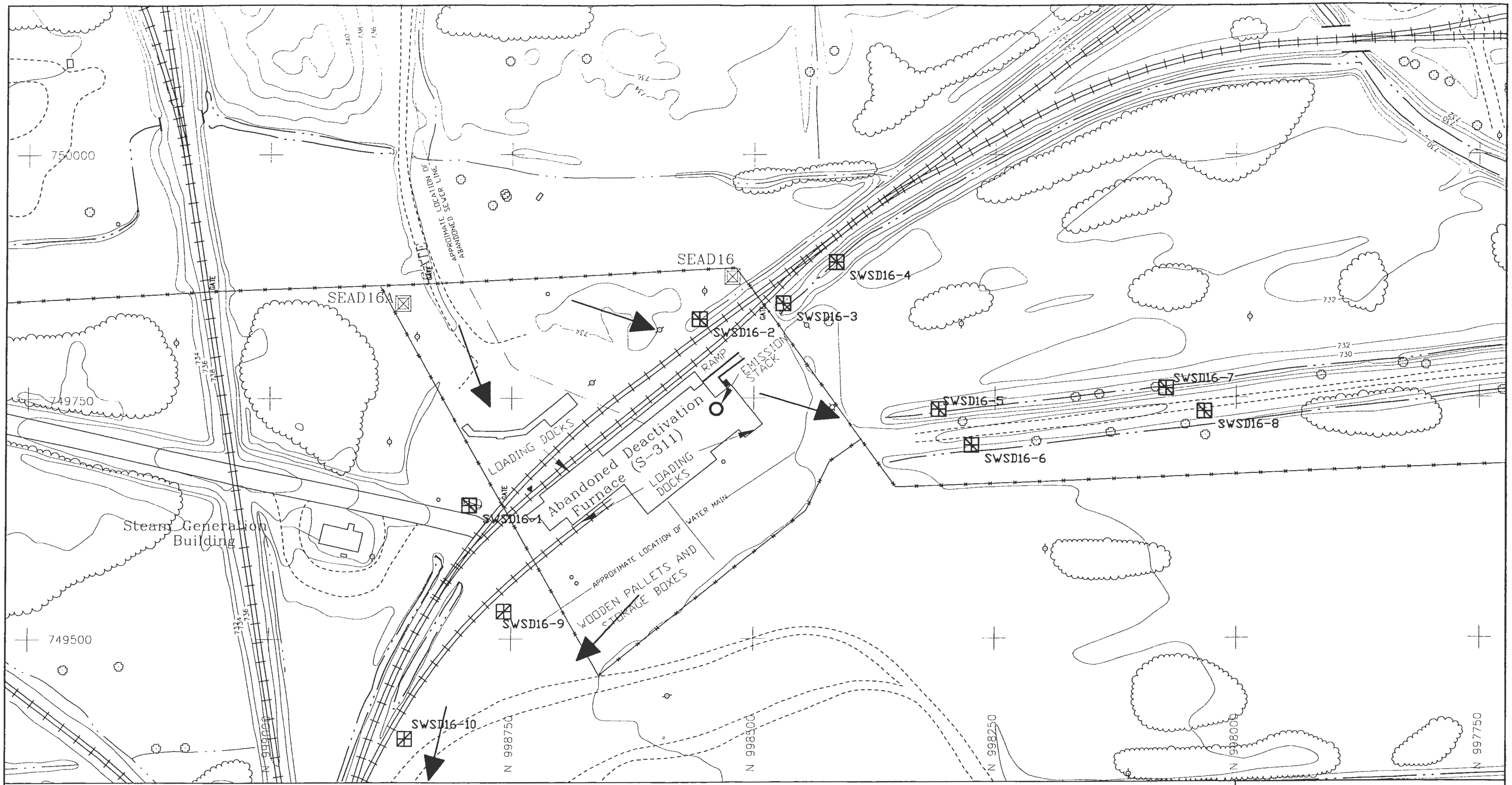

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LEGEND

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 SURFACE WATER SEDIMENT LOCATIO

DIRECTION OF SURFACE WATER FLOW

50 0 50 100
(feet)

N

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD-16 ABANDONED DEACTIVATION FURNACE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg No 728511-02002

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

SCALE 1" = 100'
DATE JULY 1995
REV A

monitoring wells are screened continuously throughout the saturated overburden (between 1.5 and 5.3 feet below grade depending upon the location) and the average screen length is two feet. The overburden materials generally consisted of unconsolidated till and weathered shale with sand, silts and clay. Competent shale (bedrock) was encountered at between 4-6 feet below grade depending upon the location. Silty conditions were encountered in MW16-3. This monitoring well is located in the paved portion of the site immediately adjacent to Building S-311. Silty conditions in this monitoring well may be due to the presence of fill materials for building foundation. The hydraulic gradient across the site is 0.004. Groundwater flow is towards the southwest based upon water levels in the three monitoring wells.

Groundwater samples from the ESI contained several metals at concentrations exceeding New York Ambient Water Quality Standards (AWQS) for Class GA groundwater (drinking water). Of particular note are the presence of chromium, copper, lead and zinc.

The goals of the groundwater investigation during the RI are to verify previous sampling data, determine the extent of groundwater contamination, gather additional potentiometric data to confirm groundwater flow direction and determine hydraulic conductivity. To accomplish this, four additional monitoring wells will be installed at the approximate locations shown in Figure 4-1. All monitoring wells are will be screened in the saturated overburden overlying the shale bedrock. The four proposed additional monitoring wells will be used to provide the following information:

MW16-4

- Collect groundwater quality data adjacent to the explosives/munitions storage and processing building
- Collect groundwater quality data in the area of elevated explosives concentrations in soil
- Provide additional potentiometric data

MW16-5

- Collect groundwater quality data downgradient of SEAD-17
- Provide additional potentiometric data

MW16-6

- Determine whether a release of petroleum hydrocarbons from the 1,000-gallon UST (Tank 311-A) has impacted groundwater
- Provide additional potentiometric data

MW16-7

- Determine whether a release of petroleum hydrocarbons from the 2,000-gallon UST (Tank 311-B) has impacted groundwater
- Provide additional potentiometric data

The groundwater samples will be tested according to the analyses described in section 4.2.6, Analytical Program.

Monitoring well installation and development procedures for overburden monitoring wells are described in Appendix A, Field Sampling and Analysis Plan. All monitoring wells will be properly developed prior to sampling. Two separate rounds of groundwater sampling will be performed approximately 3 to 4 months apart. Groundwater Sampling procedures are described in Appendix A, Field Sampling and Analysis Plan.

Aquifer testing will be performed at the seven monitoring wells. In-situ hydraulic conductivity tests will be performed on the seven monitoring wells using either a rising or falling head test. Three rounds of water levels will be measured at each of the monitoring wells at SEAD-16 to further define the existing data on groundwater flow at the site. The first round of groundwater levels will be measured at the time that the monitoring wells are developed, the second round will be measured at the time of the first round of groundwater sampling, and the third round of groundwater levels will be measured at the time of the second round of groundwater sampling. Procedures for in-situ conductivity tests and water level measurements are outlined in Appendix A, Field Sampling and Analysis Plan.

4.2.4 Building Investigations

Background

Building S-311, the Abandoned Deactivated Furnace Building was investigated during the ESI at SEAD-16. This investigation consisted of a visual inspection of the building for the presence of waste materials and sampling and analysis of building materials and wastes present. Sampling was conducted to determine whether hazardous materials are present within the building that may pose a threat to human health and the environment. This investigation was also performed to assess whether a removal action would be warranted if an imminent hazard or threat were present.

During the building inspection and investigation, miscellaneous wastes and potentially contaminated building materials were identified in several areas of the building. The building was described as being in poor condition and the presence of standing water in the basement level was also noted. Wastes which were present included soil piles and soil/sludge covering concrete floors, shell casings, filter drums, ash residues in the furnace area and miscellaneous construction debris.

A total of nine soil and residue samples and two standing water samples were collected from the interior of building S-311. Analytical results from the soil and residue samples indicated the presence of heavy metals and SVOCs. Many of the highest concentrations of metals and SVOCs on the site were detected in these samples. These include lead at 527,000 ppm, Copper at 81,400 ppm, mercury at 39.3 ppm and zinc at 35,700 ppm. The standing water samples had low (ppb) levels of metals and low (ppm) levels of nitrate/nitrite-nitrogen.

Asbestos fibers were detected at concentrations of greater than 1% in 5 of 15 samples collected throughout the building. NYSDEC and EPA consider materials with greater than one percent asbestos as asbestos containing materials (ACM). The analytical results indicate only pipe insulation, roofing and transite (cementatious panels) are ACM. One ARAR (Title 12 of the NYCRR, Part 56) requires abatement of the above materials prior to disturbing (e.g., building renovation or demolitions). Various amounts of this material were described as being "friable". The analytical results also indicate that asbestos contamination of building surfaces is minimal. No asbestos fibers were detected in soil samples collected from within the building or on the non-asbestos sheetrock walls.

The sampling results from the ESI of the interior of Building S-311 indicate that building materials (especially floors) and insulation materials contain elevated levels of heavy metals, SVOCs and asbestos. The presence of these constituents may pose a potential risk to human health and the environment. The principle receptors would be SEDA personnel and visitors and possibly terrestrial biota. The building and its contents are not considered to pose an imminent hazard since access to the area is restricted. Consequently, an immediate removal action or building decontamination would not be warranted on this basis.

Investigation of Building S-311

Up to 2 additional building material/debris samples will be collected if upon inspection, media which was not sampled previously, is present. If possible, volume estimates of media types will be performed as well as estimates of contaminated surface areas. These data will be used to develop estimates for building decontamination/demolition as part of either a removal plan or as part of the development of remedial action alternatives. ARARs which will be considered for these actions includes Land Disposal Restriction and Treatment Standards For Hazardous Debris under 40 CFR Part 268.45.

To evaluate risks from the building as part of the baseline risk assessment, indoor air samples will be collected in two locations. These samples will be collected to asses the inhalations exposure pathway from SVOCs, metals and asbestos. A third sample will be collected outside the building for a background control sample.

All health and safety protocols and sampling procedures are described in Appendix A, Field Sampling and Analysis Plan. The samples will be tested according to the analyses specified in Section 4.2.6, Analytical Program.

Investigation of Building Adjacent to S-311

The small building to the northeast of Building S-311 may have been used as a storage and processing area for munitions prior to being transferred to the furnace building by the overhead piping connecting the two buildings. Elevated levels of explosives, principally 2,4-dinitrotoluene were detected in soil samples adjacent to this building. Therefore, unexploded ordnance support is recommended when investigating this building.

The smaller building to the northeast of S-311 will be inspected for the presence of waste debris or building materials contamination and also to evaluate the physical condition of the structure. A floor plan showing the approximate location of waste debris or surface contamination will be prepared in the field. Representative samples of propellants and solid materials from the building will be collected similar to the approach used at S-311. If propellant residues are present in the pipes that can be safely handled by field sampling and laboratory personnel, the residues will be sampled from 3 locations chosen by the investigator. Samples of dirt from 5 locations on the building floor will also be collected. Additionally, 5 building material samples will also be collected for determination of asbestos content only. The exterior of the overhead piping connecting the two buildings will be inspected for signs of deterioration and the presence of any residual materials.

All health and safety protocols and sampling procedures are described in Appendix A, Field Sampling and Analysis Plan. The building material/dirt samples will be tested according to the analyses specified in section 4.2.6, Analytical Program.

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 analyses of the samples collected for the RI, described in Sections 4.2.1 through 4.2.4.

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

A topographic map showing the site and documented aquatic and terrestrial resources within a two mile radius from the site will be obtained. The aquatic and terrestrial resources of concern are Significant Habitats as defined by the New York State Natural Heritage Program; 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 use of the aquatic and terrestrial resources of the site by humans will be assessed. Included with the assessment of the site, the area within a half mile of the site, documented resources within two miles of the site, and documented resources downstream of the site that are potentially affected by contaminants will also be assessed. Human use of the resources that will be considered will be activities such as hunting, fishing, wildlife observation, scientific studies, agriculture, forestry, and other recreational and economic activities.

The appropriate regulatory criteria will be identified for the remediation of aquatic and terrestrial resources and will include both site-specific and contaminant-specific criteria.

4.2.5.2 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 47 soil samples, 14 groundwater samples (2 rounds of samples collected from the 7 monitoring wells) , 10 surface water and sediment samples, 12 dirt/building media samples from building floors or other areas (2 building material/debris samples from Building S-311, and 5 dirt samples and 5 material samples from the building adjacent to Building S-311) and 3 propellant residue samples (from the building adjacent to S-311) will be collected from SEAD-16 for chemical testing. All of these samples (except for the 5 material samples from the building adjacent to Building S-311, which will be tested for asbestos only) will be analyzed for the following: Target Compound List (TCL) VOCs (EPA Method 524.2 on groundwater), SVOCs, pesticides/PCBs and Target Analyte List (TAL) metals and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Statement of Work (SOW), explosive compounds by EPA Method 8330, and nitrate-nitrogen by EPA Method 352.1. Additional analyses to be performed on specific media are provided below.

Six (6) of the subsurface soil samples from two soil borings and 2 of the surface soil samples will also be analyzed for total organic carbon (TOC) content by EPA Method 415.1 and grain size distribution (including the distribution within the silt and clay size fraction) by ASTM Method D:422-63.

The 14 groundwater samples will be analyzed for VOCs by EPA Method 524.2 and total recoverable petroleum hydrocarbons by EPA Method 418.1.

The 10 surface water samples will also be analyzed for pH by EPA Method 150.1, hardness by EPA Method 352.1 and TOC by EPA Method 415.1.

The 10 sediment samples will also be analyzed for TOC by EPA Method 415.1 and grain size distribution (including the distribution within the silt and clay size fractions) by ASTM Method D:422-63.

The 2 building material samples from Building S-311 and 5 building material samples from the building adjacent to Building S-311 will be analyzed for asbestos by EPA Method 600/M4-82-020.

The 2 air samples from inside Building S-311 and 1 sample from outside the building will be analyzed for SVOCs, metals, and asbestos.

Analyses for all of the media to be sampled are summarized in Table 4-1. A detailed description of these methods, as well as lists of each compound included in each of the categories is presented in Appendix C, Chemical Data Acquisition Plan.

4.2.7 Surveying

Surveying will be performed at SEAD-16 for the following purposes:

- Locate all of the environmental sampling points
- Map the direction and compute the velocity of groundwater movement

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

The location, identification, coordinates and elevations of all the control points recovered and/or established at the site and all of the soil boring locations, monitoring wells (new and existing), surface soil sample locations, surface water and sediment sample locations will be surveyed and plotted on the site base 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 of the Generic Installation RI/FS Workplan.

4.3 FIELD INVESTIGATIONS AT SEAD-17

The Remedial Investigation program at SEAD-17 consists of the following investigations:

- Soil Investigation
- Surface Water and Sediment Investigation
- Groundwater Investigation
- Ecological Investigation

These investigations are described in the following sections.

4.3.1 Soil Investigation

The purpose of the soil investigation program at SEAD-17 is to:

- Determine the extent of surface soil contamination exceeding TAGM values
- Locate areas for potential removal actions
- Provide data base for baseline risk assessment

- Provide data base for feasibility study and scoping of remedial actions

The results of the ESI soil investigation which were summarized in the ESI Report and in Section 3.1.3 of this Project Scoping Plan support the following conclusions:

- The principle contaminants of concern in surface soil are heavy metals, (principally lead, copper, cadmium and zinc).

- VOCs, herbicides, pesticides/PCBs SVOCs and nitroaromatics are not contaminants of concern in surface or subsurface soil due to the infrequency of detection or low concentrations (i.e. below applicable guidelines) encountered.

4.3.1.1 Soil Boring Program

No soil borings are proposed for SEAD-17.

4.3.1.2 Surface Soil Sampling Program

Distribution maps of SVOCs and lead in surface soil were shown in the ESI report. The data shows a fairly random distribution of concentrations with localized areas of higher concentrations in the norther area of the sites adjacent to the Deactivation Furnace building. The maps provide a general distribution profile and were used to determine the location of additional soil samples.

A total of 16 additional surface soil samples (0-2 inches below the surface organic material) will be collected (Figure 4-4). These samples will be used to delineate the extent of metals contamination in surface soil. These data will provide the information necessary for completion of a baseline risk assessment and development of remedial action alternatives. The locations of additional surface soil samples are centered around sampling points which exhibited the highest concentrations of metals (SS17-6, SS17-14, SS17-8) from the ESI.

The surface soil sampling procedures are described in Appendix A, Field Sampling and Analysis Plan. The samples will be tested according to the analyses specified in Section 4.3.5 Analytical Program

Two surface soil samples will be analyzed grain size distribution. The grain size distribution

Monitoring well installation and development procedures for overburden monitoring wells are described in Appendix A, Field Sampling and Analysis Plan. All monitoring wells will be properly developed prior to sampling. Two separate rounds of groundwater sampling will be performed approximately 3 to 4 months apart. Groundwater Sampling procedures are described in Appendix A, Field Sampling and Analysis Plan.

Aquifer testing will be performed at the seven monitoring wells. In-situ hydraulic conductivity tests will be performed on the seven monitoring wells using either a rising or falling head test. Three rounds of water levels will be measured at each of the monitoring wells at SEAD-17 to further define the existing data on groundwater flow at the site. The first round of groundwater levels will be measured at the time that the monitoring wells are developed, the second round will be measured at the time of the first round of groundwater sampling, and the third round of groundwater levels will be measured at the time of the second round of groundwater sampling. Procedures for in-situ conductivity tests and water level measurements are outlined in Appendix A, Field Sampling and Analysis Plan.

4.3.4 Ecological Investigation

The following procedure for the ecological investigation was developed from the New York State Department of Environmental Conservation (NYSDEC) Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). The purpose of the ecological investigation is to determine if aquatic and terrestrial resources have been affected by a release of contaminants from the site. The investigation will be completed in two parts. The first part will be the site description, which will involve the accumulation of data describing the physical characteristics of the site, as well as the identification of aquatic and terrestrial resources present or expected to be present at the site. The second part will be the contaminant-specific impact analysis, which involves the determination of whether the identified aquatic and terrestrial resources have been impacted by contaminants that have been released at the site. The second part of the ecological investigation is dependent upon the chemical analyses of the samples collected for the RI, described in Sections 4.3.1 through 4.3.3.

4.3.4.1 Site Description

The purpose of the site description is to determine whether aquatic and terrestrial resources are present at the site and if they were present at the site prior to contaminant introduction;

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

A topographic map showing the site and documented aquatic and terrestrial resources within a two mile radius from the site will be obtained. The aquatic and terrestrial resources of concern are Significant Habitats as defined by the New York State Natural Heritage Program; 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 use of the aquatic and terrestrial resources of the site by humans will be assessed. Included with the assessment of the site, the area within a half mile of the site, documented resources within two miles of the site, and documented resources downstream of the site that are potentially affected by contaminants will also be assessed. Human use of the resources that will be considered will be activities such as hunting, fishing, wildlife observation, scientific studies, agriculture, forestry, and other recreational and economic activities.

The appropriate regulatory criteria will be identified for the remediation of aquatic and terrestrial resources and will include both site-specific and contaminant-specific criteria.

4.3.4.2 Contaminant-Specific Impact Analysis

Information from the site description developed in Section 4.3.4.1 and from the characterization of the contaminants at the site developed from the results of the RI will be used to assess the impacts of contaminants on aquatic and terrestrial resources. The impact analysis will involve three steps, each using progressively more specific information and fewer conservative assumptions and will depend upon the conclusion reached at the previous step regarding the degree of impact. If minimal impact can be demonstrated at a specific step, additional steps will not be conducted.

Pathway Analysis

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

Criteria-Specific Analysis

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

Analysis of Toxicological Effects

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

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

- **Indicator Species Analysis**–A toxicological analysis for a indicator species will be used if the ecology of the resource and the exposure scenarios are simple. This approach assumes that exposure to contaminants is continuous throughout the entire life cycle and does not vary among individuals.

- **Population Analysis**–A population level analysis is relevant to and will be used for the evaluation of chronic toxicological effects of contaminants to an entire population or to the acute toxicological effect of contaminant exposure limited to specific classes of organisms within a population.

- **Community Analysis**– A community with highly interdependent species including highly specialized predators, highly competitive species, or communities whose composition and diversity is dependent on a key-stone species, will be analyzed for alternations in diversity due to contaminant exposure.

- **Ecosystem Analysis**–If contaminants are expected to uniformly affect physiological processes that are associated with energy transformation within a specific trophic level, an analysis of the effects of contaminant exposure on trophic structure and trophic function within an ecosystem will be performed. Bioconcentration, bioaccumulation, biomagnification, etc., are concepts that may be used to evaluate the potential effects of contaminant transfer on trophic dynamics.

4.3.5 Analytical Program

A total of 18 soil samples, 10 groundwater samples (2 rounds of samples collected from the 5 monitoring wells), and 10 surface water and sediment samples will be collected from SEAD-17. All of the samples will be analyzed for the following: TCL VOCs (EPA Method 524.2 on groundwater), SVOCs, pesticides/PCBs, and TAL metals according to NYSDEC CLP SOW, and explosives using EPA Method 8330, and nitrate-nitrogen by EPA Method 352.1. Additional analyses to be performed on specific media are provided below.

Two of the surface soil samples will also be analyzed for total organic carbon (TOC) content by EPA Method 415.1 and grain size distribution (including the distribution within the silt and clay size fraction) by ASTM Method D:422-63.

The 10 groundwater samples will be analyzed for VOCs by EPA Method 524.2.

The 10 surface water samples will also be analyzed for pH by EPA Method 150.1, hardness by EPA Method 352.1 and TOC by EPA Method 415.1.

The 10 sediment samples will also be analyzed for TOC and grain size distribution (including the distribution within the silt and clay size fractions).

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

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

4.3.6 Surveying

Surveying will be performed at SEAD-17 for the following purposes:

- Locate all of the environmental sampling points
- Map the direction and compute the velocity of groundwater movement

Table 4-2

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-17

	VOCs	VOCs	SVOCs	Explosives	Metals	Pesticides/PCBs	Nitrate/Nitrogen	Grain Size*	pH	Hardness	TOC
MEDIA	Method 524.2	TCL NYSDEC CLP	TCL NYSDEC CLP	Method 8330	TAL NYSDEC CLP	TCL NYSDEC CLP	Method 352.1	ASTM Method D:422-63	Method 150.1	Method 130.2	Method 415.1
Soil Surface	0	18	18	18	18	18	18	2	0	0	2
Subsurface	0	0	0	0	0	0	0	0	0	0	0
Groundwater	10	0	10	10	10	10	10	0	0	0	0
Surface water	0	10	10	10	10	10	10	0	10	10	10
Sediment	0	10	10	10	10	10	10	10	0	0	10

Note:
1) * The grain size distribution will include the distribution within the silt and clay fractions.
2) QA/QC Sampling requirements are described in Appendix C, Section 5.3 of the Generic Installation RI/FS workplan.

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

The location, identification, coordinates and elevations of all the control points recovered and/or established at the site and all of the soil boring locations, monitoring wells (new and existing), surface soil sample locations, surface water and sediment sample locations will be surveyed and plotted on the site base 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 of the Generic Installation RI/FS Workplan.

4.4 DATA REDUCTION, ASSESSMENT AND INTERPRETATION

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

4.5 BASELINE RISK ASSESSMENT

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

4.6 DATA REPORTING

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

4.7 TASK PLAN SUMMARY FOR THE RI

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

A detailed Task Plan Summary that indicates the number and type of samples to be collected at SEAD-16 and SEAD-17 is provided in Tables 4-1 and 4-2, respectively.

5.0 TASK PLAN FOR THE FEASIBILITY STUDY (FS)

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

5.1 DEVELOPMENT OF OBJECTIVES

A discussion of the development of 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 SCREENING OF ALTERNATIVES

A discussion of the screening of 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 DETAILED ANALYSIS OF ALTERNATIVES

A discussion of the detailed analysis of 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.

5.4 TASK PLAN SUMMARY FOR THE FS

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

6.0 PLANS AND MANAGEMENT

The purpose of this Work Plan is to present and describe the activities that will be required for the site Remedial Investigation/Feasibility Studies at SEAD-16 and SEAD-17. The Field Sampling and Analysis Plan (Appendix A), details procedures which will be used during the field activities. Included in this plan are procedures for sampling soil, sediments, surface water, fish, shellfish and groundwater. Also included in this plan are procedures for developing and installing monitoring wells, measuring water levels and packaging and shipment of samples.

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

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

6.1 SCHEDULING

The proposed schedule for performing the RI/FSs to be conducted at SEAD-16 and SEAD-17 is presented in Figures 6-1 and 6-2. Figure 6-1 contains the schedule for the work to be conducted in the field. This schedule assumes that each phase of the field work will be performed at both sites before performing the next phase. Figure 6-2 contains the schedule for the reports to be drafted and submitted based on the results of the field investigations.

6.2 STAFFING

A discussion of the staffing for the RI/FS to be conducted at SEAD-16 and SEAD-17 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-16 and SEAD-17 RI Field Investigation Schedule
Seneca Army Depot Activity

Page 1 of 1

7/19/1995

	1995			1996			
	October	November	December	January	February	March	April
Mark Sample Locations	10/3 10/2						
Surface Water / Sediment Sampling and Runoff Delineation	10/7 10/4						
Ecological Investigation	10/23 10/8		12/16 12/11				
Surface Soil Sampling	10/24	11/13					
Soil Borings		11/15 11/14					
Monitoring Well Installation and Development		11/20 11/16					
Groundwater Sampling			12/13 12/4			3/9 3/4	
Water Level Measurements		11/27	12/4			3/4	
Apuifer Testing			12/16 12/14				
Sample Analysis	10/5	11/20	12/22 12/5			3/26 3/11	
Data Validation		11/21	12/8 12/27 12/26			3/28 3/27	
Surveying		11/27	12/8				
Field Activity Reports		11/17	12/15	1/12			4/5
Field Sampling Letter Report							4/29

▲—▲ Task Length

▼ Comments Due

⬇ Parsons ES Deliverable Due

Table 6-2
SEAD-16 and SEAD-17 RI/FS Schedule: Risk Assessment and Reports
Seneca Army Depot Activity

Page 1 of 1

7/19/1995

	1996										1997							
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Preliminary Site Characterization Summary	▲ 3/1	▲ 4/30																
Baseline Risk Assessment	▲ 3/1		▲ 5/31															
Preparation of RI Report	▲ 3/1			Draft ↓ 6/28	▼ 7/31	Draft Final ↓ 8/30	▼ 9/30	Final ↓ 10/31										
Preparation of FS Report						▲ 8/30		Draft ↓ 10/31	▼ 11/29	Draft Final ↓ 12/31	▼ 1/31	Final ↓ 2/28						
Post FS Support										▲ 12/31		Draft PRAP ↓ 2/28	▲ 3/15			Draft ROD ↓ 6/30		
Monthly Reports	↓ 3/8	↓ 4/5	↓ 5/3	↓ 5/31	↓ 6/28	↓ 7/26	↓ 8/23	↓ 9/20	↓ 10/18	↓ 11/15	↓ 12/13	↓ 1/10	↓ 2/7	↓ 3/7	↓ 4/4	↓ 5/2	↓ 5/30	↓ 6/27
Quarterly Reports	↓ 3/31			↓ 6/30			↓ 9/30			↓ 12/31			↓ 3/31			↓ 6/30		

▲—▲ Task Length ▼ Comments Due ↓ Parsons ES Deliverable Due

7.0 REFERENCES

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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 ACQUISITION 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 ARMY
ON THE DRAFT RI/FS PROJECT SCOPING PLAN FOR SEADs 16 & 17

Comments by Forget

Comment #1 **Risk Assessment.** Due to limited time, I was not able to review this document. However, please reference and incorporate all applicable comments made on the scoping plant for SEAD-46 scoping plan (small arms range).

Response #1 Agree. All comments made by Cathy Forget on the SEAD-46 RI/FS Project Scoping Plan that are applicable to this document have been incorporated into this revision.

Comments by Thedens

Comment #1 **SEAD-17, ELE.** To the south of the building are two objects labeled "LPG" (liquid petroleum gas?) and "TANK" (?). These items are not mentioned anywhere in the report. If they are petroleum storage tanks, they should be addressed since these types of tanks are notorious for leaking.

Response #1 The object labeled "LPG" is a 1000 gallon liquefied propane gas tank, and the object labeled "TANK" is a 400 gallon Number 2 fuel oil tank. Propane is used to fire the afterburner and the Number 2 fuel oil is used to fire the kiln and the afterburner of the deactivation furnace. They have been relabeled in the figures for clarification. A monitoring well has been proposed downgradient of the Number 2 fuel oil tank and surface soil samples are being collected in that area as well. There is no sampling proposed to address possible leakage from the propane tank, since any propane leaking from the tank would be in gaseous form and would not impact soil or water at the site.

COMMENTS BY
USEPA - REGION II
ON THE DRAFT RI/FS PROJECT SCOPING PLAN FOR
SEAD 16 & 17

GENERAL

Comment #1 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 16 and 17. All general and SEAD specific comments in the March 13, 1995 letter should be addressed when revising this Draft Project Scoping Plan.

Response #1 Agreed. All of the relevant general comments and comments specific to SEAD-16 and SEAD-17 in EPA's March 13, 1995 letter regarding the Draft ESI Report were responded to in this Project Scoping Plan.

Comment #2 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 #2 Agreed. These instances have been corrected.

Comment #3 The text consistently discusses the exceedance of TAGM values but does not discuss the values presented in the tables were not corrected for site total organic content (TOC), for organics or compared to site background for inorganics. This text should be added and a statement made that future TAGM values will be corrected for site TOC and compared to background inorganics concentrations.

Response #3 Agreed. Table 3-12 in Section 3.4.2.3 of the Generic Installation RI/FS Workplan presents a listing of guidance and standard criteria values for analytes in soil and sediment at SEDA. Two statements on this table indicate that TAGM values will be corrected for site TOC and compared to background inorganics concentrations.

Comment #4 **Page 2-13, Floor Samples**: It is unclear from the text what the matrix of the floor sample is. It is implied by the use of TAGM values that the samples were collected from "soils" on the interior of the building. The text should clearly state what type of matrix was sampled.

Response #4 Agreed. The matrix of the floor samples have been compiled into a table and has been added to the section.

Comment #5

Page 3-20 p4: The text states that there are no future use changes for the facility. However, as everyone is aware, the base has been selected for closure and this should be taken into account during the Risk Assessment process for potential future use scenarios. The text which states that there are no future use changes should be removed from this document.

Response #5

Disagreed. The following text was inserted at the end of Section 3.2.

In 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, the installation will remain open.

The President must approve the entire list 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.

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 #6

Figure 3-3: This figure does not appear to be consistent with the text presented on page 3-21. The figure presents the former furnace and fuel oil UST as the primary sources for SEAD-16. However, the text states that the UST is only a possible source for the contamination detected at the site. This should be removed from the document.

Response #6

Agreed. The UST has been removed from the figure and the text as a primary source of contamination. The tank was removed in September of 1993, and is no longer a source.

Comment #7

Page 3-27 p4: The text presents the results of a screening model analysis, which was conducted for a RCRA Part B Burn Plan. The data and the calculations for the result presented in the text, 18 ug/m^3, should be presented for review since the impact range is used later in the text for off-site surface soil sampling locations.

Response #7

Agreed. The results of the screening model analysis have been removed from the text.

Comment #8

Page 3-27 p1: The text states that there is no exposure, via ingestion, to groundwater under current uses at the site. However, when the base closes the future use of the facility may allow for the direct ingestion of groundwater via residential wells. This potential exposure route should be addressed in the text of this and future documents.

Response #8 Agreed. The text in section 3.2.5 discusses ingestion of groundwater as an exposure pathway for future residents, and Figure 3-4 shows that ingestion of groundwater is an exposure pathway for future residents.

Comment #9 **Page 3-30, SEAD-16, Groundwater Data**: Bullet #3 states that hydraulic properties of the aquifer will be calculated, i.e. transmissivity, storativity. If these are to be calculated for each of the sites pump tests will have to be conducted. Later in the document, the text does not discuss pump tests for either of the sites. If pumping tests are to be conducted the text should be corrected to give the details of such tests.

Response #9 Agreed. Pumping tests will not be conducted and the references to determining the transmissivity and storativity of the aquifer have been removed.

Comment #10 **Page 3-31, SEAD-17, Groundwater Data**: See comment above.

Response #10 Agreed. See response # 9.

Comment #11 **Page 4-3 p2**: 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 #11 Agreed. The physical and limited chemical testing referred to includes one or more of the following analyses: pH, total organic carbon content, hardness or grain size distribution. The text has been changed in each case to clarify which of these analyses will be performed.

Comment #12 **Page 4-3 p4**: 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 zero to 6-inches below the ground surface.

Response #12 Disagree. In response to EPA's comment to the Generic Workplan, Appendix A, the Field Sampling and Analysis Plan, has been changed to include that the volatile organic compound portion of surface soil samples will be collected as a core sample. As per previous agreement with NYSDEC and USEPA, however, surface soil samples will be collected from a depth of 0 to 2 inches below the surface organic matter, rather than 0 to 6 inches below the ground surface. The Project Scoping Plan refers to the Generic Workplan's Field Sampling and Analysis Plan for all sample collection procedures.

Comment #13 **Page 4-5 p2**: See comment above. Why is Hancock International Airport used for the meteorological data? Does the SEAD airfield collect site-specific data?

Response #13 Hancock Airport meteorological data was used in the past because no meteorological data existed from the SEDA Airport. Wind data gathered from the Ithaca Airport in Ithaca, New York, which is more representative of conditions at SEDA, has been substituted for the wind data from Hancock International Airport.

Comment #14 **Page 4-5 Section 4.2.1.4:** The third paragraph states that six surface soil samples will be collected off-site, however, the figure, Figure 4-2, shows ten proposed sampling locations.

Response #14 Agreed. The paragraph refers to six surface soil samples in error. The sampling plan has been changed, and the text now states that 12 downwind surface soil samples will be collected.

Comment #15 **Page 4-9 MW16-4:** Bullet #1 states that "former" groundwater quality data adjacent to the explosives/munitions and processing building will be collected. This statement is misleading since the groundwater sample being collected from this well will be representative of the quality at the time of sampling an not of "former" quality.

Response #15 Agreed. The term "former" was used in error, and has been deleted form the sentence.

Comment #16 **Page 4-12 p2:** Two indoor air quality samples are proposed for collection. We recommend that an additional sample be collected outside the building for a background control sample.

Response #16 The indoor air sampling has been removed from the sampling plan.

Comment #17 **Page 4-12 p4:** The text states that there is a small building to the northwest of Building S-311, no building is indicated on the site figure to the northwest of Building S-311. However, a building is located to the northeast of Building S-311. If this is the building then the text in this paragraph should be corrected.

Response #17 Agreed. The text has been changed to indicate that the small building is to the northeast of Building S-311.

Comment #18 **Page 4-12 p5:** Text should be added to the document which states how the interior of the piping will inspected, i.e. video inspection along its length.

Response #18 No inspection of the interior of the pipes will be performed. The exterior of the pipes only will be visually inspected. No video inspection will be performed.

Comment #19 **Table 4-1:** The ASTM method number should be given for the analysis of asbestos.

Response #19 Agreed. The analysis for asbestos will be performed by EPA Method 600/M4-82-020. This method number has been added to Table 4-1 and Section 4.2.6.

Comment #20 **Page 4-20, Section 4.3.2:** An additional surface water/sediment sample should be collected directly east of the on-site building to investigate potential effects of surface water run-off to the drainage ditch.

Response #20 Agreed. An additional surface water and sediment sample has been proposed to be collected directly to the east of Building S-311, and three additional surface water and sediment samples have been proposed to be collected from the drainage ditch that originates to the northwest of Building S-311 and drains to the north. These samples (SWSD17-7 through SWSD17-10) are shown in Figure 4-5.

Comment #21 **Page 4-20, Section 4.3.3:** An additional monitoring well should be installed downgradient of the tank to investigate potential groundwater effects associated with it.

Response #21 Agreed. An additional monitoring well has been proposed to be installed directly downgradient of the tank. The monitoring well (MW17-5) is shown in Figure 4-4. Three additional surface soil samples have also been proposed to be collected near the Number 2 fuel oil tank. These samples (SS17-36 through SS17-37) are shown in Figure 4-4.

Comment #22 **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 #22 Staffing for this project is discussed generally in the draft final Generic Workplan. The schedules for the RI/FSs to be performed at SEAD-16 and SEAD-17 have been added to Section 6.1.

Comment #23 **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 #23 Agreed. The final version of the Generic Installation RI/FS Workplan will contain the QAPP from Inchcape Corporation's Aquatec Laboratory located in Burlington, Vermont.

EPA's Hazardous Waste Facilities Branch

Comment #1 **Section 4.2.4 Investigation of Building S-311:** Specifies that "ARARs which will be considered for these actions includes Land Disposal Restriction and Treatment Standards for Hazardous Debris under 40 CFR Part 148 et al." The correct ARAR reference is "Land Disposal Restriction and Treatment Standards for Hazardous Debris under 40 CFR Part 268.45."

Response #1 The reference has been corrected.

EPA's Biological Technical Assistance Group

Comment #1 Please note that the previous comments on the "Generic Installation RI/FS Workplan" apply to these project scoping plans. 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 of the sites will be compared to the site background data which represent the site reference levels during the ecological investigation to determine whether biological sampling is required.

Comment #2 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.

Response #2 Agreed. While exposure via ingestion is the main concern for terrestrial receptors, inhalation and dermal contact are still exposure pathways of concern and the figures have not been changed with respect to this.

Comment #3 In both documents, the "Ecological Investigations" section of the RI states that the focus of the assessment will be "...aquatic species 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 phased approach to determine remedial action.

Response #3 Sections 4.2.5 and 4.3.4, the Ecological Investigations for SEAD-16 and SEAD-17, respectively, have been changed to pattern the investigation after the NYSDEC guidance document Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1991), and will focus on any aquatic or terrestrial resources found at the site. The approach recommended in the guidance is a phased approach.

Comment #4 To better determine the adequacy of the sampling locations, maps illustrating the drainage patterns, along with surface elevations, are necessary. 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.

Response #4 Agreed. Figure 4-3, Locations of Proposed Surface Water and Sediment Samples for SEAD-16, shows the surface water drainage patterns for SEAD-16 and has been refined. Surface water drainage patterns for SEAD-17 have been added to Figure 4-5, Locations of Proposed Surface Water and Sediment Samples for SEAD-17. Ground surface elevations are associated with the contours shown on the maps. Sections 4.2. and 4.3. present the reasons for choosing these locations.

Comment #5 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.

Response #5 The Draft Final Generic Workplan states in Appendix A, the Field Sampling and Analysis Plan, that surface water and sediment sampling will be conducted during high flow conditions.

Comment #6 Analysis of both filtered and unfiltered surface water samples is recommended.

Response #6 Disagreed. As per NYSDEC requirements, the analysis of surface water samples will not include filtered samples.

Comment #7 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.

Response #7 Agreed. The RI and ESI chemical analysis data for surface water will be compared to the acute and chronic effect levels from the AWQC in the RI report.

Comment #8 Sediment sampling should be conducted in the top 6".

Response #8 Agreed. Appendix A, the Field Sampling and Analysis Plan, states that sediment samples will be obtained from the 0 to 6-inch depth range.

Comment #9 Total organic carbon and grain size analysis should be conducted on all sediment samples to help determine the bioavailability of contaminants to potential receptors.

Response #9 Sections 4.2.6 and 4.3.5 and Tables 4-1 and 4-2 indicate that all sediment samples will be analyzed for total organic carbon content and grain size distribution.

Comment #10 The reference to the 1989 NYSDEC Sediment guidance should be revised to the 1994 document. 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 #10 Agreed. The 1989 NYSDEC sediment guidance document, Technical Guidance for Screening Contaminated Sediment, was updated in November 1993. This is the most current version according to the state. This document contains the LELs and SELs for freshwater sediments from the Persaud et al. reference. The criteria in the November 1993 version will be compared to the RI and ESI chemical analysis data for sediment.

Comment #11 For SEAD-16, (Figure 4-3) additional sediment and surface water sampling should be conducted in the western area where "water would likely drain... once the accumulation was large enough" (page 3-24).

Response #11 Agreed. The westward flow of surface water from the asphalt area would be directed by the drainage ditch that is located to the west of the railroad tracks that are to the northwest of Building S-311. Two additional surface water samples have been proposed to be collected from this drainage swale. The samples (SWSD16-9 and SWSD16-10) are shown in Figure 4-3.

Comment #12 In addition, sediment/surface water samples 16-3 & 16-4 are in close proximity to the railroad tracks and thus may be influenced by the railroad contaminants.

Response #12 Agreed. The surface water samples SWSD16-3 and SWSD16-4, and the two newly proposed surface water and sediment samples, SWSD16-9 and SWSD16-10, may be influenced by railroad contaminants. Because these drainage ditches are the main pathways of surface water flow in these areas, there are no alternative surface water bodies that may be sampled.

Comment #13 Additional surficial soil sampling in SEAD 16 & 17 should include soil samples from the top 12", rather than just the first 2". Siltation may have covered the initial deposition so that contaminants are now at levels below the top 2" of soil.

Response #13 Disagreed. As per previous agreement with NYSDEC and USEPA, surface soil samples will be collected from a depth of 0 to 2 inches below the surface organic matter.

Comment #14 When resampling using the wind pattern, determine if the previously obtained data matches the existing wind pattern.

Response #14 Disagreed. Because the furnace emissions occurred from 1945 to the mid-1960s at SEAD-16 and from 1962 to 1989 at SEAD-17, determining the existing wind direction at the time of sampling would not be effective for assessing downwind transport of contaminants. The wind data that was used to determine the downwind sampling directions was gathered over a five-year period from 1989 to 1993 and is representative of long-term wind patterns.

Comment #15 At SEAD-17 elevated levels of cadmium, copper, lead and zinc were identified in surface soils. Groundwater should also be analyzed for cadmium.

Response #15 Agreed. Cadmium is included in the metals Target Analyte List for which the groundwater samples have been proposed to be analyzed. Table C-2, in Appendix C of the Generic Installation RI/FS Workplan lists all of the analytes for this analysis.

Comment #16 In order to properly delineate the extent of surface soil contamination, additional soil sampling should be conducted south of sample SS17-11, which contained elevated levels of metals.

Response #16 Agreed. Two surface soil samples have been proposed to be collected in the area south of surface soil sample SS17-11. These samples (SS17-38 and SS17-39) are shown in Figure 4-4.

D#13

COMMENTS BY NYSDEC
ON THE DRAFT RI/FS PROJECT SCOPING PLAN FOR
SEADs 16 & 17

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. Although the main contaminants of concern have been identified for this AOC, EPA regulators require that all samples undergo a full suite of Level IV analyses including VOCs, SVOCs, metals, cyanide, pesticides and PCBs.

Comment #2

Table 2-1: Soil Analysis Results: The surface soil sample results and the interior floor sample results should be listed in two separate tables. Having the two in the sample table may confuse reader. For instance, the maximum value listed in the table for lead is 527,000 mg/kg. This value was actually detected in an interior floor sample, the maximum level of lead detected in an outdoor surface soil sample was 9140 mg/kg.

Response #2

The interior floor samples were of a soil/debris matrix. The were compared to soil TAGM values for the ESI report, and were therefore compared to other soil samples in the ESI report. In the RI report, however, the building samples will be treated separately from the soil samples.

Comment #3

4.2.1.1 Soil Boring Program: Section 3.4.2 of Field Sampling and Analysis Plan states that the first sample from each boring will be taken from 0 to 12 inches below ground and therefore should not be included as surface soil in Table 4-1.

Response #3

The Generic Workplan's Appendix A, the Field Sampling and Analysis Plan, has been changed to show that the first sample from each soil boring will be collected from 0 to 2 inches.

Comment #4

4.2.1.2Surface Soil Program: Based on historical use of the site and the ESI results, we do not expect surface soil 0 to 2 inch would be found contaminated with volatile organic compounds (VOCs).

Response #4

As per previous agreement with NYSDEC and USEPA, surface soil samples collected from a depth of 0 to 2 inches below the surface organic matter are required for completion of a baseline risk assessment. All surface samples, therefore, will be collected from 0 to 2 inches below the surface organic matter.

Comment #5 a. **4.2.1.3 Downwind Surface Soil Sampling**: It is stated that to assess the transport of contaminants from dust and stack emissions surface soil samples will be collected at 250, 500, 1000, 2000 and 3000 feet along both sides of downwind transect and will be analyzed for full TCL and TAL list and explosives. It further states that three samples will be collected to the east and three to the west of the area. This discrepancy of five (at 250, 500, 1000, 2000 and 3000 feet) or three samples need to be clarified. However, we have the following comment on the downwind sampling.

b. It appears that this entire sampling is redundant on the face of surface soil sampling proposed under Section 4.2.1.2. Under this section, the extent of surface soil contamination will be delineated and this information will be used in calculating risk assessment and potential removal action. The purpose of the downwind surface soil sampling is unclear.

c. In addition, if downwind surface soil sampling is still considered necessary, our suggestion is to conduct analysis in accordance with our comment 1 and 4.

Response #5 a. Agreed. The text stated in error that six downwind surface soil samples would be collected. The sampling plan has been changed and the text has been changed to indicate that the correct number of downwind surface soil samples is 12.

b. Because the primary source of contaminants for both of the sites is a furnace stack, wind transportation may have been a pathway for contaminant migration away from the sites. Using 3500 feet as the limit to where deposition from stack emissions may have reached, sample intervals of 500, 1000, 2000, 3000, and 3500 feet downwind of the two sites were chosen to assess whether contaminants from the furnace stacks have been transported from the site. The 3500-foot limit was obtained from air modelling that was performed for the RCRA permit application that was prepared for SEAD-17.

c. The analysis of the downwind surface soil samples will be conducted in accordance with Response to your Comments 1 and 4.

Comment #6 **4.3.1.2 Surface Soil Program**: Please see comment number 4.

Response #6 See response # 4.

Comment #7 **4.3.1.3 Downwind Surface Soil Sampling**: Please see comment number 5.

Response #4 See response # 5.

Comments and Recommendations
Pre-Draft Project Scoping Plan
Remedial Investigation Feasibility Study
Abandoned Deactivation Furnace (SEAD-16)
And the Active Deactivation Furnace (SEAD-17)
Seneca Army Depot Activity
Romulus, New York
January 1995

Comments By: Healy/kwh

Comment #1 Section 3.1.3.1.1, Page 3-18.

It would appear that the first 7 lines of the second paragraph are a repetition of the first paragraph. Please edit as appropriate.

Response #1 Agreed. The first seven lines of the second paragraph have been removed.

Comment #2 Section 3.1.3.1.4, Page 3-19.

Please clarify the relation of the first two sentences. It would appear that the second is a contradiction of the first.

Response #2 Agreed. The paragraph has been changed to the following:
"Based upon the results of the ESI conducted at SEAD-16, a threat to human health and the environment may exist due to the presence of heavy metals and SVOCs in surface soil within Building S-311 and in groundwater. While these data indicate that the likelihood of infiltration of surface soil contamination to groundwater is small, additional data is required to further evaluate these pathways in the overall evaluation of risks."

Comment #3 Section 3.1.3.2.2, Page 3-20.

Please clarify "The groundwater sampling summary" The thought is incomplete.

Response #3 Agreed. This incomplete sentence has been removed.

Comment #4 Section 3.2, Page 3-20.

As paragraph two of this section, please add the following: "This is a generic discussion. The future use scenario and the required degree of cleanup will be proposed on a site-by-site basis as part of each feasibility study. 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 #4

Agreed. The above paragraph has been added to the text.

Comment #5

Page 3-30. Soil Data.

In bullet one, please delete "sufficient" as occurs prior to "samples".

Response #5

Agreed. It has been removed.

Comment #6

Section 4.3.5, Page 4-23.

Since QA/QC samples proposed are not included in Appendix C, recommend adding the number proposed/projected to Table 4-2.

Response #6

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 are collected in accordance with NYSDEC/EPA and USACOE guidance. A footnote has been added to Tables 4-1 and 4-2 indicating that.

<u>Comments By: Scott Bradley</u>

Comment #1

Section 1.1, Page 1-1.

Please define the purpose of this document. Citing another document as containing the purpose of this report is frustrating. The purpose statement should define how this scoping document ties into the overall program.

Response #1

Agreed. The text has been changed to the following:

"The purpose of this RI/FS project scoping plan is to provide site specific information for the RI/FS project at SEAD-16 and SEAD-17 operable units. This plan outlines work to be conducted at SEAD-16 and SEAD-17 based upon recommendations specified in the expanded site inspections (ESIs) conducted at these areas of concern (AOCs).

The generic installation remedial investigation/feasibility study (RI/FS) workplan was designed to serve as a foundation for this document and provides generic information that is applicable to all site activities at Seneca Army Depot (SEAD)."

Comment #2

Section 1.2, Page 1-1.

Please replace the reference to the Generic work plan with a brief overview of the report organization. Subsequent utilization of cross-referencing the Generic work plan with the scoping document is appropriate following the Introduction section.

Response #2

Agreed. The text has been changed to the following:

"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 (Site Conditions) 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 (Plans and Management) discusses scheduling and staffing. Appendices A through F are included with this report.

Comment #3

Section 2.2, General.

Paragraph numeration is inconsistent. Please specify.

Response #3

Parsons ES was unable to identify paragraph numeration problems within Section 2.2 of the scoping document.

Comment #4

Table 2-1, Page 2-4.

This table lists various values significantly exceeding the reporting limits defined in the Generic work plan CDAP yet are qualified with a "U" for "not detected". If this is due to matrix effects, some discussion of subsequent data applicability is appropriate. In addition, this table does not include the floor sample results but does cite values from the floor samples in the "Maximum Detected" column. It is not clear if the number of TAGM exceedances is from the floor samples, the "U" qualified data, or other results. Please address these concerns in both the text and in the table. Floor sample results may require a separate table. In any case, a note at the bottom of the table is required to explain the qualified data exceeding PQL's or MDL's.

Response #4

The following note has been added to the bottom of Table 2-1: "h) FS=Floor Sample".

Soil samples SS16-4, SS16-6, SS16-7, SS16-8, SS16-9, SS16-10 and SS16-16 had higher reporting limits for SVOs due to the presence of at least 21 various tentatively identified compounds (TICs) in the SVO analysis. These TICs included: Tetracosane, pentacosane, hexcosane, tricosane, 2-pentanone, 4hydroxy-4met, and other unknown polycyclic hydrocarbons. The presence of these compounds suggest that the matrix contains petroleum hydrocarbons and unknown polycyclic aromatic compounds which have heavy molecular weights. The presence of these compounds cause difficulties detecting SVOs so the laboratory diluted the sample by a factor of 20 in order to more accurately identify the SVOs present. This dilution causes an increase in the detection limit by the same factor.

The following was added to the text: "Elevated semi-volatile organic detection limits were observed in samples SS16-4, SS16-6, SS16-7, SS16-8, SS16-9, SS16-10 and SS16-16 due to the presence of high molecular weight petroleum hydrocarbons and unknown polycyclic aromatic compounds".

The following was added to the text: "The soil sample SS16-4 had a high reporting limit for pesticides/PCBs because the sample was diluted ten times due to a high concentration of 4'4'-DDE in the sample".

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

Comment #5 Section 2.2, Page 2-10.

Information under "Soil Sampling" should pertain to soil only. A separate section on floor sample results should be provided in the "Building Material Sampling" review.

Response #5 Agreed. The discussion pertaining to the floor samples (identified with the FS designation) has been moved to the "Building Material Sampling" section.

Comment #6 Table 2-3.

Title block of this table should clarify that two sampling events are delineated and that the "Maximum" identified is the highest of both events.

Response #6 Clarification. A variety of surface soil and soil boring samples were collected from discreet locations on a variety of dates, as part of the SEAD 17 ESI. The maximum, frequency of detection, and number above TAGM shown in Table 2-3 apply to all samples.

Comment #7 Figures 3-1, 3-2.

Provide date of data collection on these figures.

Response #7 Agreed. The date "April 1994" has been added to both figures.

Comment #8 Section 3.2, Page 3-20.

Retitle as "Preliminary Identification of Potential Receptors and Exposure Scenarios".

Response #8 Agreed. The title has been changed.

<u>Comments By: K. Hoddinott and 1LT. Clemens</u>

Comment #1 Page 3-12, Section 3.1.2.1. Metals.

The statement that Cr(III) is a greater threat to human health than Cr(VI) is incorrect. While Cr(III) is more prevalent than Cr(VI) in the soil environment, Cr(VI) is much more toxic.

<u>Recommendations:</u> Remove this statement from the report.

Response #1 Agreed. The statement now reads, "Chromium (Cr) normally exists in groundwater as CrO_2^{-2}, which is far more soluble than Cr (III), (the dominant environmental form of Cr) and therefore represents a greater threat to human health or the environment.

Comment #2 Page 3-21, Section 3.2.2. Potential Exposure Pathways and Receptors - SEAD-16.

This discussion should include the numerical assumptions associated with the current and future exposure scenarios of SEAD-16 and SEAD-17.

<u>Recommendations:</u> Include a table or discussion outlining the numerical assumption associated with the current and future exposure scenarios of SEAD-16 and SEAD-17.

Response #2 Disagree. For a qualitative determination of exposure pathways see Table 4-1 in Section 4.

Comment #3 Page 3-30, Section 3.6. Data Gaps and Data Needs.

The need for determining the nature and extent of contamination of on-site surface waters and sediments is questionable since the discussion of the physical site characteristics states that the surface water bodies do not exist on-site.

<u>Recommendations:</u> Justify the need for surface water sampling where surface water bodies do not exist.

Comment #2. The data needs for the soil must include an adequate determination of the soil background concentrations, with a statistical comparison with the site data.

<u>Recommendations:</u> Include an adequate determination of the background levels of chemicals in the soil.

Response #3

Part 1) Agreed. Although the site characteristics do not indicate any on-site surface water bodies there is a small drainage swale that traverses the eastern and southern perimeter. This may contain surface waters during or immediately following a precipitation event. Sediment samples will be collected from this swale and surface water will be collected if available. Refer to Section 4.2.2 for further information.

Part 2) Agreed. Background data for the Seneca Army Depot already exists. These samples were previously collected as part of the OB Grounds and Ash Landfill RI/FS programs and as part of the 10 SWMU investigation. All of these data are being used to define the site wide concentrations of inorganic constituents in soils.

Comment #4

Page 4-2, Section 4.2.1. Soil Investigation.

No where in the SEAD-16 studies have contamination concentration maps been presented to substantiated the implication that airborne and surface runoff contaminants did not travel beyond the site fence. the proposed soil investigation fails to address the extent of offsite contamination.

<u>Recommendation:</u> State and support reasoning for not determining the extent of offsite contamination, especially to the northeast. Coverage in proposed sampling plan appears to be governed by site boundary fence.

Response #4

Disagreed. Contamination concentration maps were presented in the SEAD 16 ESI report (Parsons ES, 1995). The majority of the surface soil samples collected for the ESI along the fence line were virtually clean. Two samples were considered to be "Hot Spots" and the proposed RI/FS sample locations were defined based on these results.

Comment #5

Page 4-5, Section 4.2.1.3. Downwind Surface Soil Sampling.

The number of samples collected as a function of distance from the site is inconsistent with the first purpose of the Soil Investigation "Determine the extent of surface soil impacts exceeding TAGM values". There is no coverage from the site boundary fence out to 1000 feet, yet the 250 foot by 250 foot site contains 20 actual and 22 proposed soil sample points.

<u>Recommendations:</u> Demonstrate extent of offsite contamination by sampling the region between the site boundary fence the first downwind surface soil sample point for metals.

Response #5

Agreed. Additional surface soil samples will be collected at 250 and 500 foot distances along both sides of the downwind transect.

Comment #6

Page 4-19, Section 4.3.1.3. Downwind Surface Soil Sampling.

The number of samples collected as a function of distance from the site is inconsistent with the first purpose of the Soil Investigation "Determine the extent of surface soil impacts exceeding TAGM values". There is no coverage from the site proximity out to 1000 feet, yet the 200 foot by 200 foot site contains 34 actual and proposed soil sample points.

Recommendations: Demonstrate extent of distant offsite contamination by sampling the region between the site and first downwind surface soil sample point for metals.

Response #6

Agreed. Additional surface soil samples will be collected at 250 and 500 foot distances along both sides of the downwind transect.

COMMENTS FOR DRAFT FINAL PROJECT SCOPING PLAN, RI/FS, ABANDONED DEACTIVATION FURNACE (SEAD-16) AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17), SENECA ARMY DEPOT ROMULUS, NEW YORK, JULY 1995

Comment by K. Hoddinott:

Comment #1 The U.S. Army Center for Health Promotion and Preventive Medicine (Provisional) reviewed the subject document on behalf of the Office of the Surgeon General. We agree with the changes the contractor proposes to address our concerns. However, we believe that a listing of the assumptions to be used in the risk assessment should be included in this document. These assumptions are critical to the evaluation and should be agreed upon as early as possible so that site resampling may be reduced or eliminated.

Response #1 Agreed. A discussion of the exposure assessment assumptions to be used in the risk assessment process for SEADs 16 and 17 has been added to this scoping plan as Section 3.2.6.

<u>Comments by L.L. Tate</u>

Comment #1 "concentrations that exceeded both the guidance values for the protection of human health and the toxicity characteristic leaching procedure (TCLP) Alternative Guidance Values for the protection of groundwater." needs to be expanded. "Alternative Guidance Values" are not defined. The source and/or the numbers should be given.

Response #1 Alternative Guidance Values are defined and listed in the NYSDEC Spill Technology and Remediation Series Memo # 1, Petroleum-Contaminated Soil Guidance Policy (STARS Memo #1) (August 1992). This document is intended as a guidance in determining whether soils have been contaminated to levels which require investigation and remediation.

The STARS Memo #1 states that the satisfactory protection of groundwater is indicated by TCLP Extraction Guidance Values or TCLP Alternative Guidance Values. To demonstrate groundwater quality protection by the TCLP Alternative Method, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a soil matrix, must be less than or equal to the TCLP Alternative Guidance Value. Determination of these Alternative Guidance Values used the twenty times rule as described below.

The TCLP laboratory procedure requires the soil sample to be diluted by a ratio of 20:1 when preparing the sample for the acidic extraction , and subsequent leachate analysis. Assuming 100% extraction efficiency and knowing the sample weight and final TCLP volume, it is possible to apply a factor of 20 to the TCLP limit which will provide an indication of the minimum possible contaminant concentration in soil that could exceed the TCLP value. In other words, the TCLP Alternative Values are equal to 20 times the TCLP Extraction Guidance Values. TCLP Extraction Guidance Values are equal to NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent. Therefore, if a contaminant's soil concentration is known, it can simply be compared to the TCLP Alternative Guidance Values. In summary, if the contaminate concentrations in the soil are less than or equal to the TCLP Alternative Guidance Values, then the soil is considered environmentally acceptable for groundwater quality protection.

The NYSDEC STARS Memo #1 has been referenced in the text on page 2-2.

Comment #2 The potential need for treatability studies should be addressed.

Response #2 Disagree. The need for treatability studies is related to the technology that will be selected for implementation. As part of the feasibility study Parsons ES will assess the need to conduct treatability studies. This is discussed in Section 5 of the Generic Installation RI/FS Workplan. At this stage of the RI/FS process it would be inappropriate to address this need since all the data has not been collected and the FS is not done.

Comment #3 Appendices B, C, D and F belong in this document instead of in the Generic document.

Response #3 Disagree. All of the referenced appendices are applicable to the RI/FS investigation at SEADs 16 and 17. To avoid duplication of effort these appendices have been referenced from the Generic Installation RI/FS Workplan and apply to this scoping plan.

<u>Comments by K. Forget</u>

Comment #1 I do still not agree with the future residential land use at ALL the SEADs. I will be speaking with the Division's technical person regarding EPAs new future land use directive so that this issue can be reexamined.

Response #1 Acknowledged. As part of SEDA's on-going negotiations with EPA and NYSDEC, it has been agreed that for the purposes of worst case consideration, the future land use of these sites will include residential exposure. The possibility of this actually occurring is remote since the Army intends to continue using the sites for light industrial use. Although the risk due to future residential land use will be calculated, the decision to perform a remedial action will be based upon an intended land use scenario that will likely not include residential. The decision of actual future land use is an Army decision. If future use should be residential due to the upcoming

BRAC closure, the risk associated with this use will have been calculated and will not have to be redetermined. This procedure has been agreed upon since the first RI was conducted 2 years ago. No current changes will be made based upon this comment, however, we encourage MRD's involvement in the development of the risk assessment. If MRD can convince EPA and NYSDEC to omit this phase of the risk assessment, we will change the process.

D#13-Comments\SED16&17\RIFS

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

APPENDIX G

EXPANDED SITE INSPECTION SUBSURFACE INVESTIGATIONS

- Boring Logs
- Monitoring Well Installation Diagrams

BORING LOGS

PAGE 1 OF

OVERBURDEN BORING REPORT

ENGINEERING–SCIENCE, INC. CLIENT: ACOE

BORING NO.: MW16-1
(Background well)

PROJECT : 10 SWMU ESI
LOCATION : SEAD-16

JOB NO. : 720477
EST. GROUND ELEV.: 733.44 735
START DATE: 10/25/93
FINISH DATE:
CONTRACTOR: Empire
DRILLER: Al +
INSPECTOR: Pfm/ks
CHECKED BY: Pfm
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8½"	0-6'	3"x2'	SS	Drop/stl (HMR)	140/30"

DRILLING ACRONYMS:

HSA	HOLLOW–STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE–AND–WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD–ROTARY SOIL–CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN–HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE–LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUIPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM	PID	0-2000	0	3^{00}	10/25/93			Sunny

MONITORING ACRONYMS

PID	PHOTO – IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME – IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT	–	✓
SURVEYOR	–	✓
CORE LOG	–	✓
WELL INSTALLATION DETAILS	–	✓
HYDRAULIC TESTING	–	✓
GEOPHYSICAL LOGGING	–	✓

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

BORING NO.: MW16-1

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC.
CLIENT: ACOE
BORING #: MW16-1

MONITORING			
INSTRUMENT	INTERVAL	BGD	TIME
OVM	0-2000	0	300

COMMENTS: RAD BKGRD 15 μR/hr = 0

DRILLER: Empire
INSPECTOR: BM/KS
DATE: 10/25/93

DEPTH (FT)	SAMPLING			SAMPLE				SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain-size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
	BLOWS PER 6 INCHES	PENETRATION RANGE (FEET)	RECOVERY RANGE (FEET)	DEPTH INT (FEET)	NO.	VOC	RAD SCRN			
1 2	1 2 7 10	0 ↓ 2'	0 ↓ 1.8'	–	–	0	0	* Brn blk organic silt + clay, 0-0.6' Roots Fill 0.2'-0.6' Δ Till, Brn-yellow f sand + SILT w/ some clay oxidized areas all the way through, dry		Top Soil Till
3 4	12 13 14 15	2' ↓ 4'	2' ↓ 3.2'	–	–	0	0	Brn-yellow f-sand SILT w some clay oxidized areas throughout, shale frags throughout, fine gravel size shale, dry		Till
5 6	100/.3	4' ↓ 4.3	4' ↓ 4.3	–	–	0	0	Gray-brn, SILT + clay with some shale frags, fine gravel size, WET, loose		
		Competent Shale ↓						4.3' Split spoon refusal will Auger to refusal (thin w. shale zone ~ 0.3' thick) → Auger Refusal 6.0' * Water @ 4.3' below ground surface on morning of 10/26/93 @ 805 AM ∴ 1.7' in hole	← Refusal w/ Augers	
10										
15										
20								* Fill dark brn blk silt and clay w/ some coal chips + roots → 0-0.6'		

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: ACoE	BORING NO.: MW16-2

PROJECT : 10 SWMU ESI
LOCATION : SEAD-16

JOB NO.: 720477 —
EST. GROUND ELEV.: 732.829
START DATE: 10/26/93
FINISH DATE:
CONTRACTOR: Empire
DRILLER: Alan
INSPECTOR: RM/KS
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING	HOLE	DEPTH	SAMPLER		HAMMER	
METHOD	DIA.	INT.	SIZE	TYPE	TYPE	WT/FALL
HSA	8½"	0-4.1'	3"x2'	SS	HMR	140/30"

DRILLING ACRONYMS:

HSA	HOLLOW-STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE-AND-WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD-ROTARY SOIL-CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN-HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE-LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUPMENT SUMMARY

INSTRUMENT	DETECTOR	RANGE	BACKGROUND			CALIBRATION		WEATHER
TYPE	TYPE/ENERGY		READING	TIME	DATE	TIME	DATE	
OVM	PID	0-2000	0	1050	10/26/93			
RAD		0-10	4 uR/HR	1035	10/26/93			
DUST		0-.99	0.7	1030	10/26/93			

MONITORING ACRONYMS

PID	PHOTO - IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME - IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		—
SURVEYOR		—
CORE LOG		—
WELL INSTALLATION DETAILS		—
HYDRAULIC TESTING		—
GEOPHYSICAL LOGGING		—

OVERBURDEN BORING REPORT

ENGINEERING–SCIENCE, INC.	**CLIENT:** ACoE	**BORING #:** MW16-2

MONITORING				COMMENTS:
INSTRUMENT	INTERVAL	BGD	TIME	
OVM	0-2000	0.0	1050	
RAD	0-1000	18uR/HR	1035	≈0
DUST	0-.99	0.7	1030	

DRILLER: Al +

INSPECTOR: PFM

DATE: 10/26/93

DEPTH (FT)	SAMPLING: BLOWS PER 6 INCHES	SAMPLING: PENETRATION RANGE (FEET)	SAMPLING: RECOVERY RANGE (FEET)	SAMPLE: DEPTH INT (FEET)	SAMPLE: NO.	SAMPLE: VOC	SAMPLE: RAD SCRN	SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain-size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
1 2		0 ↓ 2'	0 ↓ 1.7'	–	–	10	0	0-0.3' Asphalt blk some oily residue 0.3'-2' Crushed shale red (old road?) f-c grain gravel-sized with f-m silt fines in interstices gray, dry		Fill
3 4		2 ↓ 3.3	2 ↓ 3.3	–	–	0	0	Gray shale weathered + fissile, with little f-silt in interstices some c gravel to cobble size shale flags at base of spoon, WET		W. SHALE
5 6		Competent	↓					Shale		
10								Spoon refusal @ 3.3' will Auger to refusal before setting well * Auger refusal 4.1'		
15										
20										

PAGE 1 OF

OVERBURDEN BORING REPORT

ENGINEERING–SCIENCE, INC. **CLIENT:** ACOE **BORING NO.:** MW16-3

PROJECT : 10 SWMU ESI
LOCATION : SEAD-16

JOB NO. : 720477
EST. GROUND ELEV.: 733.049
START DATE: 10/26/93
FINISH DATE: 10/26/93
CONTRACTOR: Empire
DRILLER: Alan
INSPECTOR: Pfm
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8½"		3" x 2'	SS	HMR	140/30"

DRILLING ACRONYMS:

HSA	HOLLOW–STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE–AND–WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD–ROTARY SOIL–CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN–HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE–LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM	PID	0-200	0ppm	2^{35}	10/26/93			ovr cast
RAD		0-100	8uR/h	2^{38}	10/26/93			"
Dust		0-0.99	0.05	239	10/26/93			"

MONITORING ACRONYMS

PID	PHOTO – IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME – IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		–
SURVEYOR		–
CORE LOG		–
WELL INSTALLATION DETAILS		–
HYDRAULIC TESTING		–
GEOPHYSICAL LOGGING		–

PAGE 1 OF **SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS** **BORING NO. :**

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	BORING #: MW16-3

MONITORING			
INSTRUMENT	INTERVAL	BGD	TIME
OVM	0-2000	0	235
RAD	0-100	848 r	238
DUST	0-0.99	0.05	239

COMMENTS:

DRILLER: Empire Geo

INSPECTOR: [illegible]

DATE: 10/26/93

DEPTH (FT)	SAMPLING BLOWS PER 6 INCHES	PENETRATION RANGE (FEET)	RECOVERY RANGE (FEET)	SAMPLE DEPTH INT (FEET)	NO.	VOC	RAD SCRN	SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain-size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
1 2	12 34 22 17	0 ↓ 2'	0 ↓ 1.5'	—	—	3.5 0 0	0	→ Asphalt 0-0.3' → Brn f-sand SILT + clay some f-m gravel 0.3'-0.6' → Gray weathered shale, silt + clay in interstices some c gravel sized shale (ROAD?)		Fill
3 4	15 8 8 8	2' ↓ 4'	2' ↓ 3'	—	—	0		Gray weathered shale, silt + clay in interstices (2-2.3') Sand, f-m SAND Brown, with f-c fragments wet 2.3-3'		Fill ↓
5	100/.3	4 ↓ 4.4	4 ↓ 4.4'	—	—			Brn-Gray SILT and CLAY with shale fragments (f-c gravel size) WET		~~Fill~~ W. SHALE?
6								Competent Shale		
								↓ Spoon refusal 4.4' Auger refusal 5.0'		
10										
15										
20										

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

PAGE 1 OF

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC. **CLIENT:** ACOE **BORING NO.:** MW17-1

PROJECT: 10 SMWU
LOCATION: SEAD 17

JOB NO.: 720477
EST. GROUND ELEV.: 734.465
START DATE: 12-1-93
FINISH DATE: 12-1-93
CONTRACTOR: Empire
DRILLER: BOB/JOHN
INSPECTOR: ES/LB
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8.5"		2"x3"	SS	HMR	140# /30"

DRILLING ACRONYMS:

HSA	HOLLOW-STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE-AND-WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD-ROTARY SOIL-CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN-HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE-LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUIPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM		0-2000	0		12/1/93			

MONITORING ACRONYMS

PID	PHOTO - IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME - IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		
SURVEYOR		
CORE LOG		
WELL INSTALLATION DETAILS		
HYDRAULIC TESTING		
GEOPHYSICAL LOGGING		

PAGE 1 OF **SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS** **BORING NO.:**

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	BORING #: MW17-1

MONITORING			
INSTRUMENT	INTERVAL	BGD	TIME
OVM	0-2000		1110
Dust		—	—

COMMENTS:

DRILLER: Empire

INSPECTOR: ES/LB

DATE: 12-1-93

DEPTH (FT)	SAMPLING			SAMPLE				SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain-size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
	BLOWS PER 6 INCHES	PENETRATION RANGE (FEET)	RECOVERY RANGE (FEET)	DEPTH INT (FEET)	NO.	VOC	RAD SCRN			
	2	0		0	17-			Topsoil		
	3							Med. brown SILT, some little Clay, trace		
1	6		2		1.1	0	X	Shale (.25" dia.), moist		
	10	2		2						
2	19	2		2	17-			AA		
	15		1.8		1.2	0	X	↖ Shale fragments (1-1.5" dia.)		
3	17							med. brown,		
	21	4		4				SILT, some Clay, little Shale fragments		
4	25	4						(.5" dia.), moist. ↙ 2" Shale fragments (1.5" dia.)		
5	57		1.8					AA wet area at interface		
	48									
	52	6								
6	80	6						Med. brown fine SAND, some Shale		
7	100/.2							fragments (to 1" dia.), wet.		
		8								
8								Augered to 8.5'		
10										
15										
20										

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

PAGE 1 OF 2

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC. | CLIENT: ACOE | BORING NO.: MW17-2

PROJECT: 10 SWMU ESI
LOCATION: SEAD-17

JOB NO.: 720477
EST. GROUND ELEV.: 731.649
START DATE: 10/27/93
FINISH DATE:
CONTRACTOR: Empire
DRILLER: Alan
INSPECTOR:
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8 1/4"		3"x2'	SS	HMR	140 30"

DRILLING ACRONYMS:

HSA	HOLLOW-STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE-AND-WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD-ROTARY SOIL-CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN-HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE-LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUIPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM	PID	0-2000	0	320	10/27/93			
RAD		0-100	17uR/h	320	10/27/93			
DUST		0-0.99	0.05	320	10/27/93			
OVM	PID	0-2000	0	0955	11/2/93			
RAD		0-100	20uR/h	0955	11/2/93			
DUST		0-0.99	0.05	0955	11/2/93			

MONITORING ACRONYMS

PID	PHOTO-IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME-IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		–
SURVEYOR		–
CORE LOG		–
WELL INSTALLATION DETAILS		–
HYDRAULIC TESTING		–
GEOPHYSICAL LOGGING		–

OVERBURDEN BORING REPORT

ENGINEERING–SCIENCE, INC.	CLIENT:	BORING #: MW17-2

MONITORING			
INSTRUMENT	INTERVAL	BGD	TIME
OVM	0-2000	0	[illegible]
RAD	0-100	[illegible]	[illegible]
DUST	0-0.99	0.05	[illegible]

COMMENTS: ~~[illegible]~~

DRILLER: [illegible]

INSPECTOR: [illegible]

DATE: [illegible]/93

DEPTH (FT)	SAMPLING: BLOWS PER 6 INCHES	SAMPLING: PENE-TRATION RANGE (FEET)	SAMPLING: RECOV-ERY RANGE (FEET)	SAMPLE: DEPTH INT (FEET)	SAMPLE: NO.	SAMPLE: VOC	SAMPLE: RAD SCRN	SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain–size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
1	3 3 7 7	0 2	0 1.4	0 2	MW 17-2.1	0	0	[illegible] fill 0-0.5 Δ to Brn, SILT + clay with some fine Sand, some [illegible]	Till	Till
2 3	8 27 50 100/[illegible]	2' 4'	2 4	2 4	MW 17 2.2	0	0	2.0-2.5 Brn SILT + CLAY with some f sand 2.5-3.7 Gray-Brn Silt + clay with some f sand, 3.7-4.0 weathered shale, Gray, damp	Till	Till
4										
5										
6										
10										
15										
20										

Component shale

Spoon refusal ~~[illegible]~~ 4.0'

Auger refusal ~~[illegible]~~ 3.6' (cont Auger as far as spoons were driven)

Augered to 6.0' (different drill rig) 11/2/93.

→ also MS sample from 2.2

Note: MW17-2.10 dup of MW17-2.2
also collected an MRD sample here
(MW17-2.2 MRD)

PAGE 1 OF

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC. **CLIENT:** ACOE **BORING NO.:** MW17-3

PROJECT : D SWMU
LOCATION : SEAD 17

JOB NO. : 720477
EST. GROUND ELEV.: 730.188
START DATE: 11/30/93
FINISH DATE: 11/30/93
CONTRACTOR: Empire
DRILLER: John
INSPECTOR: ES/LB
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8'2"		2'x3"	SS	HmR	140# / 30"

DRILLING ACRONYMS:

HSA	HOLLOW-STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE-AND-WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD-ROTARY SOIL-CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN-HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE-LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUIPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM		0-2000	0	1345	11/30/93			
Dust		0-0.99	0.51	1345	11/30/93			

MONITORING ACRONYMS

PID	PHOTO - IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME - IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

tremied sand dry.

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		
SURVEYOR		
CORE LOG		
WELL INSTALLATION DETAILS		
HYDRAULIC TESTING		
GEOPHYSICAL LOGGING		

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

BORING NO. :

OVERBURDEN BORING REPORT

ENGINEERING–SCIENCE, INC.

CLIENT: ACOE

BORING #: MW17-3

MONITORING			
INSTRUMENT	INTERVAL	BGD	TIME
OVM	0-2000	0	1345
Dust	0-.99	.51	1345

COMMENTS:

DRILLER: Empire

INSPECTOR: ES/LB

DATE: 11/30/93

DEPTH (FT)	SAMPLING: BLOWS PER 6 INCHES	PENETRATION RANGE (FEET)	RECOVERY RANGE (FEET)	SAMPLE: DEPTH INT (FEET)	NO.	VOC	RAD SCRN	SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain–size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
1 2	2 4 6 7	0 2	1.7	0 2	17-3.1	0	X	Med. brown SAND, some silt, moist Lt. brown SILT, some fine Sand, few Shale fragments, moist		Fill
3 4	7 19 36 67	2 4	2.0	2 4	17-3.2	0	X	AA, wet Gray. weathered Shale, (fragments to 2" dia) dry		
5 6	67 100/3	4 6	.7	4 6	17-3.3	0	X	AA, wet		
7										
8										
10										
15										
20										

Spoon refusal @ 4.8'
Augered to 6.0'

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC. | **CLIENT:** ACOE | **BORING NO.:** MW 17-4

PROJECT: 10 SWMU
LOCATION: SEAD 17

JOB NO.: 720477
EST. GROUND ELEV.: 732.453
START DATE: 11/30/93
FINISH DATE: 12/1/93
CONTRACTOR: Empire
DRILLER: John W.
INSPECTOR: ES/LB
CHECKED BY:
CHECK DATE:

DRILLING SUMMARY:

DRILLING METHOD	HOLE DIA.	DEPTH INT.	SAMPLER SIZE	SAMPLER TYPE	HAMMER TYPE	HAMMER WT/FALL
HSA	8½"		2' x 3"	SS	HMR	140# / 30"

DRILLING ACRONYMS:

HSA	HOLLOW-STEM AUGERS	HMR	HAMMER	SS	SPLIT SPOON
DW	DRIVE-AND-WASH	SHR	SAFETY HAMMER	CS	CONTINUOUS SAMPLING
MRSLC	MUD-ROTARY SOIL-CORING	HHR	HYDRAULIC HAMMER	5I	5 FT INTERVAL SAMPLING
CA	CASING ADVANCER	DHR	DOWN-HOLE HAMMER	NS	NO SAMPLING
SPC	SPIN CASING	WL	WIRE-LINE	ST	SHELBY TUBE
				3S	3 INCH SPLIT SPOON

MONITORING EQUIPMENT SUMMARY

INSTRUMENT TYPE	DETECTOR TYPE/ENERGY	RANGE	BACKGROUND READING	BACKGROUND TIME	BACKGROUND DATE	CALIBRATION TIME	CALIBRATION DATE	WEATHER
OVM		0-2000	0	1520	11/30/93			partly
								Cloudy
								cold

MONITORING ACRONYMS

PID	PHOTO - IONIZATION DETECTOR	BGD	BACKGROUND	DGRT	DRAEGER TUBES
FID	FLAME - IONIZATION DETECTOR	CPM	COUNTS PER MINUTE	PPB	PARTS PER BILLION
GMD	GEIGER MUELLER DETECTOR	PPM	PARTS PER MILLION	MDL	METHOD DETECTION LIMIT
SCT	SCINTILLATION DETECTOR	RAD	RADIATION		

COMMENTS:

Dust meter has high readings.
Sand tremied.

OTHER REPORTS	DATE/PENDING	N/A
WELL DEVELOPMENT		
SURVEYOR		
CORE LOG		
WELL INSTALLATION DETAILS		
HYDRAULIC TESTING		
GEOPHYSICAL LOGGING		

OVERBURDEN BORING REPORT

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	BORING #: MW17-4

MONITORING				COMMENTS:	
INSTRUMENT	INTERVAL	BGD	TIME		DRILLER: Empire
OVM	0-2000	0			INSPECTOR: ES/LB
Dust		—			DATE: 11-30-93

DEPTH (FT)	SAMPLING			SAMPLE				SAMPLE DESCRIPTION (As per Burmeister: color, grain size, MAJOR COMPONENT, Minor Components with amount modifiers and grain-size, density, stratification, wetness, etc.)	USCS CLASS	STRATUM CLASS
	BLOWS PER 6 INCHES	PENETRATION RANGE (FEET)	RECOVERY RANGE (FEET)	DEPTH INT (FEET)	NO.	VOC	RAD SCRN			
	3	0		0	13-			Med brown SILT, some Clay, trace		
1	5		2'		4.1	0	X	Shale fragments, moist.		
	7									
2	7	2		2						
	17	2		2				AA, wet		
	48				13-			weathered Shale, dry		
3	77		1.8'		4.2		X			
	60	4		4						
4	100/.2							Spoon refusal at 4.0		
5								Augered to 6.0'		
6										
10										
15										
20										

MONITORING WELL INSTALLATION DIAGRAMS

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
PROTECTIVE RISER COMPLETION

ENGINEERING-SCIENCE, INC. CLIENT: ACOE WELL #: MW16-1

PROJECT: 10 SWMU ESI
LOCATION: SEAD-16
PROJECT NO: 720477
INSPECTOR: PFM
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: Alan
DRILLING COMPLETED: 10/25/93
BORING DEPTH: 6.0'
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8 1/2" w/4 1/4" Augers
ASSOCIATED SWMU/AOC: SEAD-16

POW DEPTH:
INSTALLATION STARTED: 10/26/93
INSTALLATION COMPLETED: 10/26/93
SURFACE COMPLETION DATE: 10/26/93
COMPLETION CONTRACTOR/CREW: Empire
BEDROCK CONFIRMED (Y/N?) Y
ESTIMATED GROUND ELEVATION: 733.735

PROTECTIVE SURFACE CASING:
DIAMETER: 4x4" steel LENGTH: 5'

RISER: ard surface
TR: sk-up TYPE: PVC-40 DIAMETER: 2" LENGTH: 5'

SCREEN: (total length 2.4')
TSC: 3.3' TYPE: PVC-40 DIAMETER: 2" LENGTH: 2' SLOT SIZE: 0.01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC point BSC: 5.3' POW: 6.0' (0.5' point)

GROUT:
TG: NA TYPE: NA LENGTH: NA

SEAL: TBS: 0.0' TYPE: Bentonite pellets LENGTH: 2.2'

SAND PACK: TSP: 2.8' 2.2' f-sand TYPE: Berkley #3 Silica " #1 Silica LENGTH: 3.2' / 3.8' f-sand

SURFACE COLLAR:
TYPE: Cement RADIUS: 2x2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS
DEPTH 1: - DEPTH 2: - DEPTH 3: - DEPTH 4: -

COMMENTS:
→ Not enough room for grout in well - will bentonite to the surface
→ bailed water from boring prior to installing well

* ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC

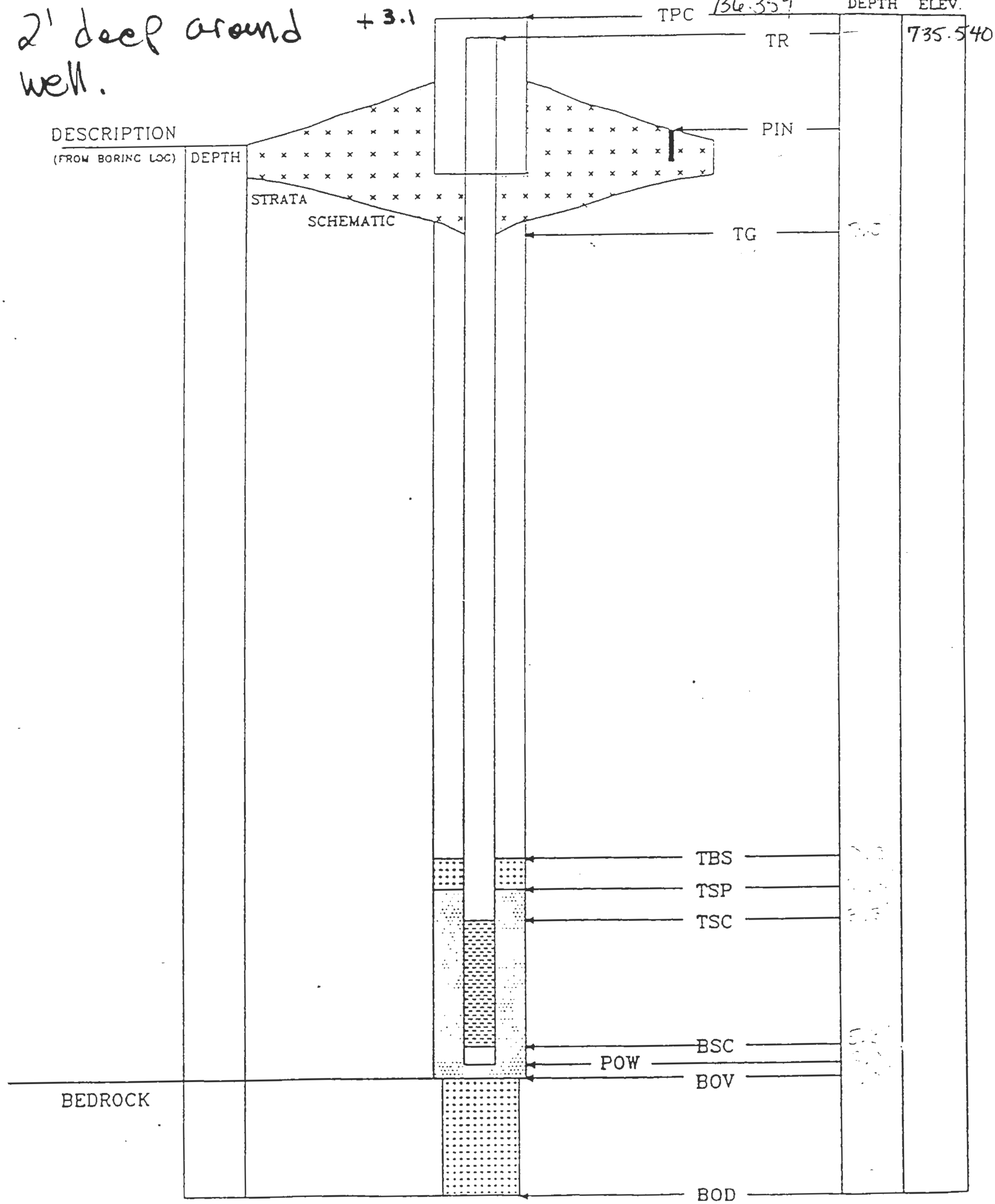
OVERBURDEN MONITORING WELL
PROTECTIVE RISER INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC. | CLIENT: ACOE | WELL #: MW16-1

DATE: 10/26/93

- `et 3 ballards
2' deep around
well.

+3.1



TPC 736.359

TR — 735.540

• NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
PROTECTIVE RISER COMPLETION

ENGINEERING-SCIENCE, INC. CLIENT: ACOE WELL #: MW16-2

PROJECT: 10 SWMU ESI
LOCATION: SEAD-5
PROJECT NO: 720477
INSPECTOR: KGu
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: Alan
DRILLING COMPLETED: 10/26/93
BORING DEPTH: 4.1'
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8 1/2"
ASSOCIATED SWMU/AOC: SEAD-16
POW DEPTH:
INSTALLATION STARTED: 10/26/93
INSTALLATION COMPLETED: 10/26/93
SURFACE COMPLETION DATE:
COMPLETION CONTRACTOR/CREW: Empire
BEDROCK CONFIRMED (Y/N?) Y
ESTIMATED GROUND ELEVATION: 732.829

PROTECTIVE SURFACE CASING:
DIAMETER: 4 x 4' LENGTH: 5' (will cut it down)

RISER:
TR: + 1.5 TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.7'

SCREEN: (total length 2.4')
TSC: 1.4 TYPE: PVC-40 DIAMETER: 2" LENGTH: 2' SLOT SIZE: 0.01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC-40 BSC: 3.4 POW: 4.1'

GROUT:
TG: NA TYPE: NA LENGTH: NA

SEAL: TBS: 0.0 TYPE: Bentonite-pellets LENGTH: 0.9'

SAND PACK: TSP: 0.9' TYPE: Berkeley #3 & #1 LENGTH:

SURFACE COLLAR:
TYPE: Cement RADIUS: 2 x 2' THICKNESS CENTER: ~~6"~~ 0.5' THICKNESS EDGE: 0.5'

CENTRALIZER DEPTHS
DEPTH 1: — DEPTH 2: — DEPTH 3: — DEPTH 4: —

COMMENTS: → bailed ~~well~~ hole of water prior to installing well.

* ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

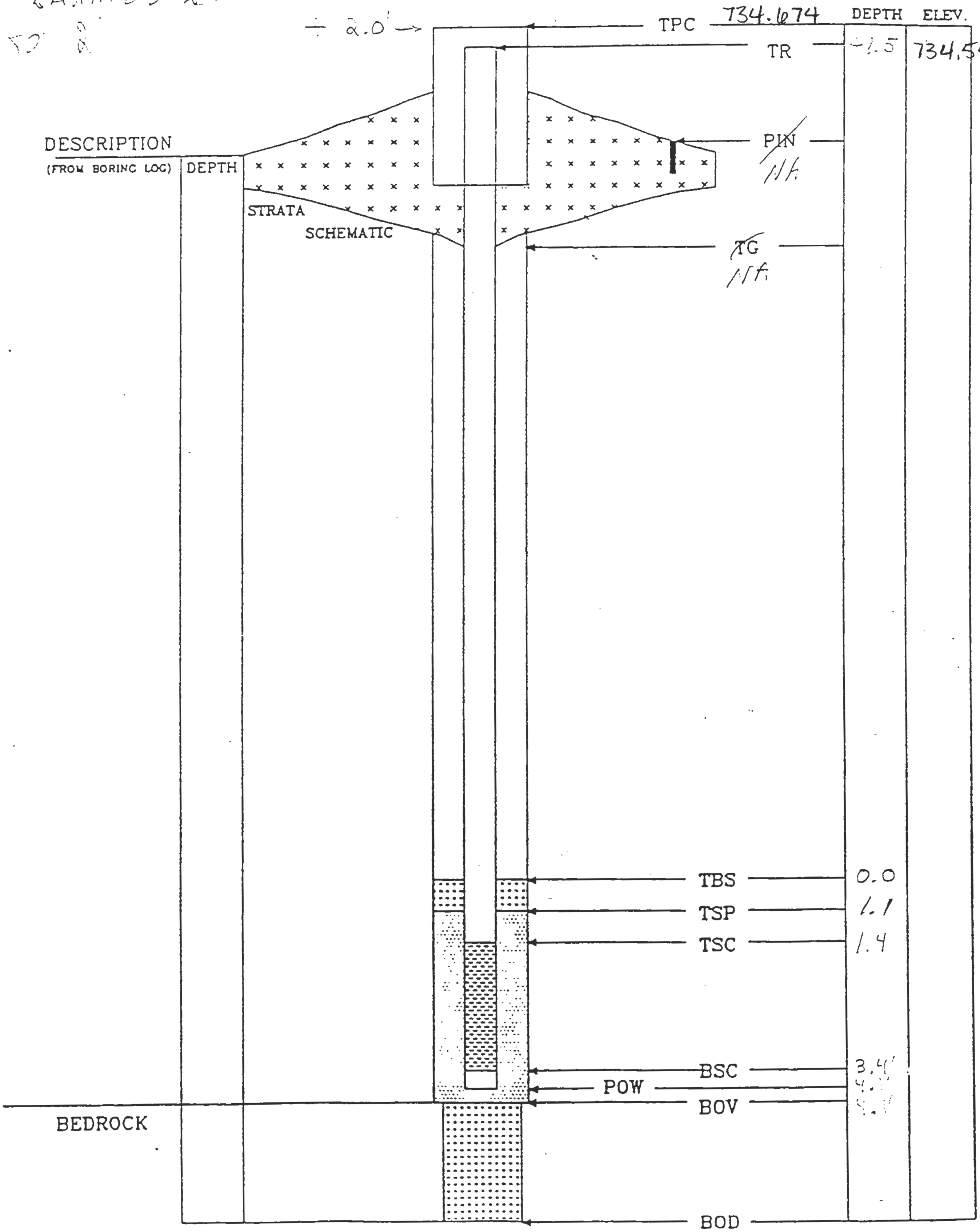
SEE PAGE 2 FOR SCHEMATIC

OVERBURDEN MONITORING WELL
PROTECTIVE RISER INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC. | CLIENT: ACOE | WELL #: MW/S-2

DATE: 10/26/93

Callaros set to 8



	DEPTH	ELEV.
TPC 734.674		
TR	-1.5	734.556
~~PIN~~ NA		
~~TG~~ NA		
TBS	0.0	
TSP	1.1	
TSC	1.4	
BSC	3.4'	
POW	4.1'	
BOV	[illegible]	
BOD		

• NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
PROTECTIVE RISER COMPLETION

ENGINEERING-SCIENCE, INC. CLIENT: ACOE WELL #: MW16-3

PROJECT: 10 SWMU
LOCATION: SEAD 16

PROJECT NO:
INSPECTOR: ES/LB
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: Alan
DRILLING COMPLETED: 10/26/93
BORING DEPTH: 5.0
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8½"
ASSOCIATED SWMU/AOC: SEAD 16

POW DEPTH: 5.0'
INSTALLATION STARTED: 10/26/93
INSTALLATION COMPLETED: 10/26/93
SURFACE COMPLETION DATE: 11/2/93
COMPLETION CONTRACTOR/CREW: Empire
BEDROCK CONFIRMED (Y/N?) Y
ESTIMATED GROUND ELEVATION: 733.049

PROTECTIVE SURFACE CASING:
DIAMETER: 4"x4" Steel LENGTH: 4.0' total

RISER:
TR: TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.5'

SCREEN:
TSC: TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.0' SLOT SIZE: .01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC point BSC: 4.3' POW: 5.0'

GROUT:
TG: NA TYPE: LENGTH:

SEAL: TBS: 0.0' TYPE: Bentonite pellets LENGTH: 1.8'

SAND PACK: TSP: 2.0' #3 1.8' #1 TYPE: #1 and #3 Silica LENGTH: 3.2'

SURFACE COLLAR:
TYPE: Cement RADIUS: 2'x2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS
DEPTH 1: — DEPTH 2: DEPTH 3: DEPTH 4:

COMMENTS:

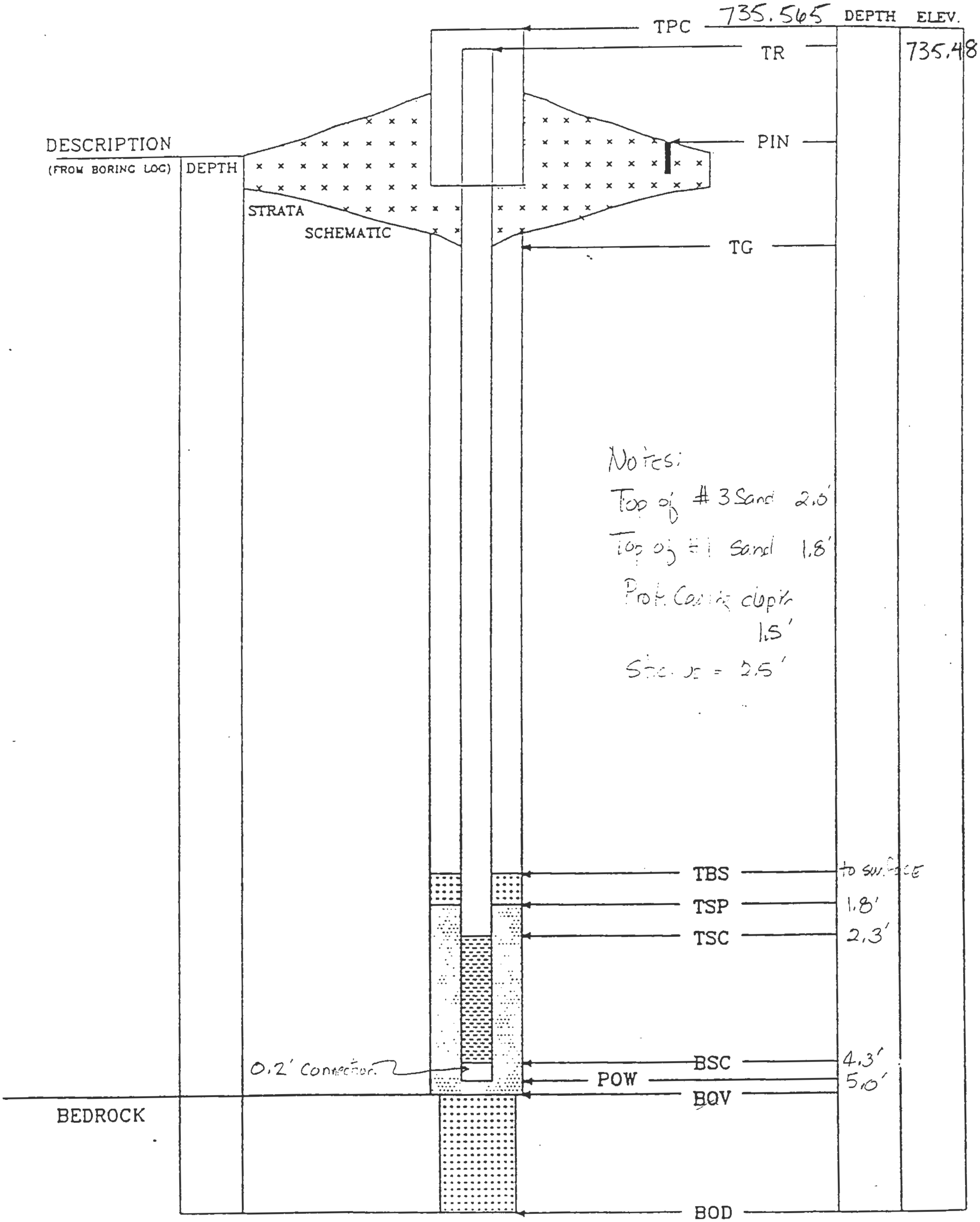
* ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC

OVERBURDEN MONITORING WELL
PROTECTIVE RISER INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC. | CLIENT: | WELL #: MW 16-3

DATE:



		DEPTH	ELEV.
TPC	735.565		
TR			735.481
PIN			
TG			
TBS		to surface	
TSP		1.8'	
TSC		2.3'	
BSC		4.3'	
POW		5.0'	
BQV			
BOD			

Notes:
Top of #3 Sand 2.0'
Top of #1 Sand 1.8'
Prot. Casing depth
1.5'
Stick up = 2.5'

• NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
ROADWAY BOX – SURFACE COMPLETION

ENGINEERING–SCIENCE, INC. CLIENT: ACOE WELL #: MW 17-1

PROJECT: 10 SMWU

LOCATION: SEAD 17

PROJECT NO: 720477-01001

INSPECTOR: ES/LB

CHECKED BY:

DRILLING CONTRACTOR: EMPIRE

DRILLER: BOB/JOHN

DRILLING COMPLETED: 12-1-93

BORING DEPTH: 8.5'

DRILLING METHOD(S): HSA

BORING DIAMETER(S): 8.5"

ASSOCIATED SWMU/AOC: SEAD 17

POW DEPTH: 8.5'

INSTALLATION STARTED: 12-1-93

INSTALLATION COMPLETED: 12-1-93

SURFACE COMPLETION DATE: 12-2-93

COMPLETION CONTRACTOR/CREW:

BEDROCK CONFIRMED (Y/N?)

ESTIMATED GROUND ELEVATION: 734.465

PROTECTIVE SURFACE CASING:

DIAMETER: 4"x4" steel LENGTH:

RISER:

TR: TYPE: PVC 40 DIAMETER: 2" LENGTH:

SCREEN:

TSC: 3.4' TYPE: PVC 40 DIAMETER: 2" LENGTH: 4' SLOT SIZE: .01"

POINT OF WELL: (SILT SUMP)

TYPE: PVC point BSC: 7.4' POW: 8.5'

GROUT:

TG: Ground TYPE: cement-bentonite LENGTH: 1.5'

SEAL: TBS: 1.5' TYPE: bentonite pellets LENGTH: 1.0

SAND PACK: TSP: 2.5' #1 3.0' #3 TYPE: #3, #1 LENGTH: .4' #3 .5' #1

SURFACE COLLAR:

TYPE: cement RADIUS: 2'x2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS

DEPTH 1: DEPTH 2: DEPTH 3: DEPTH 4:

COMMENTS:

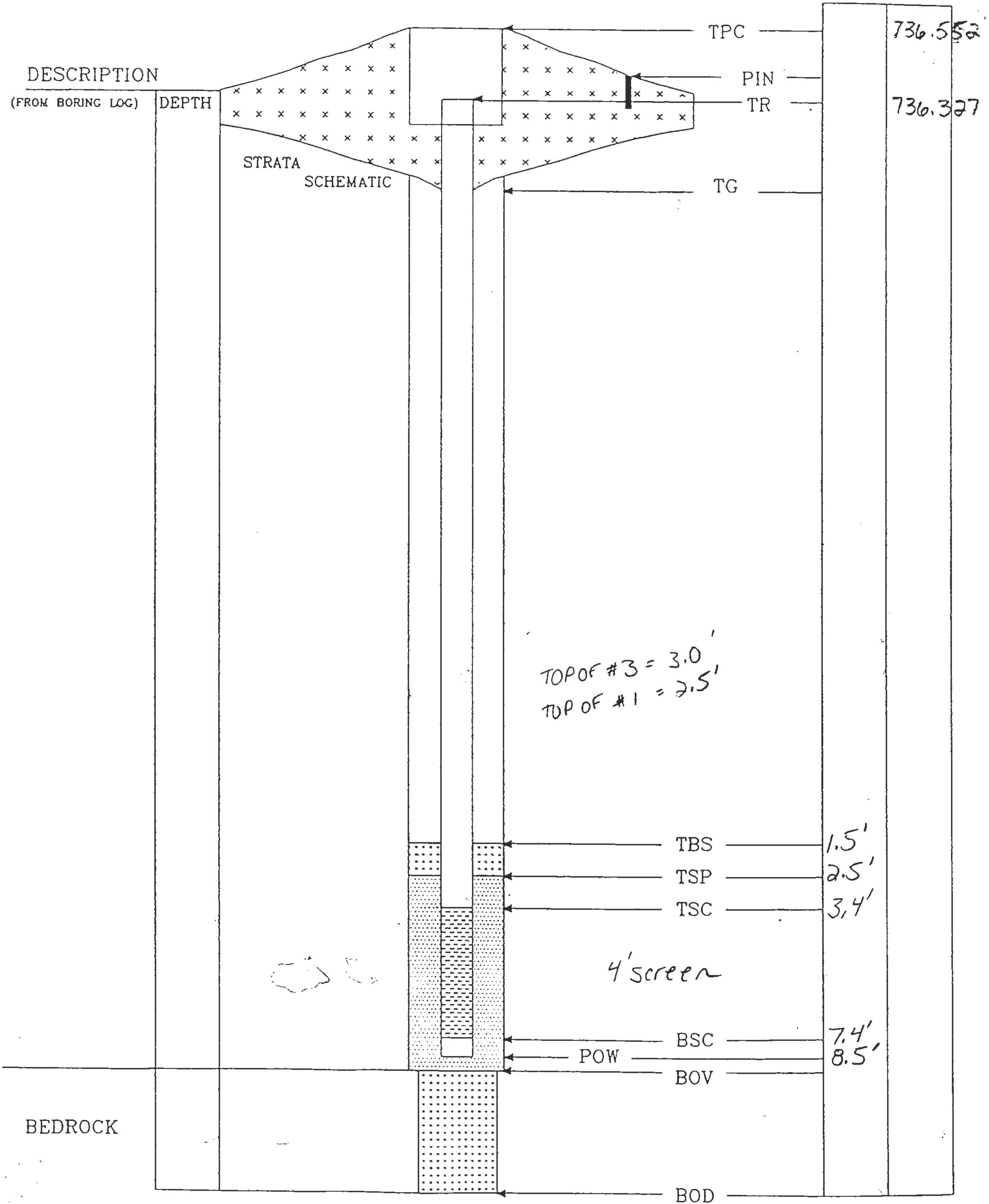
• ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC

OVERBURDEN MONITORING WELL
ROADWAY BOX INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	WELL #: MW 17-1

DATE: 12-1-93



	DEPTH	ELEV.
TPC		736.552
PIN		
TR		736.327
TG		
TBS	1.5'	
TSP	2.5'	
TSC	3.4'	
BSC	7.4'	
POW	8.5'	
BOV		
BOD		

TOP OF #3 = 3.0'
TOP OF #1 = 2.5'

4' screen

* NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
ROADWAY BOX – SURFACE COMPLETION

ENGINEERING–SCIENCE, INC. CLIENT: ACOE WELL #: MW17-2

PROJECT: 10 SWMU
LOCATION: SEAD 17
PROJECT NO: 720477-01001
INSPECTOR: ES/LB
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: Alan
DRILLING COMPLETED: 11/2/93
BORING DEPTH: 6.0'
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8½"
ASSOCIATED SWMU/AOC:
POW DEPTH: 6.0'
INSTALLATION STARTED: 10/27/93
INSTALLATION COMPLETED: 11/2/93
SURFACE COMPLETION DATE: 11/2/93
COMPLETION CONTRACTOR/CREW: Empire
BEDROCK CONFIRMED (Y/N?):
ESTIMATED GROUND ELEVATION: 731.649

PROTECTIVE SURFACE CASING:
DIAMETER: 4"x4" Steel LENGTH: 4.3' total

RISER:
TR: TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.5'

SCREEN:
TSC: 3.3' TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.0' SLOT SIZE: 0.01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC poi. BSC: 5.3' POW: 6.0' 0.5' point

GROUT:
TG: 0.0' TYPE: Cem.-bentonite LENGTH: 2.0'

SEAL: TBS: 2.0' TYPE: bentonite pellets LENGTH: 0.3'

SAND PACK: TSP: 2.3' TYPE: #3 and #1 LENGTH: 3.7'

SURFACE COLLAR:
TYPE: Cement RADIUS: 2x2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS
DEPTH 1: — DEPTH 2: DEPTH 3: DEPTH 4:

COMMENTS:

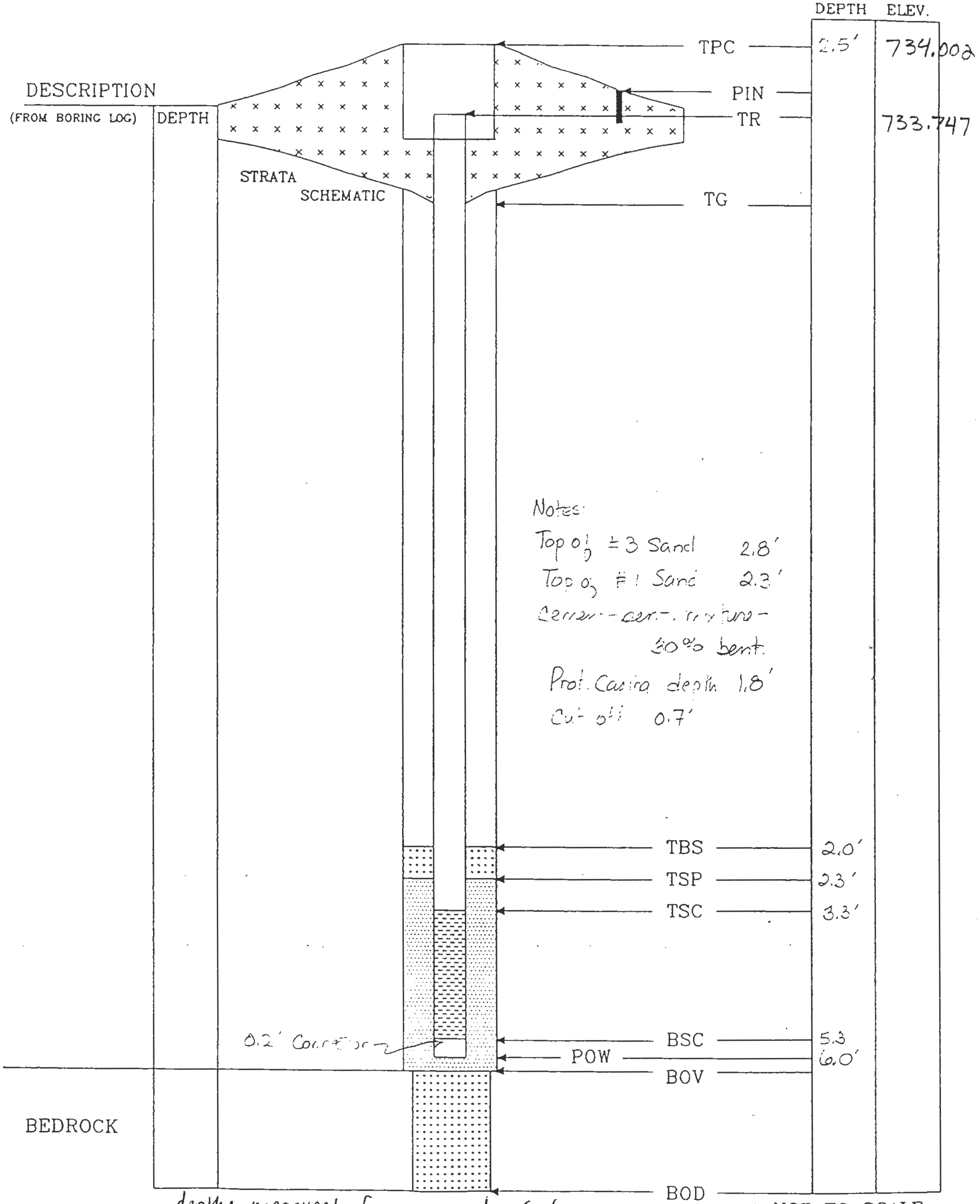
• ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC

OVERBURDEN MONITORING WELL
ROADWAY BOX INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	WELL #: MW17-2

DATE:



	DEPTH	ELEV.
TPC	2.5'	734.002
PIN		
TR		733.747
TG		
TBS	2.0'	
TSP	2.3'	
TSC	3.3'	
BSC	5.3	
POW	6.0'	
BOV		
BOD		

Notes:
Top of #3 Sand 2.8'
Top of #1 Sand 2.3'
Cement - cem. mixture -
30% bent.
Prot. Casing depth 1.8'
Cut off 0.7'

depths measured from ground surface

* NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
PROTECTIVE RISER COMPLETION

ENGINEERING-SCIENCE, INC. **CLIENT:** ACOE **WELL #:** MW 17-3

PROJECT: 10 SWMU
LOCATION: SEAD 17
PROJECT NO: 720477-01001
INSPECTOR: ES/LB
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: John N.
DRILLING COMPLETED: 11/30/93
BORING DEPTH: 6.0'
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8 1/2''
ASSOCIATED SWMU/AOC: 17

POW DEPTH: 6.0'
INSTALLATION STARTED: 11/30/93
INSTALLATION COMPLETED: 11/30/93
SURFACE COMPLETION DATE:
COMPLETION CONTRACTOR/CREW:
BEDROCK CONFIRMED (Y/N?)
ESTIMATED GROUND ELEVATION: 730.188

PROTECTIVE SURFACE CASING:
DIAMETER: 4" x 4" Steel LENGTH:

RISER:
TR: TYPE: PVC-40 DIAMETER: 2'' LENGTH:

SCREEN:
TSC: 3.1' TYPE: PVC-40 DIAMETER: 2" LENGTH: 2.0' SLOT SIZE: 0.01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC-point BSC: 5.1' POW: 6.0'

GROUT:
TG: Ground TYPE: Cement-bentonite LENGTH: 1.3'

SEAL: TBS: 1.3' TYPE: bentonite pellets LENGTH: 0.7'

SAND PACK: TSP: 2.0' #1 2.5' #3 TYPE: #3 & #1 LENGTH: 4.0'

SURFACE COLLAR:
TYPE: Cement RADIUS: 2' x 2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS
DEPTH 1: DEPTH 2: DEPTH 3: DEPTH 4:

COMMENTS:

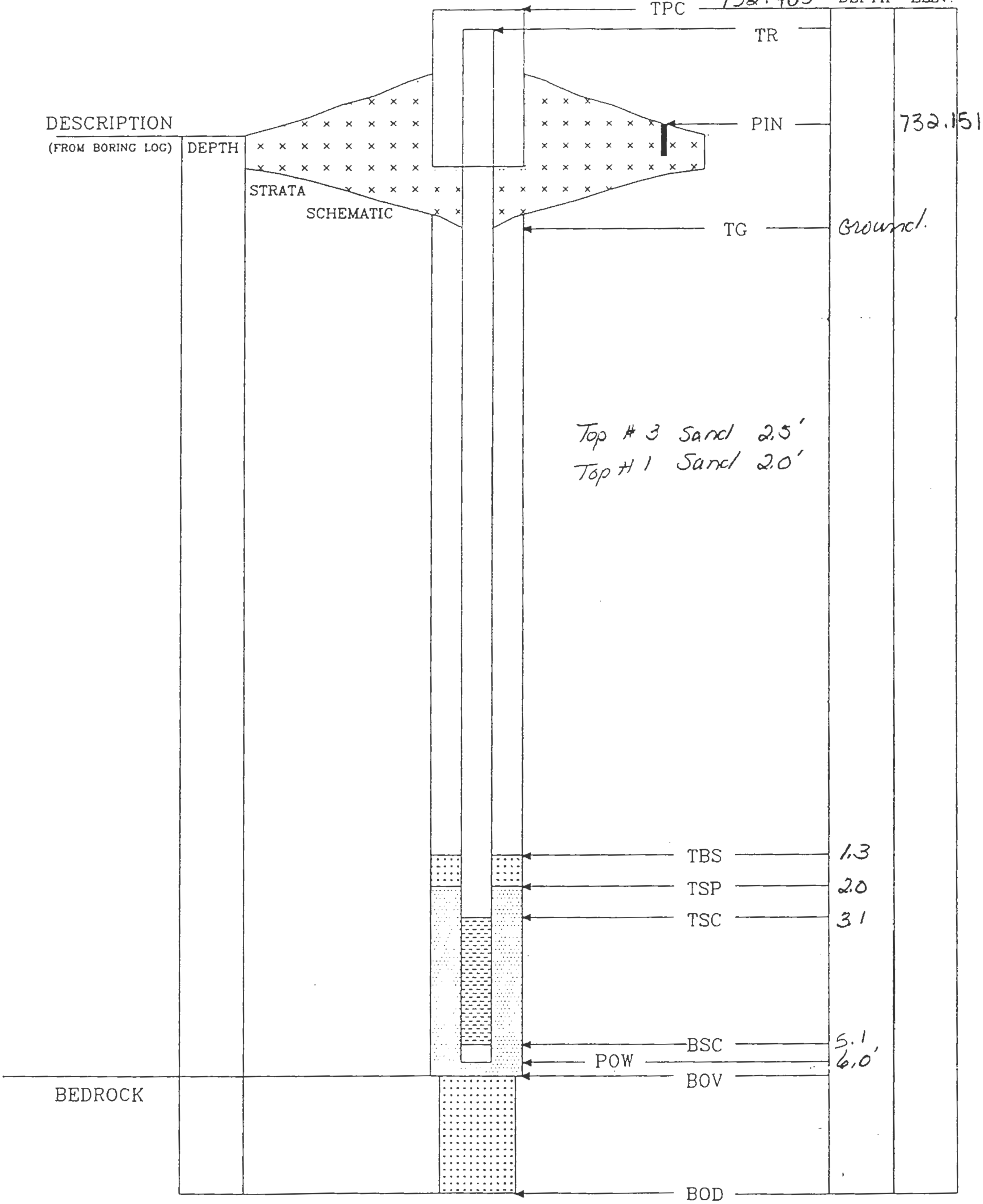
* ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC

OVERBURDEN MONITORING WELL
PROTECTIVE RISER INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC.	CLIENT: ACOE	WELL #: MW 17-3

DATE: 11/30/93



Top # 3 Sand 2.5'
Top #1 Sand 2.0'

	DEPTH	ELEV.
TPC		732.405
TR		
PIN		732.151
TG	Ground.	
TBS	1.3	
TSP	2.0	
TSC	3.1	
BSC	5.1'	
POW	6.0'	
BOV		
BOD		

Depths measured from ground.

* NOT TO SCALE

OVERBURDEN MONITORING WELL
COMPLETION REPORT & INSTALLATION DETAIL
PROTECTIVE RISER COMPLETION

ENGINEERING-SCIENCE, INC. **CLIENT:** ACOE **WELL #:** MW17-4

PROJECT: 10 SWMU
LOCATION: SEAD 17
PROJECT NO:
INSPECTOR:
CHECKED BY:

DRILLING CONTRACTOR: Empire
DRILLER: John W.
DRILLING COMPLETED: 12/1/93
BORING DEPTH: 6.0'
DRILLING METHOD(S): HSA
BORING DIAMETER(S): 8 1/2"
ASSOCIATED SWMU/AOC: 17

POW DEPTH: 6.0'
INSTALLATION STARTED: 11/30/93
INSTALLATION COMPLETED: 12/1/93
SURFACE COMPLETION DATE: 12/2/93
COMPLETION CONTRACTOR/CREW:
BEDROCK CONFIRMED (Y/N?)
ESTIMATED GROUND ELEVATION: 732.453

PROTECTIVE SURFACE CASING:
DIAMETER: 4"x4' Steel LENGTH:

RISER:
TR: TYPE: PVC-40 DIAMETER: 2" LENGTH:

SCREEN:
TSC: 3.1' TYPE: PVC-40 DIAMETER: 2" LENGTH: 2' SLOT SIZE: 0.01"

POINT OF WELL: (SILT SUMP)
TYPE: PVC point BSC: 5.1' POW: 6.0'

GROUT:
TG: Ground TYPE: Cement-bentonite LENGTH: 1.3'

SEAL: TBS: 1.3' TYPE: bentonite pellets LENGTH: 0.7'

SAND PACK: TSP: 2.0' #1 2.5' #3 TYPE: #3 + #1 Silica LENGTH: 4.0'

SURFACE COLLAR:
TYPE: Cement RADIUS: 2'x2' THICKNESS CENTER: 1' THICKNESS EDGE: 1'

CENTRALIZER DEPTHS
DEPTH 1: DEPTH 2: DEPTH 3: DEPTH 4:

COMMENTS: Sand tremied

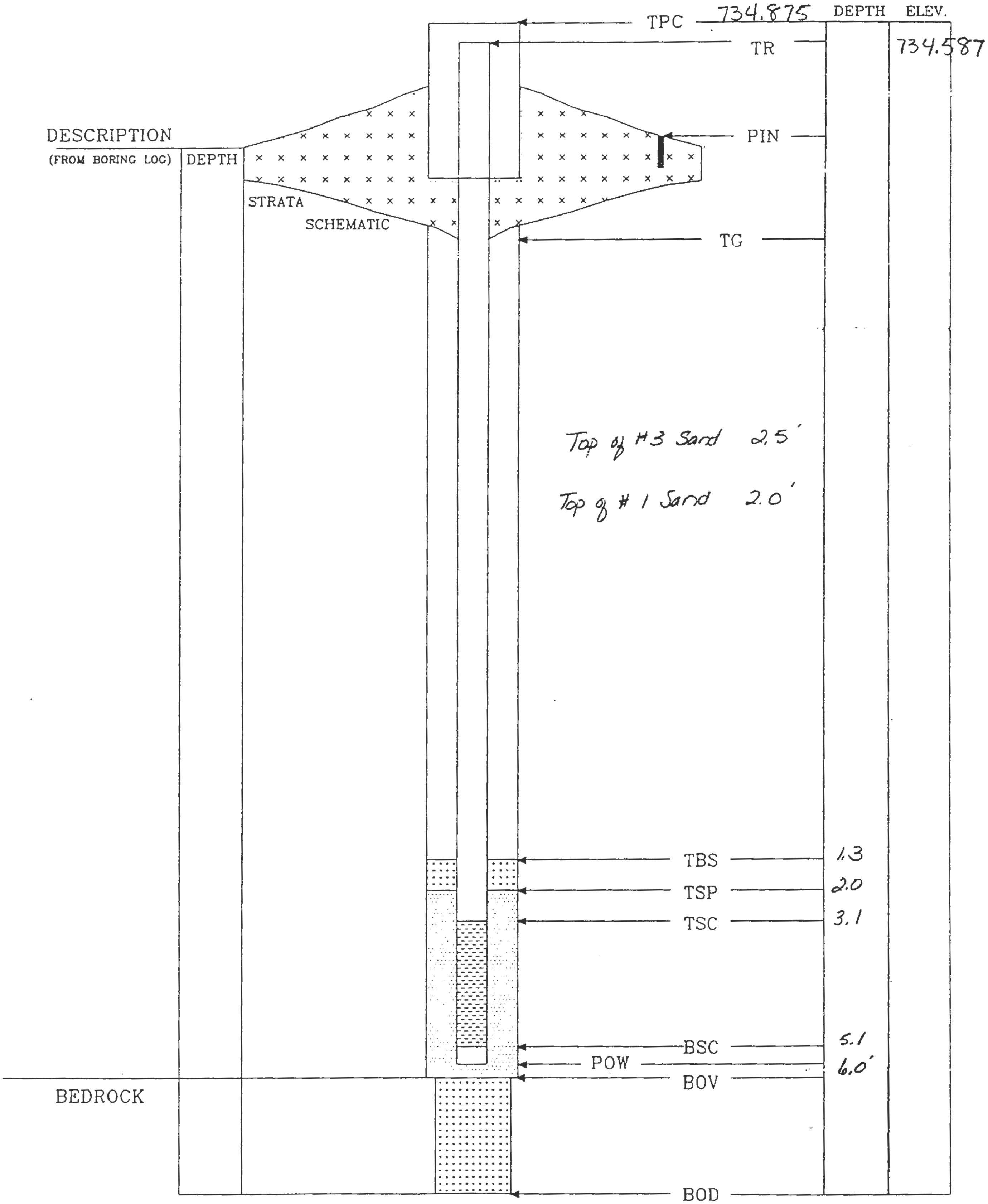
* ALL DEPTH MEASUREMENTS REFERENCED TO GROUND SURFACE

SEE PAGE 2 FOR SCHEMATIC PAGE 1 OF 2

OVERBURDEN MONITORING WELL
PROTECTIVE RISER INSTALLATION DETAIL

ENGINEERING-SCIENCE, INC. | CLIENT: ACOE | WELL #: MW17-4

DATE: 12-1-93



TPC 734.875

TR 734.587

Top of #3 Sand 2.5'

Top of #1 Sand 2.0'

TBS 1.3

TSP 2.0

TSC 3.1

BSC 5.1

POW 6.0'

BOV

* NOT TO SCALE