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January 25, 2008

Mr. John Nohrstedt
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-FS-IS
4820 University Square
Huntsville, Alabama 35816-1822

SUBJECT: Final Feasibility Study Report for the Radiological Waste Burial Sites (SEAD-12) at Seneca Army Depot Activity; Contract DACA87-02-D-0005, Delivery Order 0031

Dear Mr. Nohrstedt:

Parsons is pleased to submit the Final Feasibility Study (FS) Report for the Radiological Waste Burial Sites (SEAD-12) located at the Seneca Army Depot Activity in Romulus, New York. This work was performed in accordance with the Scope of Work for Delivery Order 0031 under Contract No. DACA87-02-D-0005.

The Draft Final FS Report for SEAD-12 was submitted on March 30, 2007. USEPA comments dated June 13, 2007 and NYSDEC comments dated September 12, 2007 were received on the Draft Final FS Report, and Parsons has incorporated the comments in the Final FS Report. The response to the comments is attached in Appendix C of this Final FS Report.

Parsons appreciates the opportunity to provide you with the FS Report for this work. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Project Manager

Enclosures

cc: S. Absolom, SEDA (3 paper copies, 1 electronic copy)
K. Hoddinott, USACHPPM (2 paper copies, 1 electronic copy)
C. Boes, USAEC (1 copy, electronic and paper)
J. Fallo, USACE, NY District (2 paper copies, 1 electronic copy)

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January 25, 2008

Mr. Julio Vazquez
U.S. Environmental Protection Agency, Region II
Superfund Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Kuldeep K. Gupta, P.E.
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, NY 12233-7015

Mr. Mark Sergott
Bureau of Environmental Exposure Investigation, Room 300
New York State Department of Health
547 River Street, Flanigan Square
Troy, NY 12180

SUBJECT: Final Feasibility Study Report for the Radiological Waste Burial Sites (SEAD-12) at Seneca Army Depot Activity, Romulus, New York
EPA Site ID# NY0213820830 and NY Site ID# 8-50-006

Dear Mr. Vazquez/Mr. Gupta/Mr. Sergott:

Parsons is pleased to submit the Final Feasibility Study Report for the Radiological Waste Burial Sites (SEAD-12) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York (EPA Site ID# NY0213820830 and NY Site ID# 8-50-006).

The Draft Final FS Report for SEAD-12 was submitted on March 30, 2007. USEPA comments dated June 13, 2007 and NYSDEC comments dated September 12, 2007 were received on the Draft Final FS Report, and Parsons has incorporated the comments in the Final FS Report. The response to the comments is attached in Appendix C of this Final FS Report.

Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

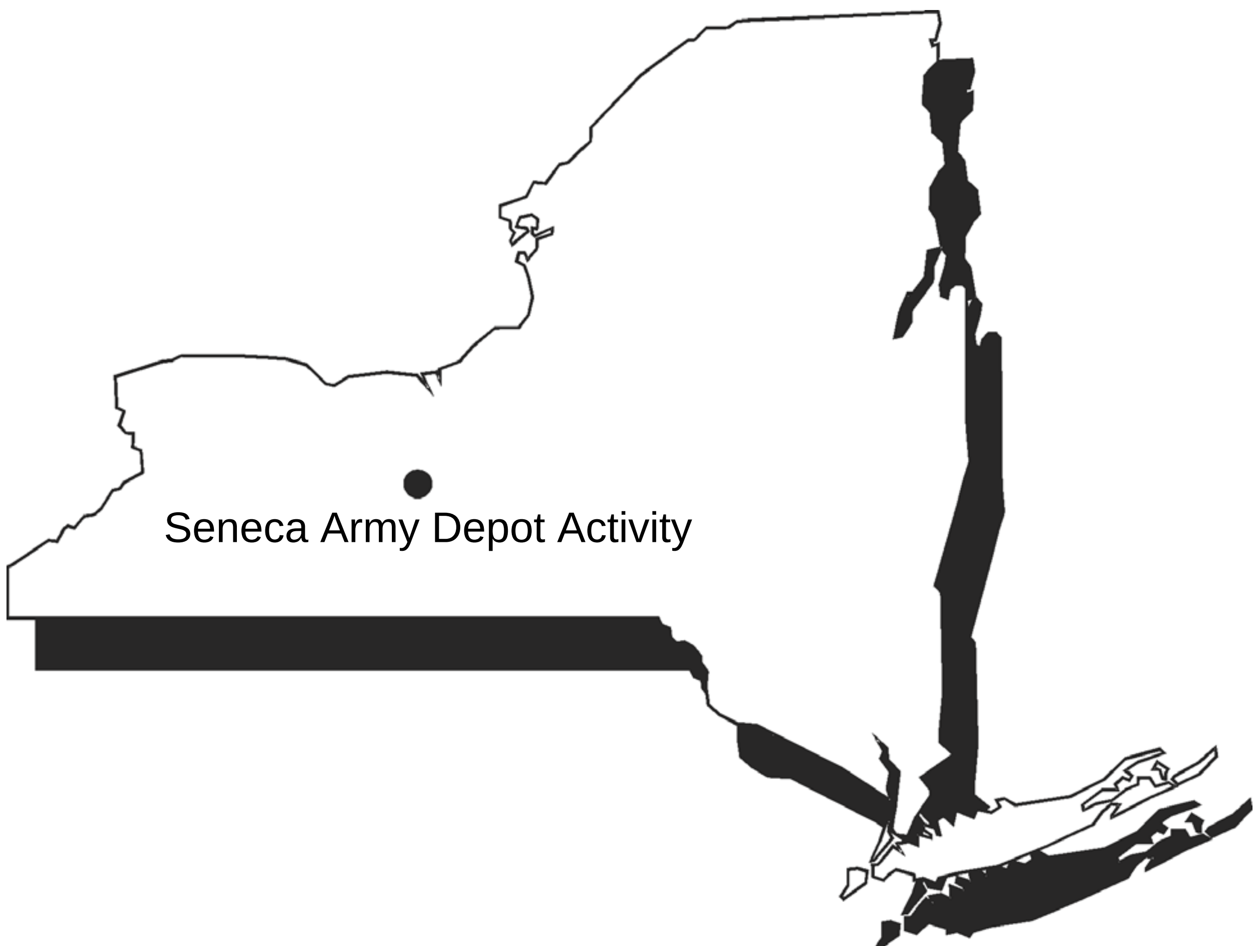
Enclosures

cc: J. Nohrstedt, USACE, Huntsville
K. Hoddinott, USACHPPM
J. Fallo, USACE, NY District
S. Absolom, SEDA
C. Boes, USAEC
M. Heaney, TechLaw

US Army, Engineering & Support Center
Huntsville, AL

01739

Seneca Army Depot Activity
Romulus, NY



FINAL

FEASIBILITY STUDY REPORT

RADIOLOGICAL WASTE BURIAL SITES (SEAD-12)
SENECA ARMY DEPOT ACTIVITY

EPA Site ID# NY0213820830
NY Site ID# 8-50-006
CONTRACT NO. DACA87-02-D-0005
DELIVERY ORDER NO. 0031

PARSONS
January 2008

FINAL

FEASIBILITY STUDY REPORT

FOR THE RADIOACTIVE WASTE BURIAL SITES (SEAD-12)

SENECA ARMY DEPOT ACTIVITY, ROMULUS, NY

Prepared for:

SENECA ARMY DEPOT ACTIVITY
5786 STATE ROUTE 96
ROMULUS, NEW YORK 14541

and

UNITED STATES ARMY CORPS OF ENGINEERS
4820 UNIVERSITY SQUARE
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Prepared by:

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150 Federal Street
Boston, MA 02110

Contract Number: DACA87-02-D-0005
Delivery Order: 0031
USEPA Site ID: NY0213820830
NY Site ID: 8-50-006

January 2008

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ARAR	Applicable or Relevant and Appropriate Requirements
AWQS	Ambient Water Quality Standards
BALAT	Benthic Aquatic Life Acute Toxicity Criteria
BALCT	Benthic Aquatic Life Chronic Toxicity Criteria
Bi	Bismuth
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/sec	Centimeters per second
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CWA	Clean Water Act
DCE	Dichloroethylene or Dichloroethene
DCGL	Derived Concentration Guideline Levels
DDD	1.1-Dichloro - 2-(o-chlorophenyl) - 2-(p-chlorophenyl)
DDE	1.1-Dichloro - 2-(p-chlorophenyl) - 2-(o-chlorophenyl)
DDT	1.1.1-Trichloro - 2-(0-chlorophenyl) - 2-(p-chlorophenyl) ethane
DoD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
ECL	Environmental Conservation Law
EM	Electromagnetic
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ESI	Expanded Site Inspection
FS	Feasibility Study
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
GCL	Geocomposite Clay Liner
HDPE	High Density Polyethylene
HHB	Human Health Bioaccumulation Criteria
HQ	Hazard Quotient
IAG	Interagency Agreement
Koc	Organic carbon partition coefficient
L	Liter
LBR	Land Ban Restrictions
LEL	Lowest Effect Level

LRA	Local Redevelopment Authority
LUC	Land Use Control
MARSSIM	Multi-Agency Radiological Survey and Site Investigation Manual
MCACES	MicroComputer Aided Cost Engineering System
mg/kg	milligram per Kilogram
ML	Inorganic Silt
mrem	milli roentgen equivalent man; millirem
MSL	Mean sea level
MW	Monitor Well
NCP	National Contingency Plan
NFA	No Further Action
NOAEL	No Observed Adverse Effect Level
NRC	Nuclear Regulatory Commission
NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
O & M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbon
Parsons	Parsons Engineering Science
Parsons ES	Parsons Engineering Science, Inc.
Pb	Lead
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Work
ppm	parts per million
Ra	Radium
RAGS	EPA Risk Assessment Guidance for Superfund
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SCIDA	Seneca County Industrial Development Agency
SCO	Soil Cleanup Objective
SEAD	Seneca Army Depot (old name)
SEDA	Seneca Army Depot
SI	Site Inspection
SMDP	Scientific Management Decision Point

SOG	Slab on Grade
SPDES	State Pollution Discharge Elimination System
SRI	Supplemental Remedial Investigation
SVOC	Semi-Volatile Organic Compound
SW	Surface water
SWMU	Solid Waste Management Unit
TAGM	New York State Technical and Administrative Guidance Memorandum
TBC	To be Considered
TCE	Trichloroethylene
TCLP	Toxicity Characteristics Leaching Procedure
TEDE	Total Effective Dose Equivalent
TP	Test Pit
TRACES	Tri-Service Automated Cost Engineering System
U	Uranium
µg/L	Micrograms per liter
USACE	United States Army Corps of Engineers
USC	United States Code
USCS	Unified Soil Classification System
VC	Vinyl Chloride
VOC	Volatile Organic Compound
WB	Wildlife Bioaccumulation
WRS	Wilcoxon Rank Sum
WSA	Weapons Storage Area

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EXECUTIVE SUMMARY

Parsons, on behalf of the US Army, is submitting this Feasibility Study (FS) Report for the Radiological Waste Burial Sites (SEAD-12) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York. This FS considers the nature and extent of impacts that were characterized in the Remedial Investigation (RI; Parsons, 2002) and the Supplemental Remedial Investigation (SRI; Parsons, 2006a), evaluates remedial action alternatives, and selects an alternative that is most appropriate for SEAD-12. This report is part of the Remedial Investigation/Feasibility Study (RI/FS) process required for compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments Reauthorization Act (SARA) of 1986. SEDA has officially been closed by the Department of Defense (DoD) and the US Army since its historic mission was ceased in 2000. This document has been prepared for the US Army Corps of Engineers, Huntsville District, under Contract No. DACA87-02-D-0005, Task Order No. 0031.

Based on the RI and the SRI, it was determined that the following areas require further consideration:

- Disposal Pit A/B due to the presence of military debris.
- Disposal Pit C due to the presence of military debris.
- Buildings 813/814 due to the need to conduct indoor air monitoring prior to any future potential occupancy.

This FS presents the selected remedial actions that were developed in accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004, 1988). Remedial alternatives were considered for Disposal Pit A/B, Disposal Pit C, and Buildings 813/814. Alternatives for the two disposal pit areas were combined since the impacts to these areas are similar in nature. Four alternatives were developed and evaluated using the US Environmental Protection Agency (EPA)'s nine evaluation criteria. These alternatives are:

- Alternative 1: No-Action
- Alternative 2: Excavation and Disposal in Off-Site Landfill/Environmental Easement
- Alternative 3: Capping/Containment/Environmental Easement
- Alternative 4: Excavation/Disposal/Building Demolition for Unrestricted Use

The two alternatives that ranked the highest as a result of the evaluation conducted in this FS are Alternative 2 and Alternative 4. Both Alternative 2 and Alternative 4 would result in the excavation and disposal of military debris associated with Disposal Pit A/B and Disposal Pit C. The only difference between Alternative 2 and Alternative 4 is the way in which potential future exposure to indoor air in Buildings 813/814 are managed. An environmental easement is adopted in Alternative 2 for Buildings 813/814 while building demolition is proposed in Alternative 4. These two alternatives are summarized below.

Alternative 2, Excavation/Disposal in Off-Site Landfill/Environmental Easement: Approximately 5,000 cubic yards of soil and debris will be excavated from Disposal Pit A/B and approximately 9,000 cubic yards of soil and debris will be removed from Disposal Pit C. Because there are no contaminants of concern at these areas, the extent of excavation will be the limits of the debris encountered within the excavation areas. All debris and soil removed from the excavation will be scanned for the presence of radionuclides. Although there were no radiological exceedances in the disposal pits, the soil and debris will be screened to provide further concurrence that all subsurface materials encountered are free from unacceptable levels of radioactivity. If elevated levels of radioactivity are found, further analytical testing would be performed to confirm and identify the radionuclides of concern. Such material would be disposed properly off-site at a licensed facility. Once all military debris and radiologically-impacted soils have been removed, the remaining soil will be backfilled. Additional clean fill from off-site will be used, as needed. The excavated areas will be re-contoured to match the existing terrain characteristics. The cost for the debris excavation and disposal is approximately $2.371 million.

In addition to the excavation of military debris, an environmental easement will be prepared to prohibit access to Buildings 813/814 and any newly constructed building in the area, prior to conducting an indoor air survey. This is needed due to the presence of trichloroethylene in soil beneath the buildings foundation. The cost for the environmental easement is about $74,000.

The total present worth cost for this alternative is $2.445 million (± 25-50 percent).

Alternative 4, Excavation/Disposal in Off-Site Landfill/Building Demolition for Unrestricted Use: Actions for Disposal Pit A/B and Disposal Pit C are the same as those presented in Alternative 2. The cost for the debris excavation and disposal is approximately $2.371 million, the same as the cost for Alternative 2. In addition to the excavation of military debris, a vapor intrusion study will be performed for Buildings 813 and 814. If warranted based on the study results, the buildings will be demolished and soil associated with elevated trichloroethylene concentrations underneath the building foundation will be excavated and disposed. This alternative will result in unrestricted use for SEAD-12. The alternative involves demolition of approximately 150 cubic yards of building material and excavation of approximately 900 cubic yards of soil underneath the buildings. The cost for the vapor intrusion study and buildings demolition is estimated at $440,000.

The total present worth cost for this alternative is $2.811 million (± 25-50 percent).

1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF REPORT

Parsons, on behalf of the U.S. Army (Army), is submitting this Feasibility Study (FS) Report for the Radiological Burial Sites (SEAD-12) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York. This report is part of the Remedial Investigation/Feasibility Study (RI/FS) process required for compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments Reauthorization Act (SARA) of 1986. The RI/FS at SEAD-12 has been performed under the guidance of the U.S. Environmental Protection Agency (EPA), EPA Region II, and the New York Department of Environmental Conservation (NYSDEC). This document has been prepared for the U.S. Army Corps of Engineers, Huntsville District, under Contract No. DACA87-02-D-0005, Task Order No. 0031.

The Final Remedial Investigation (RI) Report was submitted to EPA and NYSDEC in February 2002 and the Final Supplemental Remedial Investigation (SRI) Report was submitted to EPA and NYSDEC in October 2006. The purpose of the RI and SRI was to characterize the nature and extent of impacts and to assess human health and environmental risks at SEAD-12. This FS considers the nature and extent of impacts that were characterized in the RI and the SRI, evaluates remedial action alternatives, and selects the most appropriate remedy for SEAD-12. This report is organized in accordance with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, EPA/540/G-89/004, October 1988. The remedial alternatives developed in the FS were evaluated using the selection criteria in the NYSDEC (1990) Revised NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4030 - Selection of Remedial Actions at Inactive Hazardous Waste Sites.

Section 1.0 provides a brief overview of the RI and SRI, including background information, nature and extent of contamination, and the baseline risk assessment (BRA). **Section 2.0** presents the remedial action objectives for each medium of concern and considers general response actions that meet the remedial objectives. **Section 3.0** evaluates the alternatives for each medium by preliminary screening to determine their relative merits for use in the remedial action. **Section 4.0** evaluates the remedial action alternatives in detail and provides the basis for selection of the remedy for SEAD-12.

1.2 SEAD-12 BACKGROUND

1.2.1 SEAD-12 Description

The SEDA is located approximately 40 miles south of Lake Ontario, near Romulus, New York as shown in **Figure 1-1**. The facility is located in an uplands area, at an elevation of approximately 600 feet Mean Sea Level (MSL), that forms a divide separating two of the New York Finger Lakes; Cayuga Lake on the east and Seneca Lake on the west. Sparsely populated farmland covers most of the surrounding area. New York State Highways 96 and 96A adjoin SEDA on the east and west boundaries, respectively.

The SEDA previously occupied approximately 10,600 acres of land located in the Towns of Varick and Romulus in Seneca County, New York. The former military facility was owned by the U.S. Government and operated by the Army between 1941 and approximately 2000, when the SEDA military mission ceased. The SEDA's historic military mission included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives, and special weapons. In 1995, the SEDA was designated for closure under the Department of Defense's (DoD's) Base Realignment and Closure (BRAC) process. With the SEDA's inclusion on the BRAC list, the Army's emphasis expanded from expediting necessary investigations and remedial actions at prioritized solid waste management units (SWMUs) to including the release of non-affected portions of the Depot to the surrounding community so that the land can be reused for non-military purposes (i.e., industrial, municipal, and residential). Since the inclusion of the SEDA in the BRAC program, approximately 8,000 acres have been released to the community. An additional 250 acres of land have been transferred to the U.S. Coast Guard for continued operation of a LORAN Station. SEAD-12 has been retained for the RI/FS process.

SEAD-12 is located in the northern portion of SEDA within the former Weapons Storage Area (WSA) facility known as the Q Area. Investigation of SEAD-12 originally began as the investigation of two separate areas, formerly designated as SEAD-12A (Radioactive Waste Burial Site – northeast corner of Q) and SEAD-12B (Radioactive Waste Burial Site – northeast of Buildings 803, 804, and 805). SEAD-12A encompassed an area of approximately 1,500 feet long by 900 feet wide that is suspected to have included up to five separate small burial pits. SEAD-12B was smaller, encompassing an area measuring 300 feet long by 300 feet wide, and it was suspected to have included a 5,000 gallon storage tank and a small dry waste pit. Locations of these two historic SEADs are shown in **Figure 1-2**.

After the completion of the Expanded Site Inspections (ESIs) of SEAD-12A and SEAD-12B and the submission of the report summarizing the findings of the ESIs at the two historic SEADs, the bounds of SEAD-12 were expanded in 1995. This decision was based on the similarity of the chemicals found at the two historic SEADs and the general history of the Q Area that suggested that similar constituents were likely to exist throughout the larger area. Also included in the RI/FS at SEAD-12 are Building 715 and the portion of Reeder Creek that is adjacent to SEAD-12. Building 715 used to be a wastewater treatment plant that is suspected to have received wastewater from the buildings within the Q Area. Reeder Creek receives the surface water runoff from SEAD-12 as well as any discharge from Building 715.

The area designated as SEAD-12 excludes the area of SEAD-63, the Miscellaneous Components Burial Site, which is located along the western boundary of the former Q Area (see **Figure 1-2**). A non-time critical removal action was performed for SEAD-63 in 2004, resulting in the removal of 5,100 tons of soil and debris. A Record of Decision (ROD) for No Further Action (NFA) at SEAD-63 was submitted by Parsons in September 2006 and the SWMU is closed under CERCLA.

1.2.2 Future Land Uses

CERCLA guidance, Land Use in the CERCLA Remedy Selection Process, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-04, directs decision makers to achieve cleanup levels associated with the reasonably anticipated future land use over as much of the site as possible. As part of the 1995 BRAC process, a Local Redevelopment Authority (LRA) comprised of representatives from the local community was established. DoD policy described in Responsibility for Additional Environmental Cleanup after Transfer of Real Property also states that "For BRAC properties, the LRA's redevelopment and land use plan, will be the basis for the land use assumptions DoD will consider during the remedy selection process." A Land Reuse Plan was prepared and approved by the LRA in 1996 which designated parcels of land within the Depot for reuse into eight categories: Planned Industrial/Office Development, Warehousing, Prison, Conservation/Recreation, Institutional, Housing, Airfield/Special Events, and Federal to Federal Transfer. The area that encompasses SEAD-12 was determined to be "Conservation/Recreation Area". In 2005, the Seneca County Industrial Development Agency (SCIDA) revised the planned future use of property within the former Depot and added Institutional Training, Residential/Resort, Green Energy, Development Reserve, Training Area, and Utility uses. Under this revised future use plan, SEAD-12 is located in the Planned Institutional Training parcel of the former Depot (see **Figure 1-3**). That is, the planned future use for SEAD-12 is institutional training. In addition to the consideration of future land use during the remedy selection process, the State of New York regulations, New York Code of Rules and Regulations (NYCRR) Title 6, Chapter IV, Subchapter B, Part 375, Subpart 375-2.8 Remedial Program, requires evaluation of remedies that will restore the site conditions to "pre-disposal conditions to the extent feasible." Since a remedial alternative for an unrestricted use scenario is included in this FS, it is the Army's opinion that this requirement has been satisfied.

1.2.3 Geological Setting

A detailed discussion of the SEDA geological setting is presented in the Parsons (1995) ESI report (Section 1.1.1.1). Below is a brief summary.

The SEDA is located within a distinct unit of glacial till that covers the entire area between the western shore of Lake Cayuga and the eastern shore of Lake Seneca. The till is consistent across the entire depot although it ranges in thickness from less than 2 feet to as much as 15 feet, with the average being a few feet thick. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably rip-up clasts removed by the active glacier during the late Pleistocene era. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). The glacial tills in this area have a high percentage of silt and clay with trace amounts of fine gravel. A zone of gray weathered shale of variable thickness is present below the till in almost all locations at SEDA. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

The underlying bedrock below weathered shale is the Hamilton Group. The Hamilton Group, measuring from 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales, mudstones and thin limestones with numerous zones of abundant invertebrate fossils. Locally, the shale is soft, gray, and fissile. **Figure 1-4** displays the stratigraphic section of

Paleozoic rocks of Central New York. Three known predominant joint directions, N60^{o}E, N30^{o}W, and N20^{o}E are present within this unit (Mozola, 1951).

1.2.4 Hydrogeology

Available geologic information indicates that the upper portions of the shale formation would be expected to yield small supplies of water. Regionally, four distinct hydrologic water-bearing units have been identified (Mozola, 1951). These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift.

For mid-Devonian shales such as those of the Hamilton Group, the average yields (which are less than 15 gallons per minute) are consistent with what would be expected for shales (LaSala, 1968). The deeper portions of the bedrock (at depths greater than 235 feet) have provided yields of up to 150 gallons per minute. At these depths, the high well yields may be attributed to the effect of solution on the Onondaga limestone that is at the base of the Hamilton Group. Based on well yield data, the degree of solution is affected by the type and thickness of overlying material (Mozola, 1951). Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York (Mozola, 1951, and Crain, 1974). This information suggests that a groundwater divide trending north south exists approximately half way between the two Finger Lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be primarily westward toward Seneca Lake.

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

Regional precipitation is derived principally from cyclonic storms that pass from the interior of the country through the St. Lawrence Valley with local influence derived from Lakes Seneca, Cayuga, and Ontario providing some lake effect snows, leading to a significant amount of the winter precipitation and a moderate local climate.

Data from SWMU groundwater monitoring programs indicate that the overburden aquifer water table elevations were influenced by the seasonal cycle and some monitoring wells dried up completely during portions of the year. Depth to groundwater ranged from about 2 ft (at MW12-39) to approximately 11 ft (at MW12-40) at SEAD-12. Groundwater flow is predominantly to the west and northwest across the majority of the SWMU.

1.2.5 SWMU History

SEDA has been owned by the United States Government and operated by the Department of the Army since 1941, when it was constructed. Prior to construction of the Depot, the SWMU was used for farming.

Activities within SEAD-12 between 1962 and the demilitarization of the base in 1996 are classified or unknown. Buildings and anomalies within SEAD-12 were classified as Class I, Class II, or Class III (Parsons, 2002, 2003), in accordance with the Multi-Agency Radiological Survey and Site Investigation Manual (MARSSIM; EPA, 1997b). Class I areas are areas that have, or had prior to remediation, a potential for radioactive contamination or known contamination. Class II areas are areas that have, or had prior to remediation, a potential for radioactive contamination or known contamination, but are not expected to exceed the Derived Concentration Guideline Levels (DCGLs) that correspond to allowable radiation dose standards. Class III areas are impacted areas that are not expected to contain any residual radioactivity, or are expected to contain levels of residual radioactivity at a small fraction of the DCGL.

Nine potential release areas, shown in **Figure 1-2**, were defined within SEAD-12 as a result of the RI. The history and conditions for each of the potential release areas are presented in detail in the Final RI report (Parsons, 2002) and are summarized below.

- **Building 819/EM-27** (Class I & Class II) – During the operational period from 1957 to 1962, Building 819 was used by Sandia National Laboratories as a quality assurance inspection laboratory. Geophysical anomaly EM-27 was an anomaly identified during the RI and located adjacent to the building. Military-related debris consisting of metal wiring and plastic sheeting was found at the location of the anomaly during a test pit excavation.
- **Building 815, Building 816/EM-28** (Class I, II, & III) – Activities within the buildings up until 1962 included inspection and testing of non-radioactive mechanical and electrical systems. Geophysical anomaly EM-28 identified during the RI was determined to be associated with a metal fence post found during a test pit excavation.
- **Disposal Pit A/B** (Class I & II) **–**Test pit excavations found metal and fiberglass debris, and miscellaneous electronic components.
- **Disposal Pit C** (Class I & II) – Small disposal pits containing laboratory wastes were suspected to have been located in this area. Test pit investigations detected military debris.
- **Former Dry Waste Disposal Pit** – Wastes from this pit were periodically removed and shipped for disposal. No buried wastes were found in the area.
- **EM-5** (Class II) **–** The anomaly observed during the geophysical investigations was associated with debris remaining from an original farmstead which predates the SEDA.
- **EM-6** (Class II) **–** This area may have been a former disposal pit for construction-type debris.
- **Wastewater Treatment Plant** – The wastewater treatment plant is suspected to have received wastewater from buildings within the Weapons Storage Area.
- **Class III Area -** This area encompasses the remainder of SEAD-12 that is not assigned above and is not classified as a Class I or a Class II area.

A detailed description of all the buildings and their uses are presented in the Final RI Report (Parsons, 2002).

1.2.6 Previous Investigations and Activities

1.2.6.1 SWMU Classification

The SWMU Classification Report (Parsons, 1994) describes and evaluates all 72 of the SWMUs at SEDA and provides recommendations for future action at these SWMUs. This report describes SEAD-12 (Building 804 and Associated Radioactive Waste Sites), its physical make-up, the waste characteristics associated with it, as well as other information related to migration pathways and exposure potential. The report recommends that a CERCLA Site Inspection (SI) be performed at SEAD-12 as part of the investigation of fifteen solid waste management units at SEDA. At the time of the preparation of the SWMU Classification Report, SEAD-12 was classified as a Moderately Low Priority Area of Concern.

1.2.6.2 Expanded Site Inspection

In accordance with the decision process outlined in the Interagency Agreement (IAG) between the United States Army Corps of Engineers (USACE), EPA, and NYSDEC, an ESI was performed at SEAD-12A and SEAD-12B in 1994. This investigation included sampling of surface and subsurface soils, groundwater, surface water, and sediment to identify hazardous constituents or wastes that may have been released to the environment. The sampling data were compared to state and federal guidelines and standards to determine whether this SWMU posed a potential threat or risk to human health and the environment. A summary of the findings of the ESIs at SEAD-12A and SEAD-12B are presented in **Section 1.3** below and the SEAD-12 RI report (Parsons, 2002).

1.2.6.3 Remedial Investigation

A remedial investigation was initiated at SEAD-12 in 1997 and the tasks completed during the RI include:

- Geophysical Investigations,
- Radiological Investigations,
- Soil Gas Survey,
- Soil (surface and subsurface) Screening, Descriptions, and Sampling,
- Groundwater Field Parameter Screening and Sampling,
- Aquifer Testing,
- Surface Water and Sediment Investigations,
- Baseline Human Health Risk Assessment,
- Ecological Investigation, and
- Screening-Level Ecological Risk Assessment.

The RI concluded that the following areas should be considered in the development of alternatives in the FS:

- Disposal Pit A/B – removal of remaining "military" debris associated with electromagnetic (EM) anomalies;
- Disposal Pit C – removal of remaining "military" debris associated with EM anomalies;
- EM-5 – investigation and debris removal address Pb-210 contamination issues;
- Class III area - additional groundwater monitoring to define source and extent of trichloroethylene (TCE) in groundwater north of Buildings 813/814.

Although surface water and sediment were originally identified as media with potential concern in Section 8 of the RI, further evaluation (presented in Section 7 of the RI report) indicates that aluminum is the only chemical of concern (COC) identified in sediment and surface water. Since sediment concentrations of aluminum are very similar to background concentrations, the Army's risk management position is that aluminum does not warrant further evaluation for the sediment and surface water.

Soil within Disposal Pit A/B and Disposal Pit C was originally identified as a medium of concern for ecological receptors during the RI; but further evaluation (presented in Section 7 of the RI report) identifies no COCs and the Army's position is that no further action is warranted to mitigate potential ecological risks associated with Disposal Pit A/B and Disposal Pit C soil.

The investigation of groundwater at Buildings 813 and 814 and Pb-210 in the EM-5 area was conducted during the SRI and the findings are summarized below. The nature and extent and risk analysis conducted during the SEAD-12 RI are summarized in **Sections 1.3** and **1.4** below and in detail in the SEAD-12 RI report (Parsons, 2002). **Figures 1-5** and **1-6** show sample locations for all ESI and RI samples collected from SEAD-12.

1.2.6.4 Supplemental Remedial Investigation

Based on the findings of the RI, two additional investigations were recommended:

- The installation of additional wells at Buildings 813 and 814 to further characterize a TCE exceedance found in a single well, MW12-37, north of Building 813; and
- Additional soil sampling at EM-5 to verify elevated levels of Pb-210 detected during the RI.

An SRI was performed in 2004 and 2005 to assess these two areas. **Figures 1-7** and **1-8** show the temporary well locations and soil sample locations from the SRI. The tasks completed during the SRI include:

- Installation of 13 temporary wells in the area adjacent to MW12-37 and sampling of the temporary wells, MW12-37, and MW12-40 for volatile organic compound (VOC) analysis to determine the extent of groundwater impacts in this area. The temporary wells were installed between 20 and 300 feet from MW12-37, the monitoring well having the elevated detection of TCE (1,600 μg/L) during the RI.

- Sampling of surface water/ditch soil from seven locations from the drainage ditch adjacent to Buildings 813 and 814 to determine whether or not TCE detected in groundwater during the RI had impacted the adjacent ditch.
- Conducting of a test pit investigation in three phases north of the Buildings 813/814 area where TCE was detected in groundwater to investigate the extent of TCE contamination in soil.
- Periodic analysis of soil removed during the test pit investigation. Soil excavated from test pitting activities was initially stockpiled at the SWMU; samples were collected from this soil and analyzed for VOCs. Over a period of approximately two years, as the soil weathered, VOC concentrations reduced to below the NYSDEC (1994a) TAGM 4046 values. The soil was eventually backfilled within the test pits.
- Re-sampling and analysis of Ra-226 and Pb-210 in EM-5 soil using a Modified DOE EML HASL-300 Method to determine whether or not the levels observed during the RI were due to analytical uncertainty.

As a result of the SRI, the following conclusions were made as documented in the SRI report (Parsons, 2006a):

- TCE observed in groundwater at MW12-37 during the RI was determined to be localized and no groundwater plume was present. Adjacent temporary wells were not impacted.
- The drainage ditch adjacent to Buildings 813 and 814 was not impacted by TCE.
- The TCE-impacted soils near MW12-37 were located during the SRI and removed. TCE had not migrated in groundwater beyond the range of any of the temporary wells installed during the SRI (i.e. between 20 and 300 feet from MW12-37). Levels of TCE in soil below the foundation of Building 813 were detected above the NYSDEC TAGM value of 700 μg/kg (1,000 μg/kg and 4,800 μg/kg at two locations at the building foundation). Soils in this area could not be removed without jeopardizing the integrity of the building and were left in place.
- There were no detections of Pb-210 within the EM-5 area using Modified DOE EML HASL-300 Method for soil analysis. The elevated levels detected during the RI were attributed to analytical uncertainty. The analytical uncertainties associated with the method used in the SRI were much lower than those from the original RI.

Based on the SRI findings, the Army proposed no further action for the groundwater near Buildings 813/814 and the soil at EM-5. Due to the presence of TCE in soil below the buildings foundation, NYSDEC and EPA raised concerns regarding the quality of indoor air in these buildings. However, currently there is no future user designated for Buildings 813/814 and the buildings are uninhabitable due to lack of power, water, and sewer. Therefore, the indoor air exposure pathway is not complete under the current conditions. Nonetheless, due to the presence of TCE in soils beneath the buildings, vapor intrusion into the buildings is a potential pathway. Alternatives to eliminate potential risks associated with indoor air exposure pathway are evaluated in this FS.

1.3 NATURE AND EXTENT OF IMPACTS

1.3.1 Soil

During previous investigations, the soil cleanup levels proposed by the State of New York through TAGM under #HWR-94-4046 had been compared with the SEAD-12 soil data to evaluate soil conditions at SEAD-12. The soil concentrations provided in the TAGM 4046 are not promulgated standards and therefore were used as "To Be Considered" (TBC) guidelines for the RI at SEAD-12.

Surface and subsurface soil chemical exceedances of NYSDEC TAGMs are summarized in **Table 1-1** and **Table 1-2**, respectively. The results of the chemical analysis of surface and subsurface soil show that semi-volatile organic compound (SVOC) exceedances are limited to 4-methylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and phenol in limited samples. Trichloroethene is the only VOC with exceedances in both surface and subsurface soil and the exceedances are limited to the Buildings 813/814 area. In addition, there are metal exceedances throughout SEAD-12, but significant exceedances (values 2-5 times greater than TAGM values) are confined to Disposal Pit A/B and Disposal Pit C. In subsurface soil samples in these areas, metals that exceed their TAGMs by more than a factor of two include cadmium, chromium, copper, cyanide, lead, and zinc. The maximum concentrations of cadmium, chromium, and copper are found at Disposal Pit A/B. The maximum concentrations of lead and zinc, which are located in the Disposal Pit C area, are 431 mg/kg and 6,080 mg/kg, respectively.

Since completion of the RI and SRI, the New York State Environmental Board approved Subparts 375-1 through 375-4 and Subpart 375-6 under 6 NYCRR Part 375 - Environmental Remediation Programs. 6 NYCRR Subpart 375-6, effective December, 2006, includes the soil cleanup objective (SCO) tables developed for unrestricted use and restricted use scenarios. As SEAD-12 is located in the future institutional training area, the NYSDEC Soil Cleanup Objectives for commercial use scenario are considered to be relevant and appropriate criteria for SEAD-12. The soil cleanup objectives in 6 NYCRR Subpart 375-6 did not exist during previous investigations and were not considered in the RI. However, these values are used in the FS in the process of developing remedial action objectives for SEAD-12 and are discussed in **Section 2.5.1.1**.

1.3.2 Groundwater

During the RI, the NYSDEC (2004) Ambient Water Quality Standards (AWQS) for Class GA groundwater were used to evaluate SEAD-12 groundwater conditions. A summary of groundwater exceedances based on the RI is presented in **Table 1-3**.

Groundwater exceedances include antimony, iron, manganese, and sodium. The iron, manganese, and sodium exceedances are spread across the SWMU and often vary with the season. The antimony standard was only exceeded during the December 1999 round of sampling. The antimony concentrations detected at MW12-26 (3.2 μg/L) and MW12-29 (3.6 μg/L) were slightly above the GA Standard (3 μg/L); the maximum antimony concentration (43.2 μg/L) was detected at monitoring well MW12-39. However, the maximum concentration of antimony detected in SEDA background wells was 52.7 µg/L. Therefore, the antimony concentrations observed in SEAD-12 groundwater were consistent with SEDA background.

Bis(2-ethylhexyl)phthalate, cis-1,2-dichloroethene (cis-1,2-DCE), total 1,2-DCE, and TCE exceedances were observed during the RI or/and the SRI in monitoring well MW12-37 near Building 813. The most significant groundwater exceedances (i.e., TCE detected at 1,600 µg/L and 2,400 µg/L) were detected during the RI and the SRI, respectively, in monitoring well MW12-37 near Building 813. However, TCE was not detected in either of the adjacent wells (MW12-38 and MW12-39) during the RI. The SRI further demonstrated that TCE at MW12-37 was isolated. Elevated TCE concentrations were detected in soil in the area adjacent to MW12-37 and to the northeast corner of Building 813; the soil was regarded as the source of TCE contamination in groundwater and was later excavated during the SRI. As MW12-37 and adjacent source soil has been excavated, the VOC and SVOC exceedances no longer exist at SEAD-12 and therefore are not included in **Table 1-3**.

There were no groundwater exceedances for pesticides/Polychlorinated Biphenyls (PCBs).

1.3.3 Surface Water

A summary of surface water exceedances based on the RI is presented in **Table 1-3**.

Bis(2-ethylhexyl)phthalate was detected above the NYSDEC AWQS for Class C surface water near the former Dry Waste Disposal Pit and near Building 819. No other SVOCs were detected above the Class C AWQS at SEAD-12.

On-site, six pesticides exceeded their respective AWQS Class C surface water standards: 4,4'-DDE, 4,4'-DDT, aldrin, heptachlor, heptachlor epoxide, and hexachlorobenzene; however, most of the pesticide exceedances that occurred in on-site samples were detected below laboratory reporting limits. Only a few of the pesticides were detected above the reporting limits and none were detected greater than two times the reporting limits. Downgradient of SEAD-12, the only parameter to exceed the AWQS Class C surface water standards was hexachlorobenzene at surface water sample location SW12-48; hexachlorobenzene was detected slightly above its laboratory reporting limit in this sample (0.013 µg/L vs. 0.01 µg/L).

Based on the RI data, seven metals were found at concentrations above the respective NYSDEC AWQS standards for Class C surface water in the surface water samples. Of these seven metals, mercury is associated with the most significant exceedances. Three of the four locations where the mercury standard was exceeded (surface water sample locations SW12A-2, SW12A-1, and SW12-16) occur in the unnamed creek south of Disposal Pit A/B and Disposal Pit C, while the fourth location, surface water sample location SW12-35, is approximately 350 feet south of the creek.

1.3.4 Sediment

Sediment results were compared to the most conservative New York State (1999) guidelines for sediment including: New York State lowest effect level (NYS LEL), New York State human health bioaccumulation criteria (NYS HHB), New York State benthic aquatic life acute and chronic toxicity criteria (NYS BALAT and NYS BALCT, respectively), and New York State wildlife bioaccumulation criteria (NYS WB). Exceedances occur for SVOCs, pesticides/PCBs, and metals, both at the SWMU and downgradient of the SWMU.

A summary of sediment exceedances based on the RI is presented in **Table 1-3**. Exceedances occur for SVOCs, pesticides/PCBs, and metals, both onsite and downgradient. The incidence of exceedances in sediment decreases in the downgradient dataset. Benzo(a)pyrene is one of the SVOCs with exceedances of the greatest significance. The metal exceedances in SEAD-12 sediment do not correlate well with the locations of surface water exceedances for metals. The metal exceedances causing the greatest impact are cadmium, copper, manganese, mercury, and zinc. In sediment, Aroclor-1254 is of the greatest concern for the pesticide/PCB fraction.

1.3.5 Radiological Impact

No significant presence of radiological elements was detected in SEAD-12 soil.

Soil exceedances of radiological criteria were identified at EM-5 and EM-6 based on the RI report. Radiological exceedances are categorized by radionuclides that exceed background, background plus DCGL for residential criteria, and background plus DCGL for worker criteria. A DCGL is defined as the concentration of residual radioactivity distinguishable from background that, if uniformly distributed throughout a survey unit, would result in a defined total effective dose equivalent (TEDE) to an average member of a critical group. The TEDE selected for development of DCGLs at SEAD-12 is 10 millirem per year (mrem/yr), the cleanup guideline provided in the NYSDEC Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01). Although EPA allows a TEDE of 15 mrem/yr and the Nuclear Regulatory Commission (NRC) allows a TEDE of 25mrem/yr, this total effective dose equivalent of 10 mrem/yr was selected since it is the most conservative. Exceedances of the residential criteria at EM-5 and EM-6 are generally related to four radionuclides: Bismuth-214 (Bi-214), Lead-210 (Pb-210), Lead-214 (Pb-214), and Radium-226 (Ra-226). All of these are natural daughters of Uranium-238 (U-238). According to the RI report (Parsons, 2002), there are no exceedances to the worker criteria for soils with the exception of EM-5 (Pb-210 and Ra-226) and EM-6 (Ra-226). Upon further investigation of the Ra-226 results at EM-5 and EM-6, an error was found in the Wilcoxon Rank Sum (WRS) analyses conducted during the RI for these two areas. The WRS analyses were redone during the FS and the data from EM-5 and EM-6 for Ra-226 are actually within background plus worker DCGL values and are not elevated according to this analysis. The updated WRS results are presented in **Appendix C**.

In order to address concerns of elevated Pb-210 levels detected during the RI at EM-5, the ten locations from the RI with the highest Pb-210 concentrations or highest uncertainties were re-sampled during the SRI. Re-sampling was performed based on historical activities at SEAD-12 and observations made during the RI; and re-sampling did not support the elevated levels found during the RI and analytical uncertainty associated with RI samples was suspected. The samples collected during the SRI were analyzed for Ra-226 and Pb-210 using Modified DOE EML HASL-300 Method to minimize the uncertainty of the results. The results of this analysis indicated that there were no detections of Pb-210 in the SRI samples.

Although radiological exceedances occur within the SWMU at locations within surface water, sediment, and groundwater, the exceedances are considered to be associated with the naturally occurring daughters of uranium and thorium.

1.4 FATE AND TRANSPORT

This section presents an overview of the fate and transport characteristics for the contaminants detected at SEAD-12 - the VOCs, SVOCs and pesticides, metals, and radionuclides.

1.4.1 VOCs

TCE is a VOC of potential concern at SEAD-12. TCE and cis-1,2-DCE were detected at MW12-37 above the Class GA Standards. TCE concentrations were detected above the NYSDEC Restricted Use Soil Cleanup Objective for residential scenario (i.e., 10 parts per million or ppm) in soil within 10 feet from MW12-37. The soil was regarded as the source of TCE contamination in groundwater and was excavated during the SRI. MW12-37 was also removed during the SRI and no longer exists at SEAD-12. Volatilization from soil surfaces and leaching into groundwater are expected to be two major transport processes for VOCs in soil. As discussed in this section, TCE impact to groundwater at SEAD-12 is minimal while TCE vapor intrusion into the Buildings 813/814 is a potential pathway that needs further evaluation, if use of the buildings is warranted. TCE present in soil and groundwater can be microbiologically transformed to less chlorinated compounds as DCE isomers and vinyl chloride (VC).

TCE and cis-1,2-DCE concentrations were not detected above the GA Standards in the groundwater monitoring wells adjacent to MW12-37 (i.e., MW12-38 and MW12-39), nor were they detected in the 13 temporary monitoring wells installed in the vicinity of MW12-37 during the SRI. The low gradients and low hydraulic conductivity of the aquifer, in addition to the absence or low concentrations of TCE and cis-1,2-DCE in nearby wells, indicates that TCE observed at MW12-37 was localized and therefore the impact on groundwater is most likely limited. Further, soil in the area adjacent to MW12-37 was removed during the SRI. Therefore, TCE is not expected to pose significant impact to SEAD-12 groundwater.

Soil with elevated TCE concentrations (i.e., maximum concentration at 65,000 µg/kg) in adjacent to MW12-37 and in the northern corner of Building 813 was regarded as the source of TCE contamination in groundwater and was excavated during the SRI. Elevated TCE concentrations (i.e., 1,000 µg/kg and 4,800 µg/kg) were detected beneath the Building 813 foundation. Soils in this area could not be removed without jeopardizing the integrity of the building and were left in place. There is potential for vapors of TCE and TCE biodegradation byproducts to migrate from the subsurface soil to the unsaturated vadose zone and to infiltrate into the overlying buildings. Therefore, vapor intrusion of TCE and its byproducts into the Buildings 813/814 is a potential pathway that needs further evaluation at SEAD-12. Currently, the buildings are secured without occupants and there are no utilities available for the buildings. Therefore, the vapor intrusion exposure pathway is not complete under the current conditions as no potential receptors are identified.

1.4.2 SVOCs and Pesticides

There is a presence of Polycyclic Aromatic Hydrocarbons (PAHs), pesticides, and metals in sediment north of Building 815 near sediment sample SD12-32. PAHs are relatively immobile, having a high affinity for organic matter. This low mobility explains their primary presence in sediments. The immobile nature of the compounds and the lack of PAHs in groundwater indicate limited transport of these compounds. Pesticides were also detected primarily in the sediments due to their high organic carbon partition coefficient, K_{oc}, values which dictate low mobility.

1.4.3 Metals

While metals can be described by a range of mobilities, their transport abilities can generally be characterized by the same underlying principles. The mobility of metals within a soil system is primarily associated with the movement of water through that system. This mobility is affected by the solubility of the metal and its compounds, as well as chemical parameters affecting the oxidation state of the metal in solution. Metals associated with the aqueous phase of soil are subject to movement with soil water and may be transported through the vadose zone to groundwater. However, the rate of migration of the metal usually does not equal the rate of water movement through the soil due to fixation and adsorption reactions (Dragun, 1988). Metals, unlike organic compounds, cannot be degraded (McLean and Bledsoe, 1992). Metals become immobile due to mechanisms of adsorption and precipitation. Metal-soil interactions are such that when metals are introduced at the soil surface, downward transportation does not occur to any great extent unless the metal retention capacity of the soil is overloaded, or metal interaction with the associated waste matrix enhances mobility.

1.4.4 Radionuclides

Statistical evaluation of radionuclide data in soil presented in Section 4.0 of the RI and in accordance with MARSSIM guidance, indicates that the NYSDEC TAGM of 10 mrem/yr is achieved in all areas of the SWMU, except for Pb-210 at EM-5. However, there was a large uncertainty associated with the laboratory results for Pb-210. Selected locations from the original RI were resampled and analyzed using Modified DOE EML HASL-300 Method to reduce the uncertainty. The SRI results indicate no detections of Pb-210 at EM-5. Therefore, the SWMU is not impacted by radionuclides based on the RI and SRI results.

1.5 RISK ASSESSMENT

A baseline risk assessment was conducted for SEAD-12 and is presented in the RI (Parsons, 2002). The objectives of the baseline risk assessment were to:

- Assess SWMU conditions for protectiveness of human health and the environment;
- Determine whether additional response actions are necessary at the SWMU;
- Identify COCs and provide a basis for determining levels of chemicals of concern that are adequately protective of human health and the environment; and

- Provide a basis for comparing potential health impacts of various remedial alternatives, and evaluate selection of the No-Action remedial alternative, where appropriate.

To meet these objectives, the Risk Assessment Guidance for Superfund (RAGS) (EPA, 1989) was followed. The baseline risk assessment was divided into two components: the human health evaluation and the ecological evaluation. Separate risk calculations were presented for current and future land-use scenarios.

Although the size of SEAD-12 area is large, a large portion has not been impacted. Consequently, the human health and ecological BRA was completed on three of the nine potential release areas:

- Disposal Pit A/B;
- Disposal Pit C; and
- Former Dry Waste Disposal Pit.

These three areas were selected on the basis of area evaluation criteria, including areas of documented activity associated with WSA activities, areas where RI investigations confirmed significant “military” activity, and proximity to buildings associated with activities of potential concern. Overall, the Former Dry Waste Disposal Pit area, Disposal Pit A/B, and Disposal Pit C were impacted to the greatest extent by former activities in the WSA.

A baseline risk assessment was not conducted for the Buildings 813/814 area that exists within the Class III area. Although elevated TCE concentrations were observed in groundwater at MW12-37 and in soil near Buildings 813/814, the TCE contamination in the area is isolated and the associated soils were excavated during the SRI. The TCE concentrations remaining underneath the buildings (maximum 4.8 ppm) are below all the NYSDEC Restricted Use Soil Cleanup Objectives for protection of public health (10 ppm, 21 ppm, and 200 ppm for residential, restricted-residential, and commercial, respectively). Thirteen temporary wells located within 20 to 300 feet from MW12-37 had no TCE detected during the SRI. Therefore, groundwater and soil in Buildings 813/814 area are not considered media of concern at SEAD-12. Further, the vapor intrusion exposure pathway is not complete under the current conditions as no potential receptors are identified. There is no current or planned use of the buildings. Currently, the buildings are secured without occupants and there are no utilities available in the buildings. Nonetheless, due to the presence of TCE in soils beneath the buildings, vapor intrusion into the buildings is a potential pathway. Two alternatives are evaluated in this FS to eliminate potential risks to indoor air that may potentially be impacted by vapor intrusion. One alternative is to impose an environmental easement to ensure that an indoor air quality assessment would be required before any future building occupancy. The other alternative is to conduct a vapor intrusion study and, if warranted based on the study, to demolish the buildings and excavate underneath soil that contain elevated TCE concentrations.

1.5.1 Baseline Human Health Risk Assessment

The exposure scenarios that are considered in the baseline human health risk assessment include:

- Exposure of a current worker to contaminants at the SWMU;

- Exposure of a future park worker to contaminants at the SWMU;
- Exposure of a current/future construction worker to contaminants at the SWMU;
- Exposure of a future recreational visitor (child) to contaminants at the SWMU;
- Exposure of a future resident to contaminants at the SWMU; and
- Exposure of a future wader to downstream contaminants.

It should be noted that due to the change of the future land use for SEAD-12 (i.e., from conservation/recreation to institutional training) in 2005, some receptors evaluated during the RI (e.g., park worker and recreational visitor) no longer represent future human receptors at the SWMU. However, the exposure assumptions for these receptors are still relevant and mimic those assumptions used for potential future human receptors under an institutional training scenario. For example, the exposure profile for a park worker is similar to that for an institutional worker and exposure assumptions for recreational visitors could be used as conservative estimates for trespassers. Therefore, the risk assessment results can still be used to assess potential human health risks at SEAD-12.

Separate sets of soil exposure point concentrations were derived for each area (the Former Dry Waste Disposal Pit area, Disposal Pit A/B, and Disposal Pit C) for evaluating risks associated with soil exposure pathways. For surface water, sediment, and groundwater, a single set of exposure point concentrations were derived from all SWMU data and added to the risk generated from the area-specific soil risk. For the wader, downgradient sediment and surface water data were used to generate a set of exposure point concentrations for this scenario.

The results of the human health risk assessment are summarized in **Table 1-4**. Only a future resident has the potential to be exposed to chemicals of concern at levels that are above those defined by the EPA. The future resident exhibits non-cancer hazard indices and excess cancer risks above the EPA target risk range; however, the risks for future residents are considered highly uncertain and probably overestimates of risks as discussed below.

The Reasonable Maximum Exposure (RME) excess cancer risk for the future resident is 7×10^{-4} and it is primarily due to dermal contact with benzo(a)pyrene in groundwater and surface water. Benzo(a)pyrene was only detected twice in SEAD-12 groundwater out of 89 groundwater samples – 0.058 µg/L in MW12-39 and 0.097 µg/L in MW12-40 in April 1999. Benzo(a)pyrene was not detected in either of these wells during the December 1999 sampling event. Benzo(a)pyrene was only detected in one SEAD-12 surface water sample out of 52 surface water samples – 0.6 µg/L at SW12A-1 during the ESI. Benzo(a)pyrene was not detected in a field duplicate collected from the same location (i.e., SW12A-1). Further, benzo(a)pyrene was not detected in any surface water samples collected during the RI adjacent to SW12A-1 (e.g., SW12-14, which is immediately next to SW12A-1, and SW12-15, which is within 300 ft from SW12A-1). Overall, the groundwater and surface water data suggest that groundwater or surface water at SEAD-12 is not impacted by bezno(a)pyrene. Thus, including benzo(a)pyrene as a Chemical of Potential Concern (COPC) and using the RME exposure assumptions for the risk assessment is an overly conservative approach. The risk assessment results are considered highly uncertain and probably overestimates of risks, as qualified in the Risk Characterization and Uncertainty sections in the RI.

The Reasonable Maximum Exposure non-cancer hazard index for the future resident is 2 and it is primarily due to dermal contact with Aroclor-1242 in surface water and di-n-octylphthalate in groundwater. Aroclor-1242 was only detected twice in SEAD-12 surface water out of 52 samples – 0.33 µg/L in SW12-6 and 0.44 µg/L in SW12-23. Di-n-octylphthalate was detected in six out of 89 SEAD-12 groundwater samples. All the detected di-n-octylphthalate concentrations were below the laboratory reporting limits; and none of the detects were confirmed by results from a different sampling round at the same locations. Overall, the groundwater and surface water data suggest that groundwater at SEAD-12 is not impacted by di-n-octylphthalate and surface water at SEAD-12 is not impacted by Aroclor-1242. Thus, including Aroclor-1242 as a COPC for surface water and di-n-octylphthalate as a COPC for groundwater, and using the RME exposure assumptions for the risk assessment is an overly conservative approach. The risk assessment results are considered highly uncertain and probably overestimates of risks.

Both the carcinogenic (chemical and radiological combined) risks and the non-cancer hazard indices for all other receptors were within or below the EPA target levels.

1.5.2 Baseline Ecological Risk Assessment

The ecological risk assessment (ERA) was performed following the guidance presented in the Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (NYSDEC, 1994b), Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA, 1997a), Guidelines for Ecological Risk Assessment (EPA, 1998), the Procedural Guidelines for Ecological Risk Assessment at U.S. Army Sites, Vol. 1 (Wentsel et al., 1994), and The Role of Screening – Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessment (EPA, 2001).

The current EPA ecological risk assessment paradigm includes eight general steps:

1. Screening-Level Problem Formulation and Effects Evaluation (toxicity);
2. Screening-Level Exposure Estimate and Risk Calculation;
3. Baseline Problem Formulation;
4. Study Design and Data Quality Objectives Process;
5. Field Verification of Sampling Design;
6. Site Investigation and Analysis of Exposure and Effects;
7. Risk Characterization; and
8. Risk Management (EPA, 1997a).

Upon completion of ERA Step 2, there is a Scientific Management Decision Point (SMDP) with three possible decisions:

- There is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risks.

- The information is not adequate to make a decision at this point and the ERA process should continue to a baseline ERA.
- The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted.

For Steps 1 and 2, No Observed Adverse Effect Level (NOAEL) toxicity values and default exposure assumptions were used to calculate screening level Hazard Quotients (HQs). Due to the conservative nature of these assumptions, additional evaluation was required to refine COCs and to help streamline the overall ERA process. In accordance with the EPA guidance, this additional evaluation was performed as part of the baseline problem formulation in Step 3 (EPA, 2001).

For soils, maximum detected concentrations were compared to screening criteria to identify COPCs (Step 1). Potential exposures and effects resulting from maximum concentrations of soil contaminants were then evaluated by estimating potential direct and indirect exposures for terrestrial wildlife (short-tailed shrew, red-tailed hawk, meadow vole, and mourning dove) and comparing exposures to NOAEL toxicity values (Step 2). In addition, invertebrate and amphibian screenings were completed for SWMU soil contaminants.

Potential exposures and effects resulting from the maximum concentrations of sediment/surface water contaminants were evaluated by estimating potential direct and indirect exposures for wetland species (great blue heron) and comparing exposures to NOAEL toxicity values. Potential impacts to invertebrates were qualitatively evaluated by comparing the maximum detected concentrations to screening benchmarks.

Potential exposures and effects resulting from the maximum concentrations of surface water contaminants were also evaluated by estimating potential direct and indirect exposures for aquatic wildlife (largemouth bass) and comparing exposures to NOAEL toxicity values. Surface water contaminants were additionally evaluated by comparing surface water concentrations to effect level concentrations for amphibians.

Based on Steps 1 and 2, Aroclor-1254 and several metals including aluminum, cadmium, copper, iron, lead, manganese, nickel, selenium, silver, thallium, and zinc were identified as potential soil contaminants of concern at Disposal Pit A/B. Based on Step 3 COC refinement with alternative exposure assumptions, potential soil COCs identified for the ecological receptors at Disposal Pit A/B included: iron, lead, nickel, vanadium, and zinc. All these metals were found to be present within the Seneca background ranges. Therefore, the Army's risk management position is that no COCs were identified and that no further action is warranted at the Disposal Pit A/B based on the ecological risk assessment.

For the area designated as Disposal Pit C, the results suggest a potential for adverse ecological effects due to the presence of zinc. A further evaluation of the data indicates that the contamination is above background in three distinct areas represented by soil samples from locations TP12-7BA, TP12-7BB, and TP12A-7 for one area, TP12-7AA for another area, and TP12A-4 for the final area. Other samples for zinc in Disposal Pit C are below background and indicate that contamination outside these areas do not have the potential for adverse ecological effects. It should be further noted that based on the future use of the SWMU, SEAD-12 is not expected to support, sustain, or attract ecological receptors and therefore is not expected to be a wildlife habitat. The presence of ecological receptors is expected to be generally curtailed in these areas where habitat conditions are poor and human activity levels are sufficiently disruptive to discourage wildlife use. Therefore, it is the Army's position that no further action is warranted at Disposal Pit C to mitigate potential risks to ecological receptors.

For the area designated as former Dry Waste Disposal Pit, Steps 1 and 2 identified several metals as potential soil COCs: aluminum, iron, manganese, nickel, selenium, thallium, vanadium, and zinc. Based on the results of the further refinement of COCs (part of Step 3), no COCs were identified and therefore, no further action is recommended at the former Dry Waste Disposal Pit based on the ecological risk assessment.

The screening-level ERA identified bis(2-ethylhexyl)phthalate, 4-4'-DDD, 4-4'-DDE, 4-4'-DDT, Aroclor-1254, aluminum, chromium, iron, selenium and zinc as potential sediment/surface water COPCs. Based on the results of the screening-level ERA and further COC refinement (part of Step 3 ERA), only aluminum was identified as a potential COC in surface water and sediments at SEAD-12. Since sediment concentrations of aluminum are very similar to background concentrations, the Army's risk management position is that aluminum does not warrant further evaluation for the sediment and surface water. Therefore, no further action is proposed at SEAD-12 for sediment or surface water based on the ecological risk assessment.

1.6 SUMMARY

Nine potential release areas were identified at SEAD-12. After further investigation and analysis, most of the areas of potential release were eliminated due to the compliance with the relevant guidelines and regulations. Baseline human health and ecological risk assessments were completed for three areas (i.e., Disposal Pit A/B, Disposal Pit C, and Former Dry Waste Disposal Pit) as these areas were impacted to the greatest extent by former activities in the WSA. The risk assessments did not reveal any significant levels of risk associated with the identified contaminant release. Therefore, no further action is warranted at SEAD-12 based on the baseline human health and ecological risk assessments.

Test pit investigations at SEAD-12 indicate that Disposal Pit A/B, as well as Disposal Pit C, contain a significant quantity of debris and some of the debris can be characterized as military related components. As a result, the Army is proposing to remove military debris from Disposal Pit A/B and Disposal Pit C.

Based on the findings of the RI, additional investigation was warranted at Buildings 813/814 to investigate a groundwater exceedance of TCE and in the EM-5 area to investigate elevated levels of Pb-210 in soil. The groundwater exceedance of TCE was found to be isolated and soils impacted by TCE in the vicinity of the exceedance were removed. TCE concentrations above the NYSDEC TAGM do exist below the foundation of Building 813. As there is no future user designated for

Buildings 813/814 and the buildings are uninhabitable in their current conditions due to lack of power, water, and sewer, the indoor air quality of these buildings was not assessed. Soil locations having elevated levels of Pb-210 during the RI were re-sampled during the SRI; Pb-210 was not detected in the SRI soil samples and earlier detections were found to be due to high analytical uncertainty.

2.0 REMEDIAL ACTION OBJECTIVES

2.1 INTRODUCTION

The purpose of this section is to develop remedial action objectives (RAOs) and general response actions for each medium of interest identified at SEAD-12. Based on the RAO and the general response actions, potential remedial technologies are identified and screened in **Section 2.0** and **3.0**, and a detailed analysis of remedial action alternatives is provided in **Section 4.0**. This process follows the USEPA and NYSDEC method of identifying and screening technologies/processes and consists of the following six steps:

- Develop RAOs that specify media of interest, chemical constituents of concern, and the results of the Baseline Risk Assessment (**Section 2.0**);
- Develop general response actions for each medium of interest that will satisfy each remedial action objective for the SWMU (**Section 2.0**);
- Estimate quantities of media to which general response actions will be applied to meet RAOs (**Section 2.0**);
- Identify remediation technologies/processes associated with each general response action. Screen and eliminate technologies/processes based on technical implementability (**Section 2.0**);
- Evaluate technologies/processes and retain processes that are representative of each technology (**Section 2.0**); and
- Assemble and further screen the retained technologies/processes into a range of alternatives as appropriate (**Section 3.0** and **4.0**).

2.2 MEDIA OF INTEREST

As discussed in **Section 1**, the RI and SRI conclude that further actions are warranted for the following areas at SEAD-12:

- Disposal Pit A/B,
- Disposal Pit C, and
- Buildings 813/814.

No further action is warranted at Disposal Pit A/B and Disposal Pit C based on the human health and ecological risk assessment results. However, as both disposal pit areas contain military debris, it is in the Army's interest to prevent public access to this debris.

The SRI conducted in the area of Buildings 813/814 concluded that TCE detected in groundwater was localized at MW12-37. TCE concentrations in the remaining surrounding soil were all below the TAGM values with the exception of two soil samples collected beneath the building footers. Since no indoor air investigation was conducted within the buildings, an indoor air quality assessment must be performed prior to occupancy of the buildings.

2.3 GENERAL REMEDIAL ACTION OBJECTIVES

The CERCLA cleanup process is a risk-based process. The overall objective of any remedial response is to protect human health and the environment. Protection of human health and the environment is required where the risks from exposure to the chemicals or radiological materials present in the various environmental media exceed established EPA target ranges. RAOs have been developed to meet this overall objective. The objectives are then used as a basis for developing remedial alternatives.

CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, requires that a CERCLA remedial action:

- At minimum, attain federal and more stringent state applicable or relevant and appropriate requirements (ARARs) on completion of the remedial action for on-site remedial actions (unless an ARAR waiver becomes necessary).
- Use remedial alternatives that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances;
- Select remedial actions that protect human health and the environment, are cost effective, and involve permanent solutions, alternative solutions, and resource recovery technologies to the maximum extent possible;
- Avoid off-site transport and disposal of untreated hazardous substances or contaminated materials where practical technologies exist to treat these materials on-site.

The National Contingency Plan (NCP) regulations, which implement CERCLA, generally require ARAR compliance during remedial actions as well as at completion (40 CFR 300.435(b)(2)). However, a no-action decision does not require compliance with ARARs.

The RAOs for SEAD-12 consist of media specific objectives designed to be protective of human health and the environment. Where applicable, consideration was given to the NCP preference for permanent solutions. The general RAOs for SEAD-12 are as follows:

- Prevent public or other persons from direct contact with military debris, or direct contact with soil that may present a health risk due to potential radiological contamination, or exposure to indoor air that may present a potential health risk.
- Restore the area to a condition that would comply with the SEDA LRA determination that the future use of SEAD-12 would be for institutional training.

The following sections describe how these general RAOs were determined and describe the development of remedial actions to attain these general objectives. RAOs for this SWMU are based upon the current and intended future land use (institutional training) scenarios.

2.4 RISK-BASED REMEDIAL ACTION OBJECTIVES

The results of the BRA presented in the RI report (Parsons, 2002) were evaluated to determine the need for risk-based RAOs for Disposal Pit A/B and Disposal Pit C. As the areas do not pose significant risks to human health or the environment, risk-based remedial action objectives are not warranted for these areas. Below presents a summary of the risk assessment results.

Based on the human health risk assessment conducted for Disposal Pits A/B and C, there is no unacceptable risk. The results of the human health risk assessment show initially that only a future resident has the potential to be exposed to chemicals of concern at levels that are above those defined by the EPA. The future resident exhibits non-cancer hazard indices and excess cancer risks above the EPA target risk range due to dermal exposure to benzo(a)pyrene in surface water and groundwater and Aroclor-1242 in surface water and di-n-octylphthalate in groundwater. However, as discussed in **Section 1.5**, these results are considered highly uncertain and probable overestimates of risk. These results are also qualified in the Risk Characterization and Uncertainty sections (Section 6.5) of the RI (Parsons, 2002).

The quantitative ecological risk evaluation identified zinc as a contaminant of concern in the soil for Disposal Pit C. Based on the future use of the SWMU, SEAD-12 is not expected to support, sustain, or attract ecological receptors and therefore is not expected to be a wildlife habitat. The presence of ecological receptors is expected to be generally curtailed in these areas where habitat conditions are poor and human activity levels are sufficiently disruptive to discourage wildlife use. Further, as discussed in **Section 2.5**, virtually all of the Disposal Pit C surface soils meet the NYSDEC Soil Cleanup Objectives for unrestricted use. Therefore, it is the Army's position that no further action is warranted at Disposal Pit C to mitigate potential risks to ecological receptors.

Risk assessment was not performed to evaluate potential risks via indoor air exposure pathway at Buildings 813/814. Currently, there is no future user designated for Buildings 813/814 and the buildings are uninhabitable due to lack of power, water, and sewer. Therefore, the indoor air exposure pathway is considered incomplete under the current and intended future use scenarios. It is the Army's position that a risk analysis with respect to vapor intrusion could take place once a future user, if identified, plans to occupy the building, since the only potential risk would be to a building occupant. It will be the responsibility of the organization making the determination to occupy the building to perform such an analysis prior to use of the buildings. The rationale for this is presented below:

- Currently the residual contaminants in SEAD-12 soil near Buildings 813/814 do not exceed NYSDEC Restricted Use Soil Cleanup Objectives. Elevated TCE concentrations were observed in soils near Buildings 813/814 during the SRI and the associated soils were excavated and disposed off-site. The TCE concentrations remaining underneath the buildings (maximum 4.8 ppm) are below all the NYSDEC Restricted Use Soil Cleanup Objectives for protection of public health (10 ppm, 21 ppm, 200 ppm, and 400 ppm for residential, restricted-residential, commercial, and industrial, respectively). Although concentrations exceed NYSDEC Unrestricted Use Soil Cleanup Objective for TCE (0.47 ppm), these soils are located beneath the building foundation and are not accessible.
- Currently, groundwater at SEAD-12 is not impacted by TCE. Although TCE concentrations above the NYSDEC GA Standard were observed at MW12-37, the SRI indicated the TCE

contamination at MW12-37 was isolated. As discussed in our response to EPA's comments dated June 9, 2006 on the SRI, soil adjacent to MW12-37, which was considered source of the TCE contamination detected in MW12-37, was excavated during the SRI. As a result, MW12-37 as well as the surrounding soils and groundwater, no longer exists. Thirteen temporary wells shown in **Figure 1-7**, were installed as part of the SRI and temporary wells located as close as 20 to 30 feet of MW12-37 had no TCE detected during the SRI. Therefore, groundwater is not a media of concern at this site.

- Due to the presence of TCE in soils beneath the buildings, vapor intrusion into the buildings is a potential pathway that cannot be eliminated using existing data alone. Therefore, a restriction on building use is warranted. However, there is no current or planned use of the buildings. Currently, the buildings are secured without occupants and there are no utilities available in the buildings. Therefore, the vapor intrusion exposure pathway is not complete under the current conditions as no potential receptors are identified.
- The Army's proposal for delaying the vapor intrusion investigations until the buildings have a change in use and are planned to be occupied is consistent with the NY State and Army guidance. In NYSDOH's 2005 draft document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" indicates in Section 3.2.7 (Current and Future Land Uses) that *"Both current and future land uses are considered when evaluating the investigation data and determining appropriate actions for further investigation or measures to address exposures . .However, provisions may be put in place to defer sampling until occupancy of the building is expected;"*. In addition, the guidance states that *"if actions should be taken to mitigate exposures related to soil vapor intrusion should the site be developed, the appropriate mitigation method will depend upon the proposed land use - a parking lot, recreational field, single-family home, commercial building, high-rise building with underground parking, occupied or unoccupied building, etc."* Army guidance (dated 11/6/06) states that with respect to future construction at BRAC sites, modeling is typically not conducted and instead a notice of potential vapor intrusion risks are memorialized in transfer documents.

As vapor intrusion into the buildings is a potential pathway due to the presence of TCE in soils beneath the buildings, the risk-based RAO for Buildings 813/814 area is to eliminate potential risks via inhalation of indoor air potentially impacted by TCE and its by-products from soil underneath the buildings.

In summary, the risk-based RAOs for SEAD-12 are to reduce any non-cancer hazard indices and excess cancer risks to the levels protective of human health and the environment. As there are no significant risks expected for human or ecological receptors at Disposal Pits A/B and C, risk-based remedial action objectives are not warranted. At Buildings 813/814, the risk-based RAO is to reduce potential risks via inhalation of indoor air possibly impacted by TCE and its biodegradation by-products from soil under the buildings.

2.5 ARAR - BASED REMEDIAL ACTION OBJECTIVES

The investigation and remediation of SEAD-12 is subject to pertinent requirements of both federal environmental statutes or regulations (generally administered by EPA Region II for SEDA) and the State of New York environmental statutes and regulations (generally administered by the NYSDEC), determined in accordance with the CERCLA ARAR process. ARARs are promulgated standards that may be applicable to the site cleanup process after a remedial action has been selected for implementation.

Any standard, requirement, criterion, or limitation under any federal environmental or state environmental or facility siting law may be either applicable or relevant and appropriate to a specific action. The only state laws that may become ARARs are those promulgated such that they are legally enforceable and generally applicable and equivalent to or more stringent than federal laws. A determination of applicability is made for the requirements as a whole, whereas a determination of relevance and appropriateness may be made for only specific portions of a requirement. An action must comply with relevant and appropriate requirements to the same extent as an applicable requirement with regard to substantive conditions, but need not comply with the administrative conditions of the requirement.

Three categories of potentially applicable state and federal requirements were reviewed: (1) chemical-specific, (2) location-specific, and (3) action-specific. Chemical-specific ARARs address certain contaminants or class of contaminants and relate to the level of contamination allowed for a specific pollutant in various environmental media. Location-specific ARARs are based on the specific setting and nature of the site. Action-specific ARARs relate to specific actions proposed for implementation at a site. Both location-specific and action-specific ARARs are independent of the media. In addition to ARARs, advisories, criteria, or guidance may be evaluated as TBC. The NCP provides that the TBC category may include advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may be useful in devising CERCLA remedies. These advisories, criteria, and guidance are not promulgated and, therefore, are not legally enforceable standards such as ARARs.

2.5.1 Potential Chemical-Specific ARARs and To Be Considered (TBCs)

Chemical-specific ARARs are usually health-based or risk-based numerical values or methodologies, established by promulgated standards, that are required to be used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment. Chemical-specific ARARs may also include designated EPA, NRC, or Department of Energy (DOE) ARARs for radioactive waste. Chemical-specific TBCs can serve to indicate contaminant levels that may merit concern.

Potential federal and state chemical-specific ARARs and TBCs considered in connection with the RI at SEAD-12 are described in the following sections.

2.5.1.1 Soil

Cleanup levels for hazardous constituents in soil have been proposed by the State of New York through TAGM under #HWR-94-4046. The soil concentrations provided in the TAGM 4046 are not promulgated standards and therefore are not ARARs but were used as TBC guidelines for the RI at SEAD-12. Surface and subsurface soil chemical exceedances of NYSDEC TAGMs are summarized in **Table 1-1** and **Table 1-2** and discussed in **Section 1.3.1**. Ditch soil samples collected as part of the SRI were below TAGM values for all detected analytes; therefore, ditch soil results are not presented in **Table 1-1**.

Since completion of the RI and SRI, the New York State Environmental Board approved Subparts 375-1 through 375-4 and Subpart 375-6 under 6 NYCRR Part 375 - Environmental Remediation Programs. 6 NYCRR Subpart 375-6, effective December, 2006, includes the soil cleanup objective tables developed for five categories of future land use (i.e., unrestricted use, residential, restricted-residential, commercial, and industrial). As SEAD-12 is located in the future institutional training area, the NYSDEC Soil Cleanup Objectives for commercial use scenario are considered to be relevant and appropriate criteria for SEAD-12. In addition, the Soil Cleanup Objectives for unrestricted use are used in the SEAD-12 FS for comparison purposes.

Surface and subsurface soil chemical exceedances of the soil cleanup objectives for unrestricted use presented in 6 NYCRR Subpart 375-6 are summarized in **Table 2-1A** for Disposal Pit A/B, Disposal Pit C, and Buildings 813/814. **Table 2-1B** summarizes the surface and subsurface soil chemical exceedances of the restricted commercial use criteria. As shown in **Table 2-1B**, the detected concentrations in Disposal Pit A/B, Disposal Pit C, and Buildings 813/814 are all below the Commercial Use SCOs with the exception of three Aroclor-1254 exceedances (out of 28 samples) and three cadmium exceedances (out of 28 samples) in Disposal Pit A/B subsurface soil. Aroclor-1254 was detected at low frequency in Disposal Pit A/B soil (i.e., 6 out of 28 subsurface soil samples) and the average concentration in subsurface soil is below the NYSDEC Commercial Use SCO (294 μg/kg vs. 1,000 μg/kg). Cadmium was detected in 10 out of 28 subsurface soil samples and the average concentration in subsurface soil is below the NYSDEC Commercial Use SCO (6.6 mg/kg vs. 9.3 mg/kg). Further, the Aroclor-1254 and cadmium concentrations in Disposal Pit A/B soil do not pose significant risks to human health or the environment based on the RI baseline risk assessment. Average concentrations for all analytes are below the cleanup objectives for restricted commercial use scenario. As shown in **Table 2-1A,** the soil results at Disposal Pit A/B, Disposal Pit C, and Buildings 813/814 are all below the cleanup objectives for unrestricted use with a few exceptions. Those analytes with one or more detections exceeding the cleanup objectives are shown in **Table 2-2**. Most analytes have average concentrations below the cleanup objectives for unrestricted use. Exceptions to this are as follows: 4,4'-DDT in surface soil at Disposal Pit A/B; 4,4'-DDE, Aroclor-1254, cadmium, and nickel in subsurface soil at Disposal Pit A/B; zinc in subsurface soil at Disposal Pit C; and trichloroethene in subsurface soil at Buildings 813/814. These analytes have averages slightly above the cleanup objectives for unrestricted use scenario (within three times). 4,4'-DDT, 4,4'-DDE, and Aroclor-1254 exceedances in soil at Disposal Pit A/B were observed with low frequency (i.e., 4, 1, and 6 out of 43 total soil samples). The average nickel concentration in subsurface soil (35.1 mg/kg) at Disposal Pit A/B is close to the average Seneca soil background value (31 mg/kg) and less than the maximum background concentration (62.3 mg/kg). The average zinc concentration in subsurface soil at Disposal Pit C is within 15% of the average Seneca background value (88 mg/kg vs. 72 mg/kg).

Based on the baseline risk assessment performed during the RI, contaminants in soil at Disposal Pit A/B or Disposal Pit C do not pose significant risks to human health or the environment. Therefore, it is concluded that soil conditions at Disposal Pit A/B and Disposal Pit C are in general consistent with the unrestricted use requirements presented in 6 NYCRR Subpart 375-6. The trichloroethene concentrations in soil at Buildings 813/814 are all below the NYSDEC SCO for commercial use. The average trichloroethene concentration in subsurface soil (854 μg/kg) at Buildings 813/814 is above the unrestricted use criteria (470 μg/kg) but the soil is not accessible as the impacted soil was underneath the foundation of Buildings 813/814.

No radiological contamination was identified in soils at SEAD-12 at levels exceeding background. Therefore, consideration of any potential EPA, NRC, or DOE radioactive waste ARARs is unnecessary.

2.5.1.2 Groundwater

Groundwater at SEAD-12 is classified by NYSDEC as Class GA. As a result, the groundwater quality standards for Class GA groundwater are potential ARARs for this SWMU.

A summary of groundwater exceedances based on the RI and SRI is presented in **Table 1-3** and summarized in **Section 1.3.2**. In summary, there were no groundwater exceedances for VOCs, SVOCs, or pesticides/PCBs. Groundwater metal exceedances include antimony, iron, manganese, and sodium. The iron, manganese, and sodium exceedances are spread across the SWMU and often vary with the season. The antimony standard was only exceeded during the December 1999 round of sampling. The maximum detected concentrations of antimony and iron (43.2 µg/L and 20,700 µg/L, respectively) were below the maximum detected SEDA background concentrations (52.7 µg/L and 63400 µg/L, respectively). The average manganese concentration detected during the RI was below the average background concentration (209 µg/L vs. 224 µg/L). The average sodium concentration detected during the RI (30,126 µg/L) was slightly above two times of the average background concentration while the average sodium concentration detected during the ESI was below the average background concentration (10,400 µg/L vs. 14,600 µg/L).

Although bis(2-ethylhexyl)phthalate, cis-1,2-dichloroethene (cis-1,2-DCE), total 1,2-DCE, and TCE exceedances were observed during the RI or/and the SRI in monitoring well MW12-37 near Building 813, these exceedances do not represent the current SEAD-12 conditions as MW12-37 and adjacent TCE-impacted soil has been removed to the extent feasible. As a result, these exceedances are not included in **Table 1-3**.

Although ARAR exceedances exist in SEAD-12 groundwater for several metals, groundwater at SEAD-12 does not pose significant risks to either human health or the environment. As a result, no action is warranted for groundwater at SEAD-12 and chemical-specific ARARs need not to be designated for groundwater.

2.5.1.3 Surface Water

Surface water flows through an unnamed creek that begins in the area of the southeastern corner of SEAD-12 and flows northerly along the eastern edge of SEAD-12 before it turns to a more westerly path just south of Disposal Pit A/B. From this point it transects SEAD-12 and flows into Reeder Creek at a point that is south of SEAD-21, Sewage Treatment Plant No. 715. Surface water at SEAD-12 is also found in man-made drainage ditches that are tributaries to both the unnamed creek and Reeder Creek. The surface water in the ditches is not classified by NYSDEC because they are intermittent and not recognized as an established stream or creek. However, because the drainage ditches and the unnamed creek form the headwaters for Reeder Creek, the lower portion of which is designated as Class C surface water by NYSDEC, the Class C standards were used to provide a basis of comparison for the on-site chemical data. The Class C standards are not strictly applicable to all of the surface water found at SEAD-12.

A summary of surface water exceedances based on the RI is presented in **Table 1-3** and summarized in **Section 1.3.3**. One SVOC (bis(2-ethylhexyl)phthalate), several pesticides, and seven metals were found at concentrations above the respective NYSDEC AWQS for Class C surface water in the surface water samples. Although AWQS exceedances exist in SEAD-12 surface water, surface water at SEAD-12 does not pose significant risks to either human health or the environment. As a result, no action is warranted for surface water at SEAD-12 and chemical-specific ARARs need not to be designated for SEAD-12 surface water.

2.5.1.4 Sediment

Sediment results were compared to the most conservative New York State guidelines for sediment including: NYS LEL, NYS HHB, NYS BALAT and NYS BALCT, and NYS WB. Sediment criteria are not ARARs but rather are TBCs because they are not promulgated standards.

A summary of sediment exceedances based on the RI is presented in **Table 1-3** and summarized in **Section 1.3.4**. Exceedances occur for PAHs, pesticides/PCBs, and metals. Sediment at SEAD-12 does not pose significant risks to either human health or the environment. Therefore, no action is warranted for sediment at SEAD-12 and chemical-specific ARARs need not to be designated for SEAD-12 sediment.

2.5.1.5 Radiological Impact

NYSDEC Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01) recommends a maximum dose limit of 10 mrem/yr above background to the general public for free release of a site following the cleanup of radioactively contaminated material. Based on the RI data, no significant presence of radiological elements was detected in soil, surface water, sediment, or groundwater at SEAD-12. Therefore, radiological specific ARARs need not to be designated for SEAD-12. However, if radiological sources were encountered during a remedial action, NYSDEC Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01) would be applicable.

2.5.1.6 Summary of Chemical-Specific ARARs

ARARs were identified for SEAD-12 groundwater and TBCs were identified for SEAD-12 sediment and surface water. For SEAD-12 soil, the NYSDEC Soil Cleanup Objectives for commercial use scenario were considered to be relevant and appropriate. The TAGM values were identified as TBCs.

The ARARs and TBCs were used in the RI and FS to evaluate the SEAD-12 conditions. Although exceedances of ARARs and TBCs were observed at all the media, these media do not pose any significant risks to human health or the environment. No COCs were identified based on the baseline risk assessment performed for SEAD-12. As a result, chemical-specific ARARs need not to be designated for SEAD-12.

2.5.2 Potential Location-Specific ARARs

Location-specific ARARs may serve to limit contaminant concentrations, or even to restrict or to require some forms of remedial action in environmentally or historically sensitive areas at a site, such as natural features (including wetlands, flood-plains, and sensitive ecosystems) and manmade features (including landfills, disposal areas, and places of historic or archaeological significance). These ARARs generally restrict the concentration of hazardous substances or the conduct of activities based solely on the particular characteristics or location of the site.

Potential federal and state location-specific ARARs considered in connection with this response action include the following:

Federal:

- Executive Orders 11593, Floodplain Management (May 24, 1977), and 11990, Protection of Wetlands (May 24, 1977).
- National Historic Preservation Act (16 USC 470) Section 106 and 110(f) and the associated regulations (i.e. 36 CFR part 800) (requires federal agencies to identify all affected properties on or eligible for the National Register of Historic Places and consult with the State Historic Preservation Office and Advisory Council on Historic Presentation)
- Resource Conservation and Recovery Act (RCRA) Location Requirements and 100-year Floodplains (40 CFR 264.18(b)).
- Clean Water Act (CWA), Section 404, and Rivers and Harbor Act, Section 10 (requirements for Dredge and Fill Activities) and the associated regulations (i.e. 40 CFR part 230).
- Wetlands Construction and Management Procedures (40 CFR part 6, Appendix A).

New York State:

- New York State Freshwater Wetlands Law (New York Environmental Conservation Law (ECL) articles 24 and 71).
- New York State Freshwater Wetlands Permit and Classification Requirements (6 NYCRR 663 and 664).
- New York State Floodplain Management Act, ECL, article 36, and Floodplain Management regulations (6 NYCRR part 500).
- Endangered and Threatened Species of Fish and Wildlife, Species of Special Concern Requirements (6 NYCRR part 182).

- New York State Flood Hazard Area Construction Standards.

Based on SEAD-12 conditions and the land use determination, further consideration of these location-specific ARARs does not appear warranted at this time.

2.5.3 Action-Specific ARARs

Action-specific ARARs are usually technology or activity-based requirements or limitations that control actions involving specific substances. Action-specific ARARs generally set performance or design standards, controls, or restrictions on particular types of activities. To develop technically feasible alternatives, applicable performance or design standards must be considered during the development of all response action alternatives. The precise action-specific ARARs to be used for SEAD-12 will be subsequently determined by the Army based upon the technology chosen.

Potential federal and state action specific ARARs considered in connection with this response action include the following:

Federal:

- RCRA Groundwater Monitoring and Protection Standards (40 CFR, Subpart F).
- RCRA Generator Requirements for Manifesting Waste for Off-site Disposal (40 CFR part 262, subpart B).
- RCRA Transporter Requirements for Off-Site Disposal (40 CFR part 263).
- RCRA, Subtitle D, Non-Hazardous Waste Management Standards (40 CFR part 257).
- RCRA Land Disposal Restrictions (40 CFR part 268) (on and off-site disposal of excavated soil).
- CWA--Discharge to Public Owned Treatment Work (POTW)—general Pretreatment regulations (40 CFR part 403).
- Department of Transportation (DOT) Rules for Hazardous Materials Transport (49 CFR part 107, and 171.1-171.500).
- Occupational Safety and Health Act (OSHA) Standards for Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, and procedures for General Construction Activities (29 CFR parts 1910 and 1926).
- RCRA Air Emission Standards for Process Vents, Equipment Leaks, and Tanks, Surface Impoundments, and Containers (40 CFR subparts AA, BB, and CC.)

New York State:

- New York State Pollution Discharge Elimination System (SPDES) Permit Requirements (Standards for Stormwater Runoff, Surface Water, and Groundwater Discharges (6 NYCRR 750-757).
- New York State Solid Waste Management and Siting Restrictions (6 NYCRR 360-361).

- New York State RCRA Generator and Transporter Requirements for Manifesting Waste for Off-Site Disposal (6 NYCRR 364 and 372).

Based on SEAD-12 conditions and the land use determination, further consideration of these action-specific ARARs does not appear warranted at this time.

2.6 SITE-SPECIFIC CLEANUP GOALS

Remedial action at SEAD-12 is guided by the cleanup goal of removing all military related debris, the maximum dose limit of 10 mrem/yr above background according to NYSDEC Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01), and reducing potential risks to indoor air at Buildings 813/814 that may have been impacted by TCE in soil underneath the building foundation. These cleanup goals will have the effect of protecting human health and the environment, complying with ARARs, and meeting all other RAOs.

2.6.1 Groundwater Cleanup Goals

No further action is proposed for groundwater at SEAD-12 based on the following:

- Groundwater at SEAD-12 does not pose significant risk to potential receptors at SEAD-12 based on the planned future use of the SWMU.
- The SRI demonstrated that the TCE contamination detected at MW12-37 was isolated. Further, soil in the area with elevated TCE concentrations (i.e., above TAGM value) was excavated to the extent possible during the SRI. The SRI recommends no further action for groundwater.

As no further action is proposed for groundwater at SEAD-12, no cleanup goals need to be designated at this time.

2.6.2 Soil Cleanup Goals

Soil cleanup goals are not warranted for Disposal Pit A/B or Disposal Pit C and the rationale is presented below:

- Based on the RI, no significant risks to human health or the environment are expected at the three areas impacted to the greatest extent by former activities in the WSA - Former Dry Waste Disposal Pit area, Disposal Pit A/B, and Disposal Pit C.
- The purpose of the remedial action at Disposal Pit A/B and Disposal Pit C is solely to prevent access to military debris (the contents of the test pits in Disposal Pit A/B and Disposal Pit C are shown in **Table 2-3**).
- A comparison with the soil cleanup objectives presented under 6 NYCRR Subpart 375-6 indicates that soil conditions at Disposal Pit A/B and Disposal Pit C are consistent with the restricted commercial use requirements presented in 6 NYCRR Subpart 375-6. With a few exceptions, the average concentrations of all chemicals in these two areas are consistent with the unrestricted use requirements presented in 6 NYCRR Subpart 375-6. The few chemicals with exceedances all have average concentrations within three times of the soil cleanup objectives for unrestricted use under 6 NYCRR Subpart 375-6.

Based on the above facts, it is the Army's position that the cleanup goal for soil is to remove military-related debris at Disposal Pit A/B and Disposal Pit C. No chemical-specific cleanup goals are warranted at this time.

For Buildings 813/814 area, TCE contaminated soil in the vicinity of Buildings 813/814 was excavated to the extent possible during the SRI. Two alternatives are evaluated in this FS to eliminate potential risks to indoor air that may potentially be impacted by vapor intrusion. One alternative is to impose an environmental easement to ensure that an indoor air quality assessment would be required before any future building occupancy. The other alternative is to conduct a vapor intrusion study and if warranted based on the study, to demolish the buildings and excavate soil underneath the building foundation that contains elevated TCE concentrations. If the site remedy were selected to demolish Buildings 813/814 and to excavate soil underneath the building foundation, the NYSDEC SCO of TCE for unrestricted use (470 μg/kg) would be used as the soil cleanup goal for the selected remedy. Although the future use of the site is training, the unrestricted use SCO for TCE would be used such that future construction in this area would not be limited due to residual TCE levels in soil.

2.6.3 Radiological Goals

There were no radiological exceedances at SEAD-12. However, due to presence of military debris and the nature of work conducted with SEAD-12, precautions will be taken when dealing with excavated soil and debris. Excavated soil and debris will be scanned for radiological contamination, with the goal of ensuring that residual radioactivity levels remain below background. If radiological level is detected above background, isotope-specific DCGLs will be derived during the remedial process such that soil remaining at the SWMU does not exceed the 10 mrem/year above background criteria, which is established under NYSDEC Cleanup Guidelines for Soils Contaminated with Radioactive Materials (DSHM-RAD-05-01). The process described in MARSSIM will be used to develop the DCGLs for the worker scenario. First, activity concentrations over time equivalent to 10 mrem/yr exposure plus background will be calculated for each specified radionuclide of concern. These values will then be divided by a safety factor of 10 to account for uncertainty associated with potential cumulative effects from multiple radionuclides.

Radiological screening activities will consist of scanning and segregating materials with potentially elevated radiological levels; the screening will be done in layers that are no deeper than the screening instrument can efficiently detect. Preliminary screening flag values will be based on background measurements and a gross activity DCGL. If necessary, materials with potentially elevated radiological levels will be further screened on-site using gamma spectroscopy or at an off-site analytical laboratory.

Pursuant to the preceding ARAR analysis, further consideration of any additional chemical-specific, location-specific, or action-specific radiological ARARs does not appear to be warranted.

2.7 REMEDIATION VOLUME ESTIMATES

The RAOs for SEAD-12 are to achieve acceptable human health and environmental risk levels for the intended land use (institutional training) and compliance with ARARs. The BRA concluded that the risks to human health and the environment are acceptable for the intended land use.

The purpose of the remedial action is to remove debris with a potentially adverse effect (specifically military components) from the SWMU. Test pit results indicate that Disposal Pit A/B, as well as Disposal Pit C, contain a significant quantity of debris. The majority of the debris is construction related; however, some of the debris can be characterized as military related components. **Table 2-3** shows the contents of the test pits in the disposal areas. The boundaries of the areas to be remediated were determined by including test pits that contained debris and by including area that contains EM anomalies based on the EM survey. The EM data map is presented in **Figure 2-1**.

According to the test pit logs for Disposal Pit A/B, debris was found in all of the test pits in the area: TP12A-1, TP12-1, and TP12-2, as shown in **Figure 2-2**. A significant portion of this debris consists of military components, and, consequently, should be removed. **Figure 2-3** shows the boundary of the area surrounding Disposal Pit A/B that will be remediated. This area includes the test pits and is defined by the electromagnetic survey results. It covers a surface area of 22,500 square feet (sf) with an average depth of 6 feet. The affected volume is approximately 5,000 cubic yards (cy). Based on the percentage of debris from the RI test pitting activity (as shown in **Appendix A**, **Table A-3a**), 10% of the volume of the test pits was debris. Therefore, the volume of debris is estimated to be approximately 500 cy. The southernmost portion of Disposal Pit A/B potential release area boundary (which is outside the area to be excavated as shown in **Figure 2-2**) does not require remediation. This is based on the results of the EM survey which indicated this area was undisturbed and that Disposal Pits A/B did not extend this far to the south.

Disposal Pit C contains fourteen test pits within this area, shown in **Figure 2-4**. Military components were only found in five of the test pits. Based on the locations of the military debris, two regions were highlighted for remedial action. The first area in the northern part of the disposal pit includes TP12-8, TP12A-7, TP12-7B, TP12A-6, TP12-7A, TP12A-5, TP12-5, and TP12-23. The second area includes TP12A-4, TP12-3 (North and South), TP12-4, and TP12A-3. The electromagnetic survey map, **Figure 2-5**, shows that EM anomalies overlap with the locations of the military debris. Combining the locations of the military debris and the EM anomalies, the area to be remediated is presented in **Figure 2-5**. Area 1 in the northern part of Disposal Pit C covers approximately 13,200 sf and has a volume of 2,000 cy, 30% of which is debris (600 cy). In the southern portion of the disposal pit, Area 2 covers about 27,000 sf and has a volume of 7,000 cy, 10% of which is debris (700 cy). The combined surface area of these two areas is 40,200 sf. The total volume affected in Disposal Pit C is approximately 9,000 cy, and the volume of debris to be removed is approximately 1,300 cy.

Table 2-4 summarizes the dimensions of soil and debris to be remediated in Disposal Pit A/B and in Disposal Pit C.

2.8 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

2.8.1 Identification of Technologies

Remedial action technologies and processes were identified for consideration as possible remedial options at SEAD-12. The list of technologies and processes presented was developed from several sources including standard engineering handbooks, vendor information, and best engineering estimates.

2.8.2 Screening of Technologies

Table 2-5 shows the remedial action processes arranged according to categories for general response actions for soil/debris at SEAD-12 and provides the basis for screening out of the various technologies/processes. This table indicates which technologies/processes were retained for further evaluation in **Section 3.0**.

Screening criteria included: technical feasibility, effectiveness, and its ability to meet the RAOs and its suitability considering SEAD-12 conditions. Processes that are shaded were screened out for the reasons described under "screening comments." Only those technologies retained for further consideration are described below.

The following remedial technologies and processes were retained for further evaluation and use in the development of soil/debris remedial alternatives:

- No-Action;
- Land Use Controls (LUCs);
- Capping and Containment;
- Excavation: earthmoving/excavation;
- Ex-situ treatment: physical separation;
- Solids handling: RCRA Subtitle D landfills; and
- Building demolition.

<u>No-Action</u>

The No-Action response may be appropriate for sites where natural environmental mechanisms will result in degradation or immobilization of the constituents of concern or where the human health and environmental risks are acceptable. Although this remedial action will not meet the RAOs for preventing access to military debris and reducing potential risks via exposure to indoor air in Buildings 813/814, it provides the baseline against which other alternatives can be compared.

<u>LUCs</u>

LUCs that have been considered include:

- Access controls, such as fencing; and

- Land use restrictions (e.g., environmental easements).

LUCs are only applicable to the receptor and do not involve reductions in the volume, toxicity, or control of wastes at the SWMU. Physical barriers that restrict access to the SWMU are feasible and effective in preventing humans from becoming exposed to on-site impacts. Since there are potential risks for human exposure to indoor air that may potentially be impacted by TCE in soil underneath Buildings 813/814, access controls and land use restrictions have been retained but incorporated for use with other remedial alternatives.

Based on the results of the SRI, an environmental easement to restrict occupancy of Buildings 813/814 is retained for evaluation. Elevated TCE concentrations (i.e., above the TAGM value and the NYSDEC SCO for unrestricted use) were detected at the footers of Building 813. Because of this both EPA and NYSDEC were concerned about the quality of indoor air within the buildings. Since there are no utilities running to the buildings and no users have been identified for the buildings, an indoor air survey was not warranted. However, NYSDEC in its comments dated July 24, 2006 on the SRI report recommended an environmental easement to place a restriction on Buildings 813/814. The Army considers this LUC as one of the alternatives in the FS. The environmental easement would state that an investigation of vapor intrusion potential and indoor air quality must be performed before Buildings 813/814, or any newly constructed buildings, are occupied. It will be the responsibility of the future owner to perform such testing and implement any required mitigation prior to use.

According to 6 NYCRR Subpart 375-1.2, an environmental easement "*means an interest in real property, created under and subject to the provisions of ECL article 71, title 36 which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls; provided that no such easement shall be acquired or held by the State which is subject to the provisions of article fourteen of the constitution of the State of New York*". NYSDEC Regulations 6 NYCRR Subpart 375-1.8 (h)(2)(i) states that

"Any institutional controls, engineering controls, use restrictions and/or any site management requirements applicable to the remedial site will be contained in an environmental easement, which shall be:

(a) created and recorded pursuant to ECL article 71, title 36;

(b) in a form and manner as prescribed by the Commissioner;

(c) in compliance with GOL 5-703(1) and ECL 71-3605(2); and

(d) recordable pursuant to RPL 291."

The environmental easement for SEAD-12 would be implemented in accordance with the NYSDEC regulations and would state that an investigation of vapor intrusion potential and indoor air quality must be performed before Buildings 813/814, or any newly constructed buildings in the area, are occupied.

2.8.3 Capping and Containment

Capping involves placing a barrier over the impacted area to prevent contact (i.e. exposure to military debris via direct contact and dust inhalation) with human and ecological receptors, and surface water runoff. A soil cap and an impermeable cap were considered in the evaluation.

A soil cap involves placing a layer of soil over the affected areas. The cap would be of sufficient depth and quality to reduce infiltration and promote grass cover. The cap would control the exposure from inhalation of soil dust, prevent runoff of impacted particles and prevent exposure to humans and ecological receptors due to direct contact with military debris. Therefore, a soil cap would be effective in reducing the potential exposure to military debris and therefore has been retained for further consideration.

Impermeable caps typically have permeabilities less than 1×10^{-7} centimeters per second (cm/sec) and substantially reduce the amount of water infiltration to the underlying soils. An impermeable material includes clay, geomembrane (such as High Density Polyethylene [HDPE]), geocomposite clay liner (GCL), and bentonite admixture. Impermeable caps typically include a drainage and a vegetative layer. Impermeable caps would be effective in reducing the exposure to military debris and therefore has been retained for further consideration.

2.8.4 Excavation: Earthmoving/Excavation

Removal of soils/debris can be accomplished using standard mechanical technologies or slurry methods. Heavy equipment such as backhoes, excavators, front-end loaders, scrapers, bulldozers, and draglines are commonly used for the mechanical excavation of soils/debris. Because the soil/debris at SEAD-12 are readily accessible and can be easily removed using standard mechanical excavation techniques, this technology was retained for further consideration. Excavation would remove designated volumes of military debris and associated soil for disposal. Excavation would also be used to remove soil impacted by TCE from Buildings 813/814 area after the building demolition.

2.8.5 Ex-Situ Treatment: Physical Separation

Physical separation of military debris from soil will be achieved using standard construction equipment. After the separation, the military debris will be disposed off-site and soil will be backfilled to the excavated areas.

2.8.6 Solids Handling: RCRA Subtitle D Landfills

Off-site disposal involves removal of material, consolidation into containers, and transportation off-site. All excavated areas will be backfilled with clean imported fill or excavated soil. This technology decreases continued on-site exposure to military debris by receptors. Off-site disposal is preferable when on-site disposal is precluded or limited by site characteristics, when unimpaired future use of the site is a high priority, and when the volume for disposal is too small to warrant construction of a landfill.

Off-site disposal of military debris is a feasible option. A permitted, off-site RCRA Subtitle D facility with the capacity and capability to handle the disposal material must be identified.

2.8.7 Building Demolition

Building structures could be demolished using excavators equipped with buckets, grapples, shears and/or hydraulic hammers. The buildings will be demolished to the building slab or the existing grade common to the area.

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

3.1 INTRODUCTION

This section summarizes the remedial action alternatives that were developed from the technologies screened in **Section 2.0**. Prior to the development of alternatives, an evaluation of general response actions and a technology screening was performed for inclusion into proposed remedial action alternatives for SEAD-12. Technologies were combined into alternatives considering potential waste-limiting and site-limiting factors unique to SEAD-12 and the level of technical development for each technology. This information was used to differentiate alternatives with respect to effectiveness and implementability.

3.2 ASSEMBLY OF ALTERNATIVES

The following general response actions were retained for SEAD-12:

- No-action;
- Excavation, off-site disposal, and an environmental easement;
- On-site capping and containment and an environmental easement; and
- Excavation, off-site disposal, and vapor intrusion study and building demolition for unrestricted use.

Technologies and processes associated with these actions were assembled into remedial action alternatives and are presented in **Table 3-1**.

3.3 DESCRIPTION OF ALTERNATIVES

3.3.1 Alternative 1, No-Action Alternative

Alternative 1 is the no-action alternative. CERCLA and NYSDEC guidance for conducting feasibility studies recommends that the no-action alternative be considered against all other alternatives.

The no-action alternative would leave the disposal pits undisturbed with continuation of existing site security measures, to prevent civilian access and direct contact with debris. No additional access control will be placed on Buildings 813/814.

3.3.2 Alternative 2, Excavation/Disposal in Off-Site Landfill/Environmental Easement

Alternative 2 involves excavation of the disposal areas and disposal of military debris in an off-site landfill. The rationale for this excavation alternative is that it is effective for achieving remedial action objectives, is readily implementable, and will be cost effective for managing the remaining military debris at SEAD-12. Off-site disposal at a Subtitle D landfill eliminates human access to the military debris. Military items present could be potentially classified or sensitive and would need to be examined by appropriate military personnel for evaluation and declassification. Excavation, hauling, and disposal involve a combination of technologies that are readily available, proven, and effective at eliminating the debris from the area. Alternative 2 would remove and control the military items buried at the SWMU.

In addition, an environmental easement will be included in this alternative to place a restriction on Buildings 813/814. The easement will state that an investigation of vapor intrusion potential and indoor air quality must be performed before the buildings, or any newly constructed buildings in the vicinity, are occupied.

3.3.3 Alternative 3, Capping/Containment/Environmental Easement

Alternative 3 consists of the placement of a soil cap over the disposal areas. The soil cap would consist of the following:

- Six inches topsoil;
- Six inches common fill (i.e., clean imported soil); and
- Filter fabric (*i.e.* separation layer).

The intent of this alternative is to isolate the debris from any receptors. This alternative would place limitations on the future land use. The use of institutional controls (such as a permanent fence) will be required for this alternative.

An environmental easement will be included in this alternative to place a restriction on Buildings 813/814. The easement will state that an investigation of vapor intrusion potential and indoor air quality must be performed before the buildings, or any newly constructed buildings in the vicinity, are occupied.

3.3.4 Alternative 4, Excavation/Disposal/Building Demolition for Unrestricted Use

Alternative 4 would restore the SWMU for unrestricted use for future users. No environmental easement would be needed. A vapor intrusion study, demolition of Buildings 813/814 (if warranted), and disposal of the demolition debris is proposed for this alternative to replace the environmental easement for Buildings 813/814 in Alternative 2. This alternative addresses Disposal Pits A/B and Disposal Pit C as described in Alternative 2.

The vapor intrusion study would assess indoor and outdoor air quality at Buildings 813/814 and include sub-slab soil gas sampling. This study would determine the need for action associated with Buildings 813/814. A probable action that would alleviate the need for LUCs (i.e., building demolition and soil excavation and disposal) has been included in this alternative.

If warranted based on the vapor intrusion investigation results, Buildings 813 and 814 will be demolished. Soil underneath the foundation of Building 813 where elevated TCE concentrations were detected will be excavated. The building material and soil will be disposed at a regulated landfill.

3.4 SCREENING CRITERIA

The alternatives assembled above were screened for short-term and long-term effectiveness and implementability. This screening process is used to select the most favorable alternatives for a detailed analysis. Although this is a qualitative screening, care has been taken to ensure that screening criteria are applied consistently to each alternative and that comparisons have been made on an equal basis, at approximately the same level of detail.

3.4.1 Effectiveness

A key aspect of the screening evaluation is the effectiveness of each alternative in protecting human health and the environment. This screening criterion includes the evaluation of each alternative for its relative protectiveness and reductions in toxicity and mobility. The following items are evaluated:

- Short-term human health and environmental protectiveness: Rating the potential for the remedial action to affect human health and the environment during remedial action. Both on- and off-site exposures are considered under this criterion. Exposure routes include inhalation, ingestion, and dermal absorption.
- Long-term human health and environmental protectiveness: Rating the effectiveness of the remedial action to alleviate adverse human health and environmental effects after the remedial action is complete. The ability of an alternative to minimize future exposures is considered under this criterion.
- Reduction of mobility, toxicity, or volume of waste: Rating of effectiveness in changing one or more characteristics of the medium by treatment to decrease risks associated with chemical constituents present.
- Permanence: Rating of the adequacy and suitability of controls, if any, that are used to manage treatment residuals or untreated wastes that remain at the site. Factors considered are the adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste. This factor addresses in particular the uncertainties associated with land disposal for providing long-term protection from residuals; the assessment of the potential need to replace technical components of the alternative, and the potential exposure pathways and risks posed should the remedial action need replacement.

3.4.2 Implementability

Implementability is a measure of both the technical and administrative feasibility of constructing and operating a remedial action alternative. The following items are evaluated:

- Technical feasibility: Rating of the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete. That also includes monitoring of the alternative, if required, after the remedial action is complete.
- Administrative feasibility: Rating of the ability to obtain approvals from regulatory agencies and the Army; the availability of treatment, storage, and disposal services; and the requirements for, and availability of, specific equipment and technical specialists.

- Availability of services and materials: Rating of the availability of the materials and services required to implement an alternative. The following factors were taken into account for the screening: the availability of adequate offsite treatment, storage capacity, and disposal services; availability of personnel and technology; availability of prospective technologies; and availability of services and materials required to implement the technology.

3.4.3 Numeric Rating System

Alternatives were assigned a ranking from one (1) to six (6) for each screening criterion. A score of 1 represents the least favorable alternative and a 6 represents the most favorable alternative. The total score for all criteria served as the basis for the screening of all alternatives. The assigned rankings were based on professional engineering judgment, available technical information, and the inherent characteristics of each of the alternatives. The individual criterion values were summed for each alternative and the total score was then used as the basis for retaining alternatives for a detailed analysis.

3.5 ALTERNATIVES SCREENING

Table 3-2 summarize the assigned rankings for each of the alternatives considered. Screening was conducted by considering each alternative independently. The first step was to review each alternative and identify the alternatives that are considered the most and least favorable. The values were applied consistently to each alternative on a column-by-column basis. Other alternatives were then assigned values based on their relative ranking. The following subsections present the rationale used to assign values to each alternative.

3.5.1 Effectiveness

3.5.1.1 Short-Term Human Health and Environmental Protectiveness

Since risks for receptors under current and intended future land uses do not exceed EPA target risk criteria, the no-action alternative (Alternative 1) is considered the most protective of human health in the short term and was assigned a ranking of 6. Restricted access to the SWMU would limit the potential for exposures to military debris at Disposal Pit A/B and Disposal Pit C. The alternative would not reduce potential risk via exposure to the indoor air in Buildings 813/814.

Compared to the no-action alternative, the environmental easement would potentially reduce the short-term human health risk via indoor air exposure. But Alternative 2 involves excavation of soil/debris. Excavation would increase short-term risks to workers relative to no-action, even with use of dust controls and personal protection equipment, due to the increase in concentrations of airborne soil particulates.

Alternatives 3 (capping/containment/easement) was given a higher ranking than Alternative 2 because it does not expose the contaminated soils/debris to the atmosphere and therefore would not create airborne particulates. The soils would be capped in place and would prevent erosion and further human exposure to airborne particulates. Some disturbance and potential release of surface soils may occur during the process of installing the cap. The environmental easement would potentially reduce the short-term human health risk via indoor air exposure compared to the no-action alternative.

Alternative 4 (excavation/disposal/building demolition for unrestricted use) was ranked the lowest in this category as it not only involves excavation of soil/debris, but it also includes the demolition of Buildings 813/814. Excavation and building demolition would increase short-term risks to workers relative to no-action, even with use of dust controls and personal protection equipment, due to the increase in concentrations of airborne soil particulates.

3.5.1.2 Long-Term Human Health and Environmental Protectiveness

Alternative 1 (no-action) was given the lowest overall ranking in this category because it does not provide any active treatment or monitoring of debris in soils. Likewise, access to Buildings 813/814 would not be prevented.

Alternative 2 (excavation/off-site disposal/easement) and Alternative 4 (excavation/disposal/building demolition for unrestricted use) were given the highest overall ranking in this category because both alternatives effectively remove military debris in soil, and provide disposal in a regulated landfill. In addition, the alternatives ensure no significant risks associated with exposure to indoor air in Buildings 813/814 by either imposing the environmental easement or by performing the vapor intrusion study and by conducting Buildings 813/814 demolition, if warranted, based on the vapor intrusion study.

Alternative 3 (capping/containment/easement) scored lower than Alternatives 2 and 4 because it relies on a physical barrier (cap) to prevent potential exposures to military debris. The integrity of this barrier must be monitored and maintained to ensure its effectiveness. In addition, the environmental easement would prevent access to Buildings 813/814.

3.5.1.3 Reduction of Toxicity

All four alternatives were assigned a low score of 1 for this category because none of these remedial action alternatives would actually reduce the toxicity that may be associated with military debris. An environmental easement in Alternatives 2 and 3 would not reduce any potential toxicity present in the indoor air at Buildings 813/814. The building demolition in Alternative 4 would not reduce any toxicity present in soil underneath the Buildings 813/814 foundation.

3.5.1.4 Reduction of Mobility

The no-action alternative (Alternative 1) was ranked the lowest in this category because this alternative would not reduce the mobility of the military debris in soils or reduce the TCE levels in soil beneath Buildings 813/814.

Capping in place using a soil cover with geotextiles (Alternative 3) would not reduce the mobility of the military debris in soil. Likewise, the environmental easement would not reduce any potential mobility of contaminants in soil at Buildings 813/814 area. Consequently, this alternative was ranked the same as the no-action alternative.

Alternative 4 (excavation/disposal/building demolition for unrestricted use) was ranked the highest overall in this category because it would remove the military debris and place it in a disposal facility designed for its containment. Any potential hazards associated with the debris, would be adequately contained and therefore the mobility of such hazards would be further decreased. In addition, Buildings 813/814 would be demolished, if warranted based on the vapor intrusion study, and the TCE levels in soil would be reduced to meet the SCOs for the unrestricted use scenario before the associated soil would be backfilled.

The excavation/off-site disposal/easement alternative (Alternative 2) was ranked the second highest overall in this category because it would remove the military debris and place it in a disposal facility designed for its containment. Any potential hazards associated with the debris, would be adequately contained and therefore the mobility of such hazards would be further decreased. The environmental easement would not reduce any potential mobility of contaminants in soil in the Buildings 813/814 area.

3.5.1.5 Reduction of Volume

Both the no-action alternative (Alternative 1) and the capping/containment/easement alternative (Alternative 3) were assigned the lowest ranking for reductions of volume. Excavation/off-site disposal/easement (Alternative 2) and excavation/disposal/building demolition for unrestricted use (Alternative 4) were assigned a higher ranking because significant reductions in volume would be achieved from the soil/debris separation step. The environmental easement included in Alternative 2 and building demolition and soil excavation included in Alternative 3 would not reduce the volume of contaminated material in soil.

3.5.1.6 Permanence

The no-action alternative (Alternative 1) ranked the lowest for permanence and the excavation/disposal/building demolition for unrestricted use was assigned the highest ranking. While excavation does not satisfy the EPA and NYSDEC preference for a permanent and significant decrease in volume, toxicity, or mobility, it does provide adequate and reliable controls through the landfilling of debris in a secure landfill. The excavation/off-site disposal/easement alternative (Alternative 2) was assigned the second highest ranking as the environmental easement that would be imposed on Buildings 813/814 is not considered a permanent solution. The capping/containment/easement alternative (Alternative 3) was ranked lower than Alternative 2 in this category because it does not provide the same level of controls or reductions.

3.5.2 ARAR Compliance

All alternatives would meet the chemical-specific, location-specific, and action-specific ARARs.

3.5.3 Implementability

3.5.3.1 Technical Feasibility

The no-action alternative (Alternative 1) was ranked the highest in this category because it requires no construction or operation activities, no monitoring, and is the easiest to implement. The capping/containment/easement alternative (Alternative 3) was ranked the lowest in this category because it has the least reliability and the greatest monitoring considerations. Alternative 2 (excavation/off-site disposal/easement) and Alternative 4 (excavation/disposal/building demolition for unrestricted use) were ranked higher than Alternative 3 because they are more reliable in achieving the performance goals and have less monitoring considerations.

3.5.3.2 Administrative Feasibility

The no-action alternative (Alternative 1) was assigned the lowest ranking in this category because it would be the least likely to comply with applicable rules, regulations, and statutes and it would be least likely to receive approval from other offices and agencies. The excavation/off-site disposal/easement (Alternative 2) and the excavation/disposal/building demolition for unrestricted use (Alternative 4) received the highest ranking because both alternatives would be the most likely to receive approval. From the Army's standpoint, the removal of items that may still be classified or sensitive is necessary and would only be accomplished through Alternative 2 and Alternative 4.

3.5.3.3 Availability of Services and Materials

The no-action alternative (Alternative 1) was assigned the highest ranking in this category and both the excavation/off-site disposal/easement (Alternative 2) and excavation/disposal/building demolition for unrestricted use (Alternative 4) were assigned the lowest ranking due to the fact that a remote disposal place might need to be identified for potential radioactive debris. The capping/containment/easement (Alternative 3) was ranked the second highest in this category.

3.5.4 Screening Results

The excavation/disposal/building demolition for unrestricted use (Alternative 4) received the highest overall ranking with a total score of 30 points. The excavation/off-site disposal/easement alternative (Alternative 2) received the second highest overall ranking with a total score of 29 points. The no-action alternative (Alternative 1) received the next highest overall score of 24 and the capping/containment/easement alternative (Alternative 3) was ranked the lowest of the alternatives with a total score of 22. Since the capping/containment/easement alternative was ranked lower than the no-action alternative, it was screened out from further consideration. Alternatives 1, 2, and 4 were retained for a detailed evaluation.

4.0 DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

4.1 INTRODUCTION

In this section, a more detailed description of the three retained alternatives is presented. A discussion of the alternatives with respect to overall protection of human health and the environment; ARAR compliance; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost is presented. The two modifying criteria of the remedy selection process (state/agency acceptance and community acceptance) will be fully assessed following the comment period for the FS report and the Proposed Plan. The selected alternative will be further refined as necessary during the design phase.

The analysis of each alternative with respect to overall protection of human health and the environment provides an evaluation of how the alternative reduces the risk from potential exposure pathways and meets the remedial action objectives. Cleanup goals presented in **Section 2.0** were proposed by the Army to protect human health and the environment. Final cleanup goals for SEAD-12 will be established among NYSDEC, the USEPA, and the Army.

The analysis of each alternative with respect to ARAR compliance provides an evaluation of whether the alternative complies with the list of ARARs presented in **Section 2.0**.

Long-term effectiveness and permanence are evaluated with respect to the magnitude of residual risk remaining from untreated waste or treated residuals after the remedial action is complete, and the adequacy and reliability of controls used to manage remaining waste (untreated waste and treatment residuals) over the long-term.

The discussion of the reduction of toxicity, mobility, or volume through treatment addresses the anticipated performance of the treatment technologies involved with an alternative. This evaluation relates to one of the requirements by CERCLA and NYSDEC that a selected remedial action employs treatment to reduce the toxicity, mobility, or volume of hazardous substances as a principle element. The evaluation will determine the amount of waste treated or destroyed, the expected degree of reduction of toxicity, mobility, or volume, and the type and quantity of treatment residuals that remain following treatment.

Evaluation of alternatives with respect to short-term effectiveness takes into account protection of workers and the community during the remedial action, environmental impacts from implementing the action, and the anticipated time required to achieve cleanup goals.

The analysis of implementability deals with the technical and administrative feasibility of implementing the alternatives and the availability of necessary materials and services. This criterion includes the ability to construct and operate components of the alternatives; the availability of adequate off-site treatment, storage, and disposal services; the availability of services, equipment, and specialists; the ability to monitor the effectiveness of remedial actions; and the ability to obtain necessary regulatory approvals.

Detailed cost estimates are presented in **Appendix A** for the retained alternatives. The costs are based on quotes from area suppliers, generic unit costs, vendor information, conventional cost estimating guides, and prior experience. The cost estimates presented have been prepared for guidance in project evaluation. The actual costs of the project will depend on true labor and costs of materials at the time of construction, actual SWMU conditions, competitive market condition, final project scope, and other variables.

Construction costs include those expenditures required to implement a remedial action. Both direct and indirect costs are considered in the development of construction cost estimates. Direct costs include construction costs or expenditures for equipment, labor, and materials required to implement a remedial action. Indirect costs include costs associated with engineering, permitting, construction management, and other services necessary to carry out a remedial action. Soil monitoring costs were also estimated.

4.2 ANALYSIS OF ALTERNATIVE 1: NO-ACTION

4.2.1 Definition of Alternative 1

This alternative has been retained and will be used as a baseline for comparison with the other alternatives developed as part of this feasibility study.

4.2.2 Short-Term Effectiveness and Protection of Human Health and the Environment

The no-action alternative would provide good short-term effectiveness and protection of human health and the environment because it does not involve any remedial response actions. Consequently, there would be no adverse human health or environmental impacts from the implementation of response actions.

4.2.3 Reduction of Toxicity, Mobility, or Volume

The no-action alternative would not significantly reduce the toxicity, mobility, or volume of wastes in soils at SEAD-12. This alternative does not meet the EPA and NYSDEC preference for treatment that significantly and permanently reduces toxicity, mobility, or volume of wastes as a principal element.

4.2.4 Long-Term Effectiveness and Permanence

The no-action alternative does not provide good long-term effectiveness and permanence because it does not reduce the level of risks and does not provide adequate or reliable controls for continued protection of human health or the environment. Although the baseline human health risk assessment conducted under the RI did not show unacceptable risk, debris at Disposal Pit A/B and Disposal Pit C could pose a potential hazard if accessed in the future and should not remain at SEAD-12. Likewise, although there are no future users designated at Buildings 813/814 under the current plan for future land use, this alternative would not prevent users from occupying Buildings 813/814 without first conducting an indoor air assessment. This alternative would not significantly reduce the magnitude of these potential risks and would not provide the types of controls (institutional or removal) necessary to ensure that the residual risks would not exceed the risk criteria/goals established for this project.

4.2.5 Compliance with ARARs

This alternative would comply with all chemical-specific and location-specific ARARs listed in **Section 2.0**. The action-specific ARARs do not apply.

4.2.6 Implementability

This category considers the technical and administrative feasibility and availability of services and materials. The no-action alternative does not involve any construction or operation activities at the SWMU and consequently is not evaluated for these criteria.

4.2.7 Costs

There are no costs associated with the no-action alternative.

4.3 ANALYSIS OF ALTERNATIVE 2: EXCAVATION/DISPOSAL/EASEMENT

4.3.1 Definition of Alternative 2

This option consists of excavation of portions of Disposal Pit A/B and Disposal Pit C. **Figure 4-1** shows the decision process for how waste would be sorted and disposed once excavated from the SWMU. Soil and debris would be stockpiled in a bermed staging area. If necessary, debris will be segregated from the soils through use of a vibratory screen. All debris will be screened by Army personnel to determine if parts or components are classified. Classified parts will be disposed of at Army designated locations. In addition, debris will be scanned for the presence of radioisotopes. Any debris found to be radioactive during scanning or known to be a source of radioactivity would be sent to a facility authorized to accept such materials. Out-of-state disposal facilities have been identified to accept such materials and therefore interstate travel may be required for this alternative. Any debris free of radioactivity will be recycled or disposed of in a Subtitle D, industrial landfill. A Subtitle D landfill refers to a solid waste landfill that meets the NYSDEC and EPA Subtitle D landfill construction specifications.

An excavation plan will be developed using previous RI data to delineate the extent of removal. The data indicate that the soil/debris to be removed is limited to the areas described in **Section 2.7**. The volumes of soil to be excavated are described in **Table 2-4**. The total volume of soil to be excavated is approximately 14,000 cubic yards. The excavation will be accomplished with standard construction equipment, such as a front-end loader or backhoe. Based on the groundwater level at SEAD-12 and the Army's construction experience at the Depot, dewatering is not anticipated at SEAD-12 during the excavation due to the tight formation and schedule intent to construction work during the drier part of the year.

Soils excavated from SEAD-12 would be scanned for high and low energy gamma radiation. Soil would be placed into one of two stockpiles and screened prior to stockpiling. If the soil exhibits radiation greater than the background it would be placed in one pile; soils exhibiting radiation equal to or less than background would be placed in a separate pile. Samples will be collected from the soil pile exhibiting radiation greater than the background and submitted to a laboratory for analysis for radionuclides. The analytical results will be compared to the DCGLs to determine the soils' use as fill rather than disposing of it as waste. If levels of radionuclides meet the project cleanup goals, soil would be backfilled into the excavation pit.

Although not anticipated, if soil samples indicate that radioisotopes exist in soil above the cleanup goal (i.e., 10 mrem/yr dose limit above background), they will be transported to a facility licensed to accept this material. For evaluation purposes, it is assumed that soil having elevated radioisotopes will be transported to a licensed radiological waste facility that accepts bulk waste shipments of low-level radioactive waste material.

The final step in this alternative is disposal of the excavated debris. These materials will be considered solid waste subject to RCRA Subtitle D and New York State solid waste regulations. In New York, all sanitary landfills are authorized to accept debris, and, therefore, would be able to accept the materials excavated from the SWMU. These landfills cannot accept radiological waste, and therefore debris would be scanned for high and low energy gamma radiation. The actual testing requirements vary from landfill to landfill, and the exact requirements for this remedial action will be specified once a landfill is selected.

Two Subtitle D landfills that may be used for this remedial action have been identified. The first is the Seneca Meadows landfill located in Waterloo, New York, approximately 10 to 15 miles from the SWMU. The second option is Ontario County Landfill in Flint, New York; approximately 30 miles from the SWMU. Other equivalent approved licensed off-site facility can be used for disposal of the excavated materials from the site. Low level radioactive soils and debris may be transported to Waste Control Specialists in Andrews, Texas. Similar waste was transported to this site from SEAD-48.

In addition, an environmental easement will be included in this alternative to place a restriction on Buildings 813/814. The easement will state that an investigation of vapor intrusion potential and indoor air quality must be performed before the buildings, or any newly constructed buildings in the vicinity, are occupied.

4.3.2 Short-Term Effectiveness and Protection of Human Health and the Environment

Potential short-term impacts to the community from this alternative include:

- Off-site generation of dusts and particulates during excavation, treatment, and hauling; and
- Increased traffic in the area from hauling activities.

Continuous monitoring of airborne dusts and particulates will be performed during excavation and pre-treatment activities. The increase in truck traffic would increase the potential for off-site accidents and will be considered during the planning of the remedial action. This is not considered to be a significant issue since the area surrounding SEDA is primarily agricultural and sparsely populated. Care will be taken to assure that the trucks are not overloaded. The soil/debris will be covered with a tarp during transport to ensure that no dust is released.

The major routes of exposure to on-site workers during excavation are direct contact with the affected soil/debris and inhalation of particulates. Protection from exposure can be maximized through site access controls and the use of proper protective equipment for workers, such as dust masks (or other form of respiratory protection) and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of particulates. Standard wetting techniques or other dust suppression methods may be used to minimize airborne dusts and particulates.

Potential environmental impacts are surface runoff and airborne dusts and particulates. Silt fencing and/or hay bails may be used to minimize surface runoff from the excavation face and pre-treatment and stockpile areas. Standard dust suppression techniques include wetting and foam dust/vapor suppressants.

The time to complete the excavation, characterization, and disposal activities is not expected to be greater than 2 months.

4.3.3 Reduction of Toxicity, Mobility, or Volume

Overall, this alternative would be very effective in reducing debris volume and the mobility of the constituents potentially present in the debris at the SWMU. The debris will be consolidated and placed in a secure off-site landfill.

4.3.4 Long-Term Effectiveness and Permanence

The criteria for evaluating long-term effectiveness includes:

- Permanence;
- Magnitude of remaining risk;
- Adequacy of controls; and
- Reliability of controls.

This alternative is considered a permanent remedy for SEAD-12 with the exception of the Buildings 813/814 area since all debris would be removed from the soils and placed in a secure off-site landfill. The magnitude of remaining risk would be below acceptable criteria for human health and the environment. The adequacy and reliability of controls for continued protection of human health and the environment from the debris disposed off-site, are those monitoring controls required by the state of New York for secure Subtitle D solid waste landfills or from radiation licensed facilities.

Military items buried at the SWMU may be classified or sensitive. This alternative enables the Army to remove and examine these items so they may be properly evaluated, declassified, and disposed of.

An environmental easement provides a control on access to Buildings 813/814 and ensures that any potential future land owner considering occupancy of these buildings, first conducts an indoor air assessment.

4.3.5 Compliance with ARARs

Alternative 2 will comply with all chemical-specific, action-specific, and location-specific ARARs identified in **Section 2.0**.

4.3.6 Implementability

4.3.6.1 Technical Feasibility

The technical feasibility of implementing this alternative is rated as high. This alternative uses standard and proven construction techniques and would have a high degree of reliability in meeting the technical specifications and construction and operating requirements.

4.3.6.2 Administrative Feasibility

The administrative feasibility of this alternative is considered good. The necessary permits and approvals required for this alternative should be attainable in a reasonable amount of time to implement the alternative.

Coordination with the various regulatory agencies is also important. The Army has coordinated the entire remedial program with both EPA and NYSDEC, and will consider input from both these agencies in the final remedy selection. It is anticipated that any issues arising with the regulatory agencies will be addressed prior to remedy selection.

4.3.6.3 Availability of Services and Materials

All of the equipment and services required for implementation of this alternative are currently readily available from a number of qualified contractors. Radiologically-impacted debris and soils, if found during the remedial action, will need to be disposed at an out-of-state disposal facility, such as Waste Control Specialists in Andrews, TX, and interstate travel may be required.

4.3.7 Costs

4.3.7.1 Capital Costs

Capital costs for remedial design, excavation, off-site disposal of debris, and on-site backfilling of soil were developed using previous remediation estimates for work conducted at the Seneca Army Depot. **Appendix A** shows the cost backup detail and the MCACES cost summaries. The estimated capital cost for debris excavation from Disposal Pits A/B and C and disposal is $2,371,000. This cost includes contractor markup costs as shown in **Table 4-1**.

4.3.7.2 O&M Costs

The annual O&M cost was estimated at $3,000 for the environmental easement. The present worth cost for the environmental easement for the Buildings 813/814 area is approximately $74,000, which was calculated using a discount rate of seven percent (7%) and a 30-year time interval.

4.3.7.3 Present Worth Costs

The total present worth costs for this alternative were estimated at $2,445,000 ± 25-50%.

4.3.8 Schedule

The soil/debris excavation and disposal will be performed in the fall of 2008. The remedial action will take approximately 2 months to complete.

4.4 ANALYSIS OF ALTERNATIVE 4: EXCAVATION/DISPOSAL/BUILDING DEMOLITION FOR UNRESTRICTED USE

4.4.1 Definition of Alternative 4

Alternative 4 would restore SEAD-12 for unrestricted use by future site users. This alternative consists of all the elements of Alternative 2 except the environmental easement. A vapor intrusion study, demolition of Buildings 813/814 (if warranted), and disposal of the demolition debris and excavated soil are included in the alternative to replace the environmental easement required in Alternative 2. The elements of Alternative 2 are discussed in **Section 4.3.1**. The vapor intrusion study would assess indoor and outdoor air quality and include sub-slab soil gas sampling. This study would determine the need for action associated with Buildings 813/814. A probable action that would alleviate the need for LUCs (i.e., building demolition and soil excavation and disposal) has been included in this alternative.

The purpose of the vapor intrusion investigations is to determine whether the potential for vapor intrusion to the indoor environment exists and to evaluate other contributing factors that may play a role in the volatile vapors inside of Buildings 813 and 814, if any. The vapor intrusion study would consist of completing a building inventory inspection for Buildings 813/814 and cleaning the buildings. Following the inspection, sources or potential sources will be removed from the buildings and surrounding area (or otherwise mitigated) to the extent practicable. Because soil gas samples have already been obtained around the building foundation, no soil gas samples outside the building footages are planned for this investigation. Direct measurements of VOCs in sub-slab vapors below the building foundations along with indoor and outdoor air will be obtained. Inspections and sampling will be conducted in accordance with protocols and procedures provided in Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2006).

If warranted based on the vapor intrusion investigation results, Buildings 813 and 814 will be demolished. The buildings will be demolished to the slab or to the existing grade common to the area using conventional demolition techniques. The demolition will be performed in accordance with the Demolition Work Plan (Parsons, 2007). Soil underneath the foundation of Building 813 where elevated TCE concentrations were detected will be excavated and disposed off-site. Confirmatory samples will be collected to make sure the residual concentrations are consistent with the NYSDEC Soil Cleanup Objectives for unrestricted use scenarios. The demolition material will be sorted as necessary and loaded out for disposal or recycling as soon as practical. The volume of demolition debris will be reduced as much as practical using the demolition attachments or the tracks of the machines prior to off site disposal. The area when complete will be left “broom clean” of debris.

The alternative involves demolition of approximately 150 cy of building material and excavation of approximately 900 cy of soil underneath the buildings.

4.4.2 Short-Term Effectiveness and Protection of Human Health and the Environment

Potential short-term impacts to the community from this alternative include:

- Off-site generation of dusts and particulates during excavation, building demolition, treatment, and hauling; and
- Increased traffic in the area from hauling activities.

Continuous monitoring of airborne dusts and particulates will be performed during excavation and building demolition activities. The increase in truck traffic would increase the potential for off-site accidents and will be considered during the planning of the remedial action. This is not considered to be a significant issue since the area surrounding SEDA is primarily agricultural and sparsely populated. Care will be taken to assure that the trucks are not overloaded. The soil/debris will be covered with a tarp during transport to ensure that no dust is released.

The major routes of exposure to on-site workers during excavation and building demolition are direct contact with the affected soil/debris and inhalation of particulates. Protection from exposure can be maximized through site access controls and the use of proper protective equipment for workers, such as dust masks (or other form of respiratory protection) and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of particulates. Standard wetting techniques or other dust suppression methods may be used to minimize airborne dusts and particulates.

Potential environmental impacts are surface runoff and airborne dusts and particulates. Silt fencing and/or hay bails may be used to minimize surface runoff from the excavation face and pre-treatment and stockpile areas. Standard dust suppression techniques include wetting and foam dust/vapor suppressants.

The time to complete the excavation, characterization, building demolition, and disposal activities is not expected to be greater than 5 months.

4.4.3 Reduction of Toxicity, Mobility, or Volume

Overall, this alternative would be very effective in reducing the debris volume and mobility of the constituents potentially present in the debris at the SWMU. The debris will be consolidated and placed in a secure off-site landfill. Toxicity and volume will be reduced to some degree by consolidating the debris prior to disposal. The building and affected soil located underneath the building that may potentially be a threat due to VOCs will be removed and disposed. This alternative satisfies the EPA and NYSDEC preference for treatment that significantly and permanently reduces toxicity, mobility, or volume of hazardous wastes as a principal element.

4.4.4 Long-Term Effectiveness and Permanence

This alternative is considered a permanent remedy since all debris would be removed from the soils and placed in a secure off-site landfill. Buildings 813/814 would be demolished and any impacted soil would be excavated and disposed. The magnitude of remaining risk would be below acceptable criteria for human health and the environment. The adequacy and reliability of controls for continued protection of human health and the environment from the debris disposed off-site, are those monitoring controls required by the state of New York for secure Subtitle D solid waste landfills or from radiation licensed facilities.

Military items buried at the SWMU may be classified or sensitive. This alternative enables the Army to remove and examine these items so they may be properly evaluated, declassified, and disposed.

Any threat posed by the building and impacted soils will be removed from the site.

4.4.5 Compliance with ARARs

Alternative 4 will comply with all chemical-specific, action-specific, and location-specific ARARs identified in **Section 2.0**.

4.4.6 Implementability

4.4.6.1 Technical Feasibility

The technical feasibility of implementing this alternative is rated as high. This alternative uses standard and proven construction techniques and would have a high degree of reliability in meeting the technical specifications and construction and operating requirements.

4.4.6.2 Administrative Feasibility

The administrative feasibility of this alternative is considered good. The necessary permits and approvals required for this alternative should be attainable in a reasonable amount of time to implement the alternative.

Coordination with the various regulatory agencies is also important. The Army has coordinated the entire remedial program with both EPA and NYSDEC, and will consider input from both these agencies in the final remedy selection. It is anticipated that any issues arising with the regulatory agencies will be addressed prior to remedy selection.

4.4.6.3 Availability of Services and Materials

All of the equipment and services required for implementation of this alternative are currently readily available from a number of qualified contractors. Radiologically-impacted debris and soils, if found during the remedial action, will need to be disposed at an out-of-state disposal facility and interstate travel may be required.

4.4.7 Costs

4.4.7.1 Capital Costs

Capital costs for remedial design, excavation, off-site disposal of debris, on-site backfilling of soil, vapor intrusion study, demolition of Buildings 813/814, and excavation and disposal of impacted soil were developed and the backup material is included in **Appendix A**. The estimated capital cost for debris excavation from Disposal Pits A/B and C and disposal is $2,371,000. The cost for the vapor intrusion and building demolition for the Buildings 813/814 area is approximately $440,000. As a result, the estimated total capital cost for SEAD-12 remedial action is $2,811,000 ± 25-50%. This cost includes contractor markup costs as shown in **Table 4-1**.

4.4.7.2 O&M Costs

There are no O&M costs associated with this alternative.

4.4.7.3 Present Worth Costs

The total present worth costs for this alternative were estimated at $2,811,000 ± 25-50%.

4.4.8 Schedule

The soil/debris excavation and disposal and building demolition will be performed in the fall of 2008. The vapor intrusion study will precede the building demolition activity. The remedial action will take approximately 5 months to complete.

4.5 COMPARATIVE ANALYSIS OF ALTERNATIVES

4.5.1 Introduction

This section provides a comparative analysis of the alternatives to the evaluation criteria and the relative advantages and disadvantages of each alternative. This comparison will provide additional information to help select the most appropriate remedial action alternative for SEAD-12. **Table 4-2** provides a comparison for the alternatives based on EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* alternative comparison criteria.

The comparative analysis is divided into two categories. The first category is considered the threshold criteria and includes overall protection of human health and the environment and compliance with ARARs. The next category considers the long-term effectiveness and permanence, reduction of toxicity, mobility, and volume through treatment, short-term effectiveness, implementability, and costs.

4.5.2 Threshold Criteria

The threshold criteria are overall protection of human health and the environment and compliance with ARARs. Each alternative must meet these criteria in order to be carried through the detailed evaluation process. All of the alternatives that were selected for a detailed evaluation meet these threshold criteria.

4.5.3 Other Considerations

4.5.3.1 Long Term Effectiveness and Permanence

The principal considerations of this evaluation criterion are:

- Permanence of remedial alternative;
- Magnitude of remaining risk after the remedial action is complete; and
- Adequacy and reliability of controls.

Alternative 2 (excavation/disposal/ easement) and Alternative 4 (excavation/disposal/building demolition) ranked the highest for long-term effectiveness and permanence. The no-action alternative does not provide good long-term effectiveness and permanence because it does not reduce the magnitude of potential risks and does not provide adequate or reliable controls for continued protection of human health or the environment.

4.5.3.2 Reductions of Toxicity, Mobility, or Volume

This evaluation criterion focuses on the following factors:

- Amount of hazardous material destroyed or treated;
- The degree of expected reduction of toxicity, mobility, or volume;
- The degree to which the treatment is reversible; and
- The type and quantity of residuals remaining after treatment.

Alternative 1 (no-action), Alternative 2 (excavation/disposal/easement), and Alternative 4 (excavation/disposal/building demolition) were not ranked high for reduction of toxicity, volume or degree of reversibility. Alternative 2 would reduce the mobility and volume to a greater degree than Alternative 1 because it would remove the military debris from the SWMU and dispose of the material in an off-site secure landfill. Alternative 4 would reduce the mobility to a greater degree than Alternative 2 as Buildings 813/814 may be demolished and soil contaminated with TCE may be excavated and disposed.

4.5.3.3 Short-Term Effectiveness

Alternative 1 (no-action) was ranked higher than Alternative 2 (excavation/disposal/easement) and Alternative 4 for short-term effectiveness, because it does not involve any disruption to the environment from implementation of a remedial action. Alternative 2 ranked higher than Alternative 4 for short-term effectiveness because Alternative 4 may involve Buildings 813/814 demolition and more soil excavation.

4.5.3.4 Implementability

Alternative 1 (no-action) was ranked higher than Alternative 2 (excavation/disposal/easement) and Alternative 4 (excavation/disposal/building demolition) for technical feasibility and availability of services and materials because it does not involve construction and operation activities. However, the no-action alternative was ranked the lowest for administrative feasibility.

Both Alternative 2 and Alternative 4 potentially involve construction and operation activities and the disposal of radiologically-impacted debris and soils, if found during the remedial action, at an out-of-state disposal facility. Therefore, the alternatives were ranked lower than Alternative 1 for technical feasibility and availability of services and materials. Alternatives 2 and 4 were ranked higher for administrative feasibility because both alternatives would be the most likely to receive approval. From the Army's standpoint, the removal of items that may still be classified or sensitive is necessary and would only be accomplished through Alternatives 2 and 4.

4.5.3.5 Costs

Alternative 1 (no-action) has no costs associated with it and was therefore ranked higher than Alternative 2 (excavation/disposal/easement) and Alternative 4 (excavation/disposal/building demolition).

The cost for excavation and disposal of debris from Disposal Pits A/B and C is estimated at $2,371,000, the same for Alternative 2 and Alternative 4. The costs for the Buildings 813/814 area remediation are $74,000 and $440,000 for Alternative 2 and Alternative 4, respectively. The cost of Alternative 4 for the Buildings 813/814 area remediation is about six times of the cost for Alternative 2. The total estimated costs for Alternative 2 and Alternative 4 are $2,445,000 and $2,811,000. The accuracy of these cost estimates are expected to be on the order of ± 25-50%. These estimates were developed primarily for comparative purposes.

4.6 UNCERTAINTY ASSOCIATED WITH ALTERNATIVE

Alternatives discussed in this FS have been well defined. Nonetheless, uncertainties related to the alternatives remain. A significant uncertainty that would affect the alternative analysis and cost estimate is the actual volumes of debris present in the disposal pits. Other uncertainties (e.g., uncertainties with the definition of alternatives, uncertainties associated with land disposal, and uncertainties related to construction) would also affect the alternative analysis and cost estimation. The focus of the alternative analysis presented in this FS is to make comparative estimates for alternatives with relative accuracy; uncertainties associated with the identified alternatives are not expected to impact the overall alternative comparison results.

4.7 SUMMARY AND CONCLUSIONS

All of the identified remedial alternatives meet the threshold criteria of protectiveness of human health and the environment and compliance with ARARs based upon the results of the human health and ecological risk assessment and a comparison with ARARs. These alternatives are intended to address the presence of military-related debris identified during the Remedial Investigation in specific areas of SEAD-12.

Alternative 4 ranked the highest among the four alternatives for long-term human health and environmental protectiveness, reduction of mobility, reduction of volume, permanence, and administrative feasibility. Both Alternative 2 and Alternative 4 would result in the excavation and disposal of military debris associated with Disposal Pit A/B and Disposal Pit C. The only difference between Alternative 2 and Alternative 4 is the way in which potential future exposure to indoor air in Buildings 813/814 are managed. An environmental easement is adopted in Alternative 2 for Buildings 813/814 while building demolition is proposed in Alternative 4. Alternative 1 ranked the highest among the four alternatives for short-term human health and environmental protectiveness, technical feasibility, and availability of services and materials. All the four alternatives ranked the same in reduction of toxicity.

Alternatives 2 and 4 have the highest total scores among the four alternatives (29 and 30, respectively). The intended land-use for SEAD-12 is institutional training. The presence of military debris could potentially place restrictions on the use of SEAD-12 as an institutional training area. Based upon the lack of long-term effectiveness and permanence associated with military debris for the no-action alternative, Alternatives 2 and 4 are the recommended alternatives. A detailed screening process would be employed during the excavation and stockpiling stage to ensure that all materials classified as military or containing isotopes above the threshold criteria are disposed of properly. In addition, an environmental easement (Alternative 2) or a building demolition (Alternative 4) will be performed for Buildings 813/814 area. The easement will state that an investigation of vapor intrusion potential and indoor air quality must be performed before the buildings, or any newly constructed buildings in the vicinity, are occupied. The building demolition will include demolition of the Buildings 813/814 and excavation of soil associated with elevated levels of TCE in soil underneath the building foundation. The estimated costs are $2,445,000 and $2,811,000 for Alternative 2 and Alternative 4, respectively. The cost for the debris excavation from Disposal Pits A/B and appropriate disposal is $2,371,000, the same for Alternative 2 and Alternative 4. The cost for the Buildings 813/814 area remediation using Alternative 4 is approximately six times of the cost for Alternative 2 ($74,000 and $440,000 for Alternative 2 and Alternative 4, respectively). The costs associated with these two alternatives assume that a percentage of the materials excavated would be classified for off-site disposal. The actual costs may be higher or lower depending upon the type and volume of material present in the areas identified for excavation.

TABLES

Table 1-1
Exceedance Summary - Surface Soils
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	TAGM [1]	Unit	Building 819/ EM27		Building 815-816/ EM-28		Buildings 813/814		Disposal Pit A/B		Disposal Pit C		Former Dry Waste Disposal Pit		EM-5		EM-6		Class III		Former Wastewater Treatment Plant		Exeedances by Compound	Maximum Exceedance Factor (% Criteria)
			No. of TAGM Exceedances	Max. Value	No. of TAGM Exceedances	Max. Value	No. of TAGM Exceedances	Max. Value	No. of TAGM Exceedances	Max. Value	No. of TAGM exceedances	Max. Value	No. of TAGM exceedances	Max. Value	No. of TAGM exceedances	Max. Value	No. of TAGM exceedances	Max. Value	No. of TAGM exceedances	Max. Value	No. of TAGM exceedances	Max. Value		
VOCs																								
Methylene chloride	100	ug/kg																					0	
Trichoroethene	700	ug/kg					2	3100															2	443%
SVOCs																								
4-Methylphenol	900	ug/kg																	1	930			1	103%
Benzo(a)anthracene	224	ug/kg	4	6200															3	3500			7	2768%
Benzo(a)pyrene	61	ug/kg	4	5400															5	3200			9	8852%
Benzo(b)fluoranthene	1100	ug/kg	2	4800															1	2800			3	436%
Benzo(k)fluoranthene	1100	ug/kg	2	6100															1	2900			3	555%
Chrysene	400	ug/kg	3	6800															3	3600			6	1700%
Dibenz(a,h)anthracene	14	ug/kg	4	1500					1	16									5	680	1	110	11	10714%
Phenol	30	ug/kg																	2	42			2	140%
Pesticides/PCBs																								
Heptachlor epoxide	20	ug/kg																					0	
Metals																								
Aluminum	19520	mg/kg	1	20800																			1	107%
Antimony	6	mg/kg																					0	
Arsenic	9.8	mg/kg																					0	
Cadmium	2.46	mg/kg			1	17.7			1	3.2													2	720%
Calcium	125300	mg/kg	1	202000															1	154000			2	161%
Chromium	30	mg/kg																					0	
Cobalt	30	mg/kg																					0	
Copper	33	mg/kg													1	37.3			3	35.4	3	60.3	7	183%
Cyanide	0.35	mg/kg							2	1.6									1	1.4			3	457%
Iron	37410	mg/kg																					0	
Lead	24.4	mg/kg	1	33.1	1	25					1	24.9			2	142			16	43.8	3	34.4	24	582%
Magnesium	21700	mg/kg	1	34800									1	23800									2	160%
Manganese	1100	mg/kg							1	1420							1	1120	4	2370	1	1240	7	215%
Mercury	0.1	mg/kg							1	0.11					1	0.27			6	0.17	3	0.48	11	480%
Nickel	50	mg/kg																	2	57.4			2	115%
Potassium	2623	mg/kg	1	2660															4	2970			5	113%
Selenium	2	mg/kg							2	2.5									2	2.3			4	125%
Silver	0.8	mg/kg																					0	
Sodium	188	mg/kg							1	207			3	276							1	243	5	147%
Thallium	0.855	mg/kg	1	3					5	1.8	3	1.7	3	2			2	2	18	2.5	1	1.5	33	351%
Zinc	115	mg/kg													1	174			5	197	3	246	9	214%

Note:
1. NYSDEC Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046, Revised January 24, 1994.
2. All ditch soil samples collected as part of the Supplement Remedial Investigation were below TAGM criteria; and thus were not presented in the table.
3. Data for Building 819/EM27, Building 815-816/EM-28, Disposal Pit A/B, Disposal Pit C, Former Dry Waste Disposal Pit, EM-5, EM-6, Class III, and Former Wastewater Treatment Plant from Remedial Investigation Report (Parsons, 2002) Table 4-A through Table 4-Q.
Data for Buildings 813/814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were evaluated.

Table 1-2
Exceedance Summary - Subsurface Soils
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	TAGM [1]	Units	Building 819/ EM27		Building 815-816/ EM-28		Buildings 813/814		Disposal Pit A/B		Disposal Pit C		Former Dry Waste Disposal Pit		EM-5		EM-6		Class III		Exeedances by Compound	Maximum Exceedance Factor (% Criteria)
			No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value	No. of exceed-ances	Max. Value		
VOCs																						
Methylene chloride	100	ug/kg									1	180									1	180%
Trichoroethene	700	ug/kg					2	4800													2	686%
SVOCs																						
4-Methylphenol	900	ug/kg																				
Benzo(a)anthracene	224	ug/kg													1	3500			1	760	2	1902%
Benzo(a)pyrene	61	ug/kg							1	200	4	180			1	2600			3	1000	9	6525%
Benzo(b)fluoranthene	1100	ug/kg													1	2200					1	200%
Benzo(k)fluoranthene	1100	ug/kg													1	2600					1	236%
Chrysene	400	ug/kg													1	3000			1	1000	2	1000%
Dibenz(a,h)anthracene	14	ug/kg							1	57	4	99			1	710			4	300	10	8329%
Phenol	30	ug/kg							2	300											2	1000%
Pesticides/PCBs																						
Heptachlor epoxide	20	ug/kg							1	22											1	110%
Metals																						
Aluminum	19520	mg/kg	1	21200																	1	109%
Antimony	6	mg/kg							1	7.2											1	120%
Arsenic	8.9	mg/kg									1	11.1							1	9.8	2	235%
Cadmium	2.46	mg/kg							7	94.3	2	6							1	13.3	10	4618%
Calcium	125300	mg/kg	1	151000					1	142000	3	224000	1	132000							6	518%
Chromium	30	mg/kg							4	83.3											4	278%
Cobalt	30	mg/kg															1	36.3			1	121%
Copper	33	mg/kg	1	44.7					5	215	3	74.5	4	41.1	5	73.3			3	34	21	1462%
Cyanide	0.35	mg/kg							2	1.5	1	2.2									3	1057%
Iron	37410	mg/kg	1	44500							1	51000	1	41100			1	40600	3	53400	7	616%
Lead	24.4	mg/kg	1	27.1					3	366	8	431			6	112	2	34	10	284	30	5140%
Magnesium	21700	mg/kg							1	34300	2	36100	2	34200							5	482%
Manganese	1100	mg/kg															1	4110	3	3200	4	665%
Mercury	0.1	mg/kg	2	0.2							3	0.15	4	0.5	3	1			8	0.2	20	2050%
Nickel	50	mg/kg	1	64.5	1	50.5			2	201			1	50.9	1	52			1	51.3	7	940%
Potassium	2623	mg/kg									2	3670			3	2810			2	3460	7	379%
Selenium	2	mg/kg											2	2.5							2	125%
Silver	0.8	mg/kg							2	11.9	1	1.8									3	1713%
Sodium	188	mg/kg									4	1420	2	252			1	197	3	748	10	1392%
Thallium	0.855	mg/kg			1	1.1			5	1.7	12	1.7	7	2.2			7	3.8	10	1.6	42	1415%
Zinc	115	mg/kg	3	143					3	424	7	6080	1	142	6	280	4	391	4	3370	28	9417%

Note:
1. NYSDEC Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046, Revised January 24, 1994.
2. Data for Building 819/EM27, Building 815-816/EM-28, Disposal Pit A/B, Disposal Pit C, Former Dry Waste Disposal Pit, EM-5, EM-6, Class III, and Former Wastewater Treatment Plant from Remedial Investigation Report (Parsons, 2002) Table 4-A through Table 4-Q.
Data for Buildings 813/814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in remaining subsurface soil during the SRI were evaluated.

TABLE 1-3
Exceedance Summary-Surface Water, Sediment, and Groundwater
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Surface Water					Sediment						Groundwater		
		Downgradient		SEAD-12				Downgradient		SEAD-12			SEAD-12	
	Criteria [1] (ug/L)	No. of Criteria Exceedances	Max value (ug/L)	No. of Criteria Exceedances	Max value (ug/L)	Criteria [2]	Units	No. of Criteria Exceedances	Max value	No. of Criteria Exceedances	Max value	Criteria [3] (ug/L)	No. of Criteria Exceedances	Max value (ug/L)
VOCS														
1,2-Dichloroethene (total)														
Cis-1,2-Dichloroethene														
Toluene						2.7 [a]	ug/Kg			8	20			
Trichloroethene														
SVOCS														
Anthracene						5.8 [a]	ug/Kg	5	160	26	830			
Bis(2-Ethylhexyl)phthalate	0.6			2	12									
Benzo(a)anthracene						0.648 [a]	ug/Kg	8	1500	39	3100			
Benzo(a)pyrene						70.2 [b]	ug/Kg	3	1300	21	3300			
Benzo(b)fluoranthene						70.2 [b]	ug/Kg	4	1200	24	3200			
Benzo(k)fluoranthene						70.2 [b]	ug/Kg			15	2700			
Chrysene						70.2 [b]	ug/Kg	4	1400	23	3200			
Fluorene						0.432 [a]	ug/Kg	4	59	20	340			
Ideno(1,2,3-cd)pyrene						70.2 [b]	ug/Kg	2	670	18	2000			
Naphthalene						1.6 [a]	ug/Kg	4	16	7	49			
Pyrene						51.9 [a]	ug/Kg	5	2000	30	5400			
PESTICIDES/PCBS														
4,4'-DDD						0.54 [b]	ug/Kg	2	3.7	6	110			
4,4'-DDE	0.000007			1	0.0056	0.54 [b]	ug/Kg	2	4	10	76			
4,4'-DDT	0.00001			1	0.062	0.54 [b]	ug/Kg			7	200			
Aldrin	0.001			1	0.0041									
Arochlor-1254						0.0432 [b]	ug/Kg			4	1200			
Arochlor-1260						0.0432 [b]	ug/Kg			2	37			
Endosulfan I						1.62 [b]	ug/Kg			2	3.6			
Heptachlor	0.0002			3	0.0063									
Heptachlor epoxide	0.0003			2	0.0033	0.0432 [b]	ug/Kg			3	11			
Hexachlorobenzene	0.00003	1	0.013	3	0.02									

TABLE 1-3
Exceedance Summary-Surface Water, Sediment, and Groundwater
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Surface Water					Sediment						Groundwater		
		Downgradient		SEAD-12				Downgradient		SEAD-12			SEAD-12	
	Criteria [1] (ug/L)	No. of Criteria Exceedances	Max value (ug/L)	No. of Criteria Exceedances	Max value (ug/L)	Criteria [2]	Units	No. of Criteria Exceedances	Max value	No. of Criteria Exceedances	Max value	Criteria [3] (ug/L)	No. of Criteria Exceedances	Max value (ug/L)
METALS														
Aluminum	100			19	3430									
Antimony						2 [c]	mg/Kg			1	2.8	3	3	43.2
Arsenic						6 [c]	mg/Kg	3	7.6	10	19.1			
Cadmium						0.6 [c]	mg/Kg			8	9			
Chromium						26 [c]	mg/Kg	2	37.1	9	130			
Cobalt	5			1	6									
Copper	17.36			2	27.6	16 [c]	mg/Kg	9	36.8	49	1160			
Iron	300			12	6830	20000 [c]	mg/Kg	8	43000	38	85900	300	43	20700
Lead	8.7			4	35.4	31 [c]	mg/Kg			8	215			
Manganese						460 [c]	mg/Kg	4	947	25	14000	300	12	3280
Mercury	0.0007			5	0.11	0.15 [c]	mg/Kg	1	0.27	7	1.7			
Nickel						16 [c]	mg/Kg	9	58.9	51	126			
Silver	0.1			6	1.6	1 [c]	mg/Kg			1	1.5			
Sodium												20000	24	408000
Zinc						120 [c]	mg/Kg	3	196	35	2650			

Notes:
1. New York State Ambient Water Quality Standards, Class C for Surface Water
For copper and lead, the standards were calculated assuming a hardness of 217 mg/L, which was the average hardness detected in SEAD-12 surface water.
2. Criteria values for sediment were the lowest of:
a. NYS Benthic Aquatic Life Chronic Toxicity Criteria
b. NYS Human Health Bioaccumulation Criteria
c. NYS Lowest Effect Level
3. Groundwater criteria was GA = NYSDEC Class GA Groundwater Standard (TOGS 1.1.1, June 1998, 1999, 2000, 2004)
4. Surface water data from Remedial Investigation Report (Parsons, 2002) Table 4-S and Table 4-T. No VOCs were detected in any surface water samples collected during the SRI.
5. Sediment data from Remedial Investigation Report (Parsons, 2002) Table 4-V and Table 4-W.
6. Groundwater data from Remedial Investigation Report (Parsons, 2002) Table 4-X and the Supplemental Remedial Investigation Report (Parsons, 2006).
It should be noted that MW12-37 and the surrounding impacted soil were removed during the SRI; therefore, groundwater results for MW12-37 were not included in the evaluation.

Table 1-4
TOTAL CANCER RISK AND NON-CANCER HAZARD INDEX
FOR CHEMICAL AND RADIOLOGICAL PATHWAYS
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Potential Area of Concern	Risk Scenerio	Chemical Total Cancer Risk (1)	Radiological Total Cancer Risk	Chemical and Radiological Total Cancer Risk	Total Non-Cancer Hazard Index
Disposal Pits A/B	Current Worker	5.E-08	6.E-09	6.E-08	0.003
	Future Park Worker	2.E-05	2.E-05	4.E-05	0.09
	Future Recreational Child	2.E-05	1.E-06	2.E-05	0.3
	Current/Future Construction Worker	1.E-07	4.E-06	4.E-06	0.1
	Future Resident	7.E-04	3.E-05	7.E-04	2 (2)
Disposal Pits C	Current Worker	2.E-08	3.E-08	5.E-08	0.001
	Future Park Worker	2.E-05	2.E-05	4.E-05	0.08
	Future Recreational Child	2.E-05	1.E-06	2.E-05	0.2
	Current/Future Construction Worker	1.E-07	4.E-06	4.E-06	0.06
	Future Resident	7.E-04	4.E-05	7.E-04	2 (2)
Former Dry Waste Disposal Pit	Current Worker	2.E-08	<1E-15	2.E-08	0.002
	Future Park Worker	2.E-05	2.E-05	4.E-05	0.08
	Future Recreational Child	2.E-05	1.E-06	2.E-05	0.2
	Current/Future Construction Worker	4.E-08	3.E-06	3.E-06	0.07
	Future Resident	7.E-04	3.E-05	7.E-04	2 (2)
Downgradient	Off-Site Wader (Child)	1.E-06	6.E-09	1.00E.06	8.E-04

Notes:
(1) Chemical Reasonable Maximum Exposure risk values are presented.
(2) Hazard index for residential child is presented.

Table 2-1A
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Exceedances Compared to NYSDEC Soil Cleanup Objectives for Unrestricted Use Criteria
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Unit	NYSDEC Unrestricted Use [1]	Disposal Pit A/B						Disposal Pit C						Buildings 813/814					
			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil		
			No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]
VOCs																				
Acetone	UG/KG	50	1	15	52		29	34		9	15	1	42	61		16			8	32
Benzene	UG/KG	60		15			29			9			42			16	0.33		8	
Carbon Disulfide	UG/KG			15			29			9			42			16	0.48		8	
Chlorobenzene	UG/KG	1100		15			29			9			41	5		16			8	
Chloroform	UG/KG	370		15			29			9			42			16	0.47		8	1.4
cis-1,2-Dichloroethene	UG/KG	250		15			29			9			42			16	2.6		8	4.9
Ethyl benzene	UG/KG	1000		15			29	66		9			41			16	80		8	
Meta/Para Xylene	UG/KG			15			29			9			42			16	150		8	
Methyl butyl ketone	UG/KG			15	1		29			9			42			16			8	
Methyl ethyl ketone	UG/KG	120		15			29			9			42			16			8	4.5
Methylene chloride	UG/KG	50		15	1		29	3		9		1	42	180		16	0.38		8	
Ortho Xylene	UG/KG			15			29			9			42			16	42		8	
Styrene	UG/KG			15			29	33		9			41			16			8	
Tetrachloroethene	UG/KG	1300		15			29			9			42			16	0.32		8	3.2
Toluene	UG/KG	700		15	4		29	15		9			42	62		16	210		8	100
Total Xylenes	UG/KG	260		15		1	29	520		9			41	14		16			8	
Trichloroethene	UG/KG	470		15			29	26		9			42	2	3	16	3100	3	8	4800
Vinyl Chloride	UG/KG	20		15			29			9			42			16			8	1.5
SVOCs																				
2,4-Dimethylphenol	UG/KG			15			28	25		9			41							
2-Methylnaphthalene	UG/KG			15			28	56		9			41	22						
4-Methylphenol	UG/KG	330		15			28	140		9			41							
Acenaphthene	UG/KG	20000		15			28	23		9			41	44						
Acenaphthylene	UG/KG	100000		15			28	33		9			41							
Anthracene	UG/KG	100000		15			28	96		9	4.6		41	63						
Benzo(a)anthracene	UG/KG	1000		15	27		28	180		9	20		41	200						
Benzo(a)pyrene	UG/KG	1000		15	18		28	200		9	20		42	180						
Benzo(b)fluoranthene	UG/KG	1000		15	36		28	190		9	28		41	320						
Benzo(ghi)perylene	UG/KG	100000		15	23		28	120		9	18		42	98						
Benzo(k)fluoranthene	UG/KG	800		15	26		28	160		9	19		41	170						
Bis(2-Ethylhexyl)phthalate	UG/KG			15	210		28	930		9	5.8		42	16						
Butylbenzylphthalate	UG/KG			15	6.7		28	5.1		9			41	30						
Carbazole	UG/KG			15	16		28			9	6.4		41	40						
Chrysene	UG/KG	1000		15	51		28	240		9	27		41	310						
Di-n-butylphthalate	UG/KG			15	68		28	1700		9	4.5		41	52						
Di-n-octylphthalate	UG/KG			15	7.8		28	54		9	7.3		41	20						
Dibenz(a,h)anthracene	UG/KG	330		15	16		28	57		9	5.8		41	99						
Dibenzofuran	UG/KG			15			28			9			41	4.1						
Fluoranthene	UG/KG	100000		15	24		28	420		9	40		42	320						
Fluorene	UG/KG	30000		15	5.4		28	52		9			41	35						
Indeno(1,2,3-cd)pyrene	UG/KG	500		15	18		28	120		9	15		41	140						
N-Nitrosodiphenylamine	UG/KG			15			28			9			41	9500						
Naphthalene	UG/KG	12000		15			28	600		9			41	13						
Phenanthrene	UG/KG	100000		15	8.5		28	340		9	21		41	280						
Phenol	UG/KG	330		15	22		28	300		9			41							
Pyrene	UG/KG	100000		15			28	380		9	40		42	310						
Pesticides/PCBs																				
4,4'-DDD	UG/KG	3.3		15			28		1	9	8.6	2	42	25						
4,4'-DDE	UG/KG	3.3	2	15	15	2	28	42		9		2	42	6.4						
4,4'-DDT	UG/KG	3.3	1	15	42		28	2.1		9	2.2	4	42	4.9						
Aldrin	UG/KG	5		15			28	0.79		9			42							
Alpha-BHC	UG/KG	20		15		1	28	24		9			42	5.8						
Alpha-Chlordane	UG/KG	94		15			28	4.6		9			42	2.6						

Table 2-1A
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Exceedances Compared to NYSDEC Soil Cleanup Objectives for Unrestricted Use Criteria
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Unit	NYSDEC Unrestricted Use [1]	Disposal Pit A/B						Disposal Pit C						Buildings 813/814					
			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil		
			No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]
Aroclor-1254	UG/KG	100	2	15	670	4	28	3000		9			42	28						
Aroclor-1260	UG/KG	100		15		1	28	150		9			42	25						
Beta-BHC	UG/KG	36		15			28	2.2		9			42	1.7						
Dieldrin	UG/KG	5	2	15	14	2	28	40		9			42							
Endosulfan I	UG/KG	2400		15	1.8		28			9			42							
Endosulfan II	UG/KG	2400		15	2.7		28	19		9			42							
Endrin	UG/KG	14		15	4.2	2	28	20		9			42							
Endrin aldehyde	UG/KG			15	5.6		28			9			42							
Gamma-Chlordane	UG/KG			15	11		28	58		9			42	2.3						
Heptachlor	UG/KG	42		15			28			9			42	8.4						
Heptachlor epoxide	UG/KG			15	4.6		28			9			42	2						
Metals																				
Aluminum	MG/KG			15	15800		28	17100		9	14100		42	18600						
Antimony	MG/KG			6	0.87		10	7.2					12	0.39						
Arsenic	MG/KG	13		15	4.9		28	5.9		9	4.3		42	11.1						
Barium	MG/KG	350		15	89.2		28	125		9	108		42	135						
Beryllium	MG/KG	7.2		15	0.59		28	0.74		9	0.69		42	0.83						
Cadmium	MG/KG	2.5	1	15	3.2	7	28	94.3				2	42	6						
Calcium	MG/KG			15	77600		28	142000		9	75900		42	224000						
Chromium	MG/KG	30 [4]		15	23.3	4	28	83.3		9	21.6		42	29.7						
Cobalt	MG/KG			15	17.5		28	26.5		9	11		42	16.3						
Copper	MG/KG	50		15	32.5	3	28	215		9	22.1	1	42	74.5						
Cyanide	MG/KG	27		15	1.6		28	1.5					42	2.2						
Iron	MG/KG			15	27100		28	35700		9	23200		42	51000						
Lead	MG/KG	63		15	22.2	2	28	366		9	24.9	2	42	431						
Magnesium	MG/KG			15	21500		28	34300		9	18600		42	36100						
Manganese	MG/KG	1600		15	1420		28	631		9	700		42	857						
Mercury	MG/KG	0.18		15	0.11		28	0.06		9	0.06		42	0.15						
Nickel	MG/KG	30	2	15	39.9	9	28	201		9	27.6	6	42	45.5						
Potassium	MG/KG			15	1740		28	2090		9	1980		42	3670						
Selenium	MG/KG	3.9		15	2.5		28	1.2		9	0.95		42	1.9						
Silver	MG/KG	2		15	0.2	1	28	11.9					42	1.8						
Sodium	MG/KG			15	207		28	134		9	92.4		42	1420						
Thallium	MG/KG			15	1.8		28	1.7		9	1.7		42	1.7						
Vanadium	MG/KG			15	24		28	25.6		9	24.6		42	36.4						
Zinc	MG/KG	109		15	83.7	4	28	424		9	97.3	8	42	6080						

Notes:

1. NYSDEC Soil Cleanup Objectives for Unrestricted Use, Table 375-6.8(a), http://www.dec.state.ny.us/website/regs/subpart375_6.html
2. The number represents the number of samples with exceedences.
3. Only maximum values that exceed the NYSDEC Soil Cleanup Objective for Unrestricted Use criteria are presented in this table.
4. Chromium value is for Trivalent form.
5. Data for Disposal Pit A/B and Disposal Pit C from Remedial Investigation Report (Parsons, 2002) Table 4-E through Table 4-H.
6. Data for Building 813-814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were used to characterize surface soil conditions in the area. The TCE concentrations detected in remaining subsurface soil during the SRI were used to characterize subsurface soil conditions in the area.

Table 2-1B
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Exceedances Compared to NYSDEC Soil Cleanup Objectives for Restricted Commercial Use Criteria
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Unit	NYSDEC Brownsfield Restricted Commercial [1]	Disposal Pit A/B						Disposal Pit C						Buildings 813/814					
			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil		
			No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]
VOCs																				
Acetone	UG/KG	500000		15	52		29	34		9	15		42	61		16			8	32
Benzene	UG/KG	44000		15			29			9			42			16	0.33		8	
Carbon Disulfide	UG/KG			15			29			9			42			16	0.48		8	
Chlorobenzene	UG/KG	500000		15			29			9			41	5		16			8	
Chloroform	UG/KG	350000		15			29			9			42			16	0.47		8	1.4
cis-1,2-Dichloroethene	UG/KG	500000		15			29			9			42			16	2.6		8	4.9
Ethyl benzene	UG/KG	390000		15			29	66		9			41			16	80		8	
Meta/Para Xylene	UG/KG			15			29			9			42			16	150		8	
Methyl butyl ketone	UG/KG			15	1		29			9			42			16			8	
Methyl ethyl ketone	UG/KG	500000		15			29			9			42			16			8	4.5
Methylene chloride	UG/KG	500000		15	1		29	3		9			42	180		16	0.38		8	
Ortho Xylene	UG/KG			15			29			9			42			16	42		8	
Styrene	UG/KG			15			29	33		9			41			16			8	
Tetrachloroethene	UG/KG			15			29			9			42			16	0.32		8	3.2
Toluene	UG/KG	500000		15	4		29	15		9			42	62		16	210		8	100
Total Xylenes	UG/KG	500000		15			29	520		9			41	14		16			8	
Trichloroethene	UG/KG	200000		15			29	26		9			42	2		16	3100		8	4800
Vinyl Chloride	UG/KG	13000		15			29			9			42			16			8	1.5
SVOCs																				
2,4-Dimethylphenol	UG/KG			15			28	25		9			41							
2-Methylnaphthalene	UG/KG			15			28	56		9			41	22						
4-Methylphenol	UG/KG	500000		15			28	140		9			41							
Acenaphthene	UG/KG	500000		15			28	23		9			41	44						
Acenaphthylene	UG/KG	500000		15			28	33		9			41							
Anthracene	UG/KG	500000		15			28	96		9	4.6		41	63						
Benzo(a)anthracene	UG/KG	5600		15	27		28	180		9	20		41	200						
Benzo(a)pyrene	UG/KG	1000		15	18		28	200		9	20		42	180						
Benzo(b)fluoranthene	UG/KG	5600		15	36		28	190		9	28		41	320						
Benzo(ghi)perylene	UG/KG	500000		15	23		28	120		9	18		42	98						
Benzo(k)fluoranthene	UG/KG	56000		15	26		28	160		9	19		41	170						
Bis(2-Ethylhexyl)phthalate	UG/KG			15	210		28	930		9	5.8		42	16						
Butylbenzylphthalate	UG/KG			15	6.7		28	5.1		9			41	30						
Carbazole	UG/KG			15	16		28			9	6.4		41	40						
Chrysene	UG/KG	56000		15	51		28	240		9	27		41	310						
Di-n-butylphthalate	UG/KG			15	68		28	1700		9	4.5		41	52						
Di-n-octylphthalate	UG/KG			15	7.8		28	54		9	7.3		41	20						
Dibenz(a,h)anthracene	UG/KG	560		15	16		28	57		9	5.8		41	99						
Dibenzofuran	UG/KG	350000		15			28			9			41	4.1						
Fluoranthene	UG/KG	500000		15	24		28	420		9	40		42	320						
Fluorene	UG/KG	500000		15	5.4		28	52		9			41	35						
Indeno(1,2,3-cd)pyrene	UG/KG	5600		15	18		28	120		9	15		41	140						
N-Nitrosodiphenylamine	UG/KG			15			28			9			41	9500						
Naphthalene	UG/KG	500000		15			28	600		9			41	13						
Phenanthrene	UG/KG	500000		15	8.5		28	340		9	21		41	280						
Phenol	UG/KG	500000		15	22		28	300		9			41							
Pyrene	UG/KG	500000		15			28	380		9	40		42	310						
Pesticides/PCBs																				
4,4'-DDD	UG/KG	92000		15			28			9	8.6		42	25						
4,4'-DDE	UG/KG	62000		15	15		28	42		9			42	6.4						
4,4'-DDT	UG/KG	47000		15	42		28	2.1		9	2.2		42	4.9						
Aldrin	UG/KG	680		15			28	0.79		9			42							
Alpha-BHC	UG/KG	3400		15			28	24		9			42	5.8						
Alpha-Chlordane	UG/KG	24000		15			28	4.6		9			42	2.6						

Table 2-1B
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Exceedances Compared to NYSDEC Soil Cleanup Objectives for Restricted Commercial Use Criteria
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Unit	NYSDEC Brownsfield Restricted Commercial [1]	Disposal Pit A/B						Disposal Pit C						Buildings 813/814					
			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil			Surface Soil			Subsurface Soil		
			No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]	No. of Exceedances [2]	No. Analyzed	Max Value [3]
Aroclor-1254	UG/KG	1000		15	670	3	28	3000		9			42	28						
Aroclor-1260	UG/KG	1000		15			28	150		9			42	25						
Beta-BHC	UG/KG	3000		15			28	2.2		9			42	1.7						
Dieldrin	UG/KG	1400		15	14		28	40		9			42							
Endosulfan I	UG/KG	200000		15	1.8		28			9			42							
Endosulfan II	UG/KG	200000		15	2.7		28	19		9			42							
Endrin	UG/KG	89000		15	4.2		28	20		9			42							
Endrin aldehyde	UG/KG			15	5.6		28			9			42							
Gamma-Chlordane	UG/KG			15	11		28	58		9			42	2.3						
Heptachlor	UG/KG	15000		15			28			9			42	8.4						
Heptachlor epoxide	UG/KG			15	4.6		28			9			42	2						
Metals																				
Aluminum	MG/KG			15	15800		28	17100		9	14100		42	18600						
Antimony	MG/KG			6	0.87		10	7.2					12	0.39						
Arsenic	MG/KG	16		15	4.9		28	5.9		9	4.3		42	11.1						
Barium	MG/KG	400		15	89.2		28	125		9	108		42	135						
Beryllium	MG/KG	590		15	0.59		28	0.74		9	0.69		42	0.83						
Cadmium	MG/KG	9.3		15	3.2	3	28	94.3					42	6						
Calcium	MG/KG			15	77600		28	142000		9	75900		42	224000						
Chromium	MG/KG	1500		15	23.3		28	83.3		9	21.6		42	29.7						
Cobalt	MG/KG			15	17.5		28	26.5		9	11		42	16.3						
Copper	MG/KG	270		15	32.5		28	215		9	22.1		42	74.5						
Cyanide	MG/KG	27		15	1.6		28	1.5					42	2.2						
Iron	MG/KG			15	27100		28	35700		9	23200		42	51000						
Lead	MG/KG	1000		15	22.2		28	366		9	24.9		42	431						
Magnesium	MG/KG			15	21500		28	34300		9	18600		42	36100						
Manganese	MG/KG	10000		15	1420		28	631		9	700		42	857						
Mercury	MG/KG	2.8		15	0.11		28	0.06		9	0.06		42	0.15						
Nickel	MG/KG	310		15	39.9		28	201		9	27.6		42	45.5						
Potassium	MG/KG			15	1740		28	2090		9	1980		42	3670						
Selenium	MG/KG	1500		15	2.5		28	1.2		9	0.95		42	1.9						
Silver	MG/KG	1500		15	0.2		28	11.9					42	1.8						
Sodium	MG/KG			15	207		28	134		9	92.4		42	1420						
Thallium	MG/KG			15	1.8		28	1.7		9	1.7		42	1.7						
Vanadium	MG/KG			15	24		28	25.6		9	24.6		42	36.4						
Zinc	MG/KG	10000		15	83.7		28	424		9	97.3		42	6080						

Notes:

1. NYSDEC Soil Cleanup Objectives for Restricted Commerical Use, Table 375-6.8(a), http://www.dec.state.ny.us/website/regs/subpart375_6.html
2. The number represents the number of compounds with exceedences.
3. Only maximum values that exceed the NYSDEC Soil Cleanup Objective for Restricted Commerical Use criteria are presented in this table.
4. Chromium value is for Trivalent form.
5. Data for Disposal Pit A/B and Disposal Pit C from Remedial Investigation Report (Parsons, 2002) Table 4-E through Table 4-H.
6. Data for Building 813-814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were used to characterize surface soil conditions in the area.
The TCE concentrations detected in remaining subsurface soil during the SRI were used to characterize subsurface soil conditions in the area.

Table 2-2
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Summary Statistics and Comparison with NYSDEC Soil Cleanup Objectives
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Units	NYSDEC Unrestricted Use [1]	NYSDEC Restricted Commerical Use [1]	EPA Region IX PRG Residential Soil [2]	EPA Region IX PRG Industrial Soil [2]	SEDA Maximum Detected Background Concentration	Disposal Pit A/B					
							Surface Soil			Subsurface Soil		
							Average Value [3]	UCL Value [3]	Maximum Value	Average Value [3]	UCL Value [3]	Maximum Value
VOCs												
Acetone	UG/KG	50	500,000	14,000,000	54,000,000		9.1	22.6	52			
Methylene chloride	UG/KG	50	500,000	9,100	21,000							
Trichloroethene	UG/KG	470	200,000	53	110							
Total Xylenes	UG/KG	260	500,000	270,000	420,000					32.4	226.4	520
Pesticides/PCBs												
4,4'-DDD	UG/KG	3.3	92,000	2,400	10,000							
4,4'-DDE	UG/KG	3.3	62,000	1,700	7,000		3.0	6.9	15	4.3	11.4	42
4,4'-DDT	UG/KG	3.3	47,000	1,700	7,000		4.6	16.3	42			
Alpha-BHC	UG/KG	20	3,400	90	360					2	5.6	24
Aroclor-1254	UG/KG	100	1,000	220	740		91	588	670	294	1730	3000
Aroclor-1260	UG/KG	100	1,000	220 [5]	740 [5]					25.6	34.0	150
Dieldrin	UG/KG	5	1,400	30	110		3.0	6.6	14	4.2	11	40
Endrin	UG/KG	14	89,000	18,000	180,000					3.3	6.9	20
Metals												
Cadmium	MG/KG	2.5	9.3	37	450	2.9	0.4	2.6	3.2	6.6	42.7	94.3
Chromium	MG/KG	30	1,500	210 [6]	450 [6]	32.7				20.2	32.9	83.3
Copper	MG/KG	50	270	3,100	41,000	62.8				35.8	69.8	215
Lead	MG/KG	63	1,000	400	800	266				26.1	81.7	366
Nickel	MG/KG	30	310	1,600 [7]	20,000 [7]	62.3	24.4	27.6	39.9	35.1	64.1	201
Silver	MG/KG	2	1,500	390	5,100	0.87				0.6	4.8	11.9
Zinc	MG/KG	109	10,000	23,000	100,000	126				88.1	156.1	424

Notes:

1. NYSDEC Soil Cleanup Objectives for Unrestricted Use and Restricted Commercial Use from 6 NYCRR Subpart 375-6 http://www.dec.state.ny.us/website/regs/subpart375_6.html
2. EPA Region IX Preliminary Remediation Goals (PRGs) for residential and industrial soil. On-line resources available at http://www.epa.gov/region09/waste/sfund/prg/files/prgtable2004.xls. Last updated October 2004.
3. Average and appropriate UCL values were calculated with USEPA ProUCL program, version 3.00.02, http://www.epa.gov/esd/tsc/download.htm. Half reporting limits were used for nondetects. The program recommended appropriate UCL was used. Due to the limited sample number, UCL calculated for TCE in Building 813-814 subsurface soil is above the maximum detected concentration and the maximum detected concentration was used as the UCL.
4. Only compounds with maximum detected concentrations exceeding the NYSDEC Unrestricted Use SCOs were listed in this table.
5. PRGs listed in EPA Region 9 for PCBs with high risk were used for Aroclor-1260.
6. Chromium values based on the assumption of 1:6 ratio CrVI: CrIII.
7. EPA Region 9 PRGs for soluble salts were used for nickel.
8. Data for Disposal Pit A/B and Disposal Pit C from Remedial Investigation Report (Parsons, 2002) Table 4-E through Table 4-H.
9. Data for Buildings 813/814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were used to characterize surface soil conditions in the area. The TCE concentrations detected in remaining subsurface soil during the SRI were used to characterize subsurface soil conditions in the area.

Table 2-2
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Summary Statistics and Comparison with NYSDEC Soil Cleanup Objectives
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Units	NYSDEC Unrestricted Use [1]	NYSDEC Restricted Commerical Use [1]	EPA Region IX PRG Residential Soil [2]	EPA Region IX PRG Industrial Soil [2]	SEDA Maximum Detected Background Concentration	Disposal Pit C					
							Surface Soil			Subsurface Soil		
							Average Value [3]	UCL Value [3]	Maximum Value	Average Value [3]	UCL Value [3]	Maximum Value
VOCs												
Acetone	UG/KG	50	500,000	14,000,000	54,000,000					8.5	10.8	61
Methylene chloride	UG/KG	50	500,000	9,100	21,000					9.6	27.7	180
Trichloroethene	UG/KG	470	200,000	53	110							
Total Xylenes	UG/KG	260	500,000	270,000	420,000							
Pesticides/PCBs												
4,4'-DDD	UG/KG	3.3	92,000	2,400	10,000		2.8	4.1	8.6	2.6	3.5	25
4,4'-DDE	UG/KG	3.3	62,000	1,700	7,000					2.2	2.4	6.4
4,4'-DDT	UG/KG	3.3	47,000	1,700	7,000					2.2	2.4	4.9
Alpha-BHC	UG/KG	20	3,400	90	360							
Aroclor-1254	UG/KG	100	1,000	220	740							
Aroclor-1260	UG/KG	100	1,000	220 [5]	740 [5]							
Dieldrin	UG/KG	5	1,400	30	110							
Endrin	UG/KG	14	89,000	18,000	180,000							
Metals												
Cadmium	MG/KG	2.5	9.3	37	450	2.9				0.4	2.0	6
Chromium	MG/KG	30	1,500	210 [6]	450 [6]	32.7						
Copper	MG/KG	50	270	3,100	41,000	62.8				21.5	24.1	74.5
Lead	MG/KG	63	1,000	400	800	266				26.7	70.9	431
Nickel	MG/KG	30	310	1,600 [7]	20,000 [7]	62.3				24.4	26.5	45.5
Silver	MG/KG	2	1,500	390	5,100	0.87						
Zinc	MG/KG	109	10,000	23,000	100,000	126				240	866	6080

Notes:
1. NYSDEC Soil Cleanup Objectives for Unrestricted Use and Restricted Commercial Use from 6 NYCRR Subpart 375-6 http://www.dec.state.ny.us/website/regs/subpart375_6.html
2. EPA Region IX Preliminary Remediation Goals (PRGs) for residential and industrial soil. On-line resources available at http://www.epa.gov/region09/waste/sfund/prg/files/prgtable2004.xls. Last updated October 2004.
3. Average and appropriate UCL values were calculated with USEPA ProUCL program, version 3.00.02, http://www.epa.gov/esd/tsc/download.htm. Half reporting limits were used for nondetects. The program recommended appropriate UCL was used. Due to the limited sample number, UCL calculated for TCE in Building 813-814 subsurface soil is above the maximum detected concentration and the maximum detected concentration was used as the UCL.
4. Only compounds with maximum detected concentrations exceeding the NYSDEC Unrestricted Use SCOs were listed in this table.
5. PRGs listed in EPA Region 9 for PCBs with high risk were used for Aroclor-1260.
6. Chromium values based on the assumption of 1:6 ratio CrVI: CrIII.
7. EPA Region 9 PRGs for soluble salts were used for nickel.
8. Data for Disposal Pit A/B and Disposal Pit C from Remedial Investigation Report (Parsons, 2002) Table 4-E through Table 4-H
9. Data for Buildings 813/814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were used to characterize surface soil conditions in the area. The TCE concentrations detected in remaining subsurface soil during the SRI were used to characterize subsurface soil conditions in the area.

Table 2-2
Disposal Pit A/B, Disposal Pit C, and Building 813-814 Summary Statistics and Comparison with NYSDEC Soil Cleanup Objectives
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Compound	Units	NYSDEC Unrestricted Use [1]	NYSDEC Restricted Commerical Use [1]	EPA Region IX PRG Residential Soil [2]	EPA Region IX PRG Industrial Soil [2]	SEDA Maximum Detected Background Concentration	Buildings 813/814					
							Surface Soil			Subsurface Soil		
							Average Value [3]	UCL Value [3]	Maximum Value	Average Value [3]	UCL Value [3]	Maximum Value
VOCs												
Acetone	UG/KG	50	500,000	14,000,000	54,000,000							
Methylene chloride	UG/KG	50	500,000	9,100	21,000							
Trichloroethene	UG/KG	470	200,000	53	110		407	846	3100	854	4800	4800
Total Xylenes	UG/KG	260	500,000	270,000	420,000							
Pesticides/PCBs												
4,4'-DDD	UG/KG	3.3	92,000	2,400	10,000							
4,4'-DDE	UG/KG	3.3	62,000	1,700	7,000							
4,4'-DDT	UG/KG	3.3	47,000	1,700	7,000							
Alpha-BHC	UG/KG	20	3,400	90	360							
Aroclor-1254	UG/KG	100	1,000	220	740							
Aroclor-1260	UG/KG	100	1,000	220 [5]	740 [5]							
Dieldrin	UG/KG	5	1,400	30	110							
Endrin	UG/KG	14	89,000	18,000	180,000							
Metals												
Cadmium	MG/KG	2.5	9.3	37	450	2.9						
Chromium	MG/KG	30	1,500	210 [6]	450 [6]	32.7						
Copper	MG/KG	50	270	3,100	41,000	62.8						
Lead	MG/KG	63	1,000	400	800	266						
Nickel	MG/KG	30	310	1,600 [7]	20,000 [7]	62.3						
Silver	MG/KG	2	1,500	390	5,100	0.87						
Zinc	MG/KG	109	10,000	23,000	100,000	126						

Notes:

1. NYSDEC Soil Cleanup Objectives for Unrestricted Use and Restricted Commercial Use from 6 NYCRR Subpart 375-6 http://www.dec.state.ny.us/website/regs/subpart375_6.html
2. EPA Region IX Preliminary Remediation Goals (PRGs) for residential and industrial soil. On-line resources available at http://www.epa.gov/region09/waste/sfund/prg/files/prgtable2004.xls. Last updated October 2004.
3. Average and appropriate UCL values were calculated with USEPA ProUCL program, version 3.00.02, http://www.epa.gov/esd/tsc/download.htm. Half reporting limits were used for nondetects. The program recommended appropriate UCL was used. Due to the limited sample number, UCL calculated for TCE in Building 813-814 subsurface soil is above the maximum detected concentration and the maximum detected concentration was used as the UCL.
4. Only compounds with maximum detected concentrations exceeding the NYSDEC Unrestricted Use SCOs were listed in this table.
5. PRGs listed in EPA Region 9 for PCBs with high risk were used for Aroclor-1260.
6. Chromium values based on the assumption of 1:6 ratio CrVI: CrIII.
7. EPA Region 9 PRGs for soluble salts were used for nickel.
8. Data for Disposal Pit A/B and Disposal Pit C from Remedial Investigation Report (Parsons, 2002) Table 4-E through Table 4-H
9. Data for Buildings 813/814 from the Supplemental Remedial Investigation Report (Parsons, 2006). The TCE concentrations detected in the stockpiles that were backfilled at SEAD-12 were used to characterize surface soil conditions in the area. The TCE concentrations detected in remaining subsurface soil during the SRI were used to characterize subsurface soil conditions in the area.

Table 2-3
TEST PIT CONTENTS OF DISPOSAL PIT A/B AND DISPOSAL PIT C
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Loc ID	Location	Debris/Contents	Removal Action
TP12A-1	Disposal Pit A	Misc. metal fragments	
TP12A-2	Disposal Pit A	[5-7] Instrument box [3-4] Empty drums [many] Tubes Pipe [3-4] Spool of wire Box of tools	
TP12-1	Disposal Pit A	Heavy sheet metal Broken fiberglass Electrical components Metal box with liquid – no VOCs	
TP12-2	Disposal Pit A	Large sheet metal object (maybe from a cabinet or shelving unit) (2) One gallon metal cans, with high VOCs – maybe paint cans? Electrical components Metal/fiberglass debris Light sheen on water at 6’ Debris continues below the water table	Both cans and surrounding soil were drummed and removed
TP12A-3	Disposal Pit C	Foreign components – thermal battery? (4) SEAD “Trainer” – 1950’s style	3 of the 4 Trainers were removed
TP12A-4	Disposal Pit C	Large cylindrical object composed of concrete and styrofoam	
TP12-3 (North)	Disposal Pit C	Cone-shaped objects above and below water table - gamma radiation screening – 8xbackground - paint on dial on cone likely source of rad Pocket of grease like material – no VOCs Metal lids Steel threaded pipes w/end caps Wood fragment with metal hasp Electrical components Sheet metal Styrofoam fiberglass	(6) cone-shaped objects were removed
TP12-3 (South)	Disposal Pit C	Electrical cable with connector Stacked sheet metal	
TP12-4	Disposal Pit C	Large cylindrical object (stainless steel?) (~4’ in diameter, L>3’)	Attempted, but unable to remove
TP12-5	Disposal Pit C (EM-23)	Small pieces of concrete with rebar Strands of insulated wire 1” diameter pipe	
TP12-6	Disposal Pit C (EM-23)	Concrete slab with rebar Small concrete pieces, asphalt	

Table 2-3
TEST PIT CONTENTS OF DISPOSAL PIT A/B AND DISPOSAL PIT C
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Loc ID	Location	Debris/Contents	Removal Action
TP12-7AA, 7BA, & 7BB	Disposal Pit C (EM-22, EM-21)	Steel drain pipe with wire inside Wire Culvert pipe Fired 7.62 NATO black casing Heavy gauge wire Aluminum foil	
TP12-8	Disposal Pit C (EM-21)	Railroad ties Nails 2' diameter culvert pipe sections concrete with rebar asphalt brush electrical tape	
TP12-23	Disposal Pit C (EM-23)	Pocket of ash 8" grinding disk posts and pipe pocket of black material	TP log is nondescript about location of debris
TP12A-5	Disposal Pit C	6" piece of glass	
TP12A-6	Disposal Pit C	None	
TP12A-7	Disposal Pit C	None	
TP12A-8	Disposal Pit C	None	

Table 2-4
VOLUME ESTIMATES FOR SOIL AND DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

	Surface Area (SF)	Average Depth (FT)	Approximate Volume for Excavation (CY)	% Debris	Approximate Debris Volume (CY)	Approximate Soil Volume (CY)
Disposal Pit A/B	22,500	6	5,000	10%	500	4,500
Disposal Pit C (total)	40,200		9,000		1,300	7,700
Disposal Pit C (northern area, Area 1)	13,200	4	2,000	30%	600	1,400
Disposal Pit C (southern area, Area 2)	27,000	7	7,000	10%	700	6,300
Total	62,700		14,000		1,800	12,200

Notes:
The debris volume was calculated based on the excavation volume and the percentage of debris encountered during the RI test pit investigation.
The percentage of debris was based on the thorough review of the test pit logs presented in Appendix B of the RI report.
Calculation of the percentage of debris is presented in Appendix A.

Table 2-5
TECHNOLOGY SCREENING FOR SOIL/DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

SOIL/ DEBRIS GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS	DESCRIPTION	SCREENING COMMENTS
No Action	None	Natural Degradation	No Action.	Applicable. Required as baseline response for comparison to other technologies.
Land Use Control	Access Control	Fencing and posting	Access to SEAD-12 restricted by fencing at access points. Warning signs posted.	Applicable. Effective in reducing human exposure to military debris and access to Buildings 813/814.
	Land Use Restrictions	Deed restrictions	Deed for property modified to restrict future sales and land use, or U.S. Government holds deed into perpetuity.	Applicable. May not restrict future resident exposure.
		Environmental Easement	Any institutional controls, engineering controls, use restrictions and/or any site management requirements applicable to the site will be retained in an environmental easement according to NYSDEC regulations subpart 375-1.8 (h)(2).	Applicable. Effective in reducing human exposure.
	Monitoring	Soil Monitoring	Periodic sampling soils. Monitors changes in extent of soil/sediment affected by constituents.	Not Applicable. Not necessary because the condition of the SEAD-12 source area is not expected to change significantly in the near future.
Containment	Horizontal barriers	Soil cap	Place clean fill on source areas, grade and seed.	Applicable. Effective in eliminating direct human exposure to military debris.
		Clay cap	Add one to two foot clay layer beneath soil cap.	Not cost effective compared to soil cap to eliminate direct human exposure to military debris..
		Asphalt cap	Highway-grade base and asphalt pavement over SEAD-12 source areas.	Not applicable. Not as reliable as a clay or soil cap, high maintenance.
In-Situ Treatment	Solidification	Pozzolan-portland cement	Pozzolan mixed with soil/sediment using auger type mechanism.	Not Applicable. Ineffective for military debris.
		Pozzolan-lime/flyash	Pozzolan mixed with soil/sediment using auger type mechanism.	Not Applicable. Not effective for military debris.

[shaded box] = screened

[white box] = retained

Table 2-5
TECHNOLOGY SCREENING FOR SOIL/DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

SOIL/ DEBRIS GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS	DESCRIPTION	SCREENING COMMENTS
In-Situ Treatment (cont.)		Microencapsulation	High density polyethylene is mixed with soil/sediment to form plastic frit	Not Applicable. Not effective for military debris
		Vitrification	Additives mixed into soil, electrodes placed in-ground and energy applied to electrodes. Soil/sediment and additives form molten glass that cools to a stable non-crystalline solid.	Not Applicable. Not effective for military debris.
	Extraction	Soil flushing	Constituents are extracted using surfactants, solvent (polar or non-polar) or hot water.	Not Applicable. Not effective in meeting remedial objectives for military debris.
	Biological	Bioventing	Soil is aerated to stimulate in situ biological activity and promote biodegradation of organic contaminants by enhancing/accelerating the natural biodegradation process.	Not Applicable for SEAD-12. Ineffective for military debris.
		Vegetative uptake	Area is planted with coniferous and deciduous trees that uptake constituents through root system and incorporate them into wood mass.	Not Applicable. Ineffectiveness for military debris.
		Vacuum extraction	Apply negative pressure to vadose zone well system and treat soil vapor off-gas (via carbon filter, biofilter, catalytic incinerator, chemical oxidation or plasma reactor	Not Applicable. Not practical for small volume of soil at SEAD-12 that is impacted by VOCs.

[shaded box] = screened

[unshaded box] = retained

Table 2-5
TECHNOLOGY SCREENING FOR SOIL/DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

SOIL/ DEBRIS GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS	DESCRIPTION	SCREENING COMMENTS
In-Situ Treatment (cont.)	Soil Vapor Extraction	Radiowave volatilization	Apply radio frequency to soil, extract soil vapor and treat.	Not applicable. Not a proven technology.
Removal	Excavation	Earthmoving/Excavation	Wheeled, bulk scraper, removes surficial or subsurficial soil into storage compartment.	Applicable. Effective. Used for relatively large quantities of soil.
	Building Demolition	Earthmoving/Building Demolition	Excavators equipped with buckets, grapples, shears and/or hydraulic hammers will be used to demolish the structures.	Applicable. Effective. Used for building demolition.
Ex-Situ Treatment	Biological	Aerobic	Microbes cultivated to degrade constituents under aerobic conditions. Includes composting, land farming and slurry reactors.	Not Applicable. Not effective for military debris.
		Anaerobic	Microbes cultivated to degrade constituents under anaerobic conditions, typically an in-vessel process.	Not Applicable. Not effective for military debris.
	Physical Solidification	Pozzolan-portland cement	Pozzolan mixed with soil/sediment using auger type mechanism.	Not Applicable. Wastes at Disposal Pits are not amenable.
		Pozzolan-lime/flyash	Pozzolan mixed with soil/sediment using auger type mechanism.	Not Applicable. Wastes at Disposal Pits are not amenable.
		Asphalt Batching	Asphalt mixed with soil/sediment using an auger type mechanism.	Not Applicable. Wastes at Disposal Pits are not amenable.
		Micro-encapsulation	High density polyethylene is mixed with soil/sediment to form plastic frit.	Not Applicable. Wastes at Disposal Pits are not amenable.
	Physical Separation	Soil/Debris separation	Standard construction equipment will be used for physical separation.	Applicable. May be used to classify soils/debris prior to treatment or disposal.
Ex-Situ Treatment (cont.)	Physical Separation	Magnetic classification	Soils subjected to magnetic field to remove ferrous metals.	Not Applicable. Not practical for separation of military

[shaded box]	=	screened
[blank box]	=	retained

Table 2-5
TECHNOLOGY SCREENING FOR SOIL/DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

SOIL/ DEBRIS GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS	DESCRIPTION	SCREENING COMMENTS
	(cont.)			debris found at SEAD-12.
	Oxidation-thermal	High temperature processes	Includes: electric reactor, fluid bed incinerator, molten salt, multi-hearth incinerator, rotary kiln incinerator, plasma arc incinerator and catalytic incinerator.	Not Applicable. Ineffective for military debris. Not enough soil to justify construction of an on-site incinerator.
		Low temperature processes	Soils subjected to <800^{o} heat to drive off volatile organic compounds.	Not Applicable. Ineffective for military debris.
	Oxidation-other	Supercritical air/water oxidation	Soil mixed with water and excess air under supercritical pressure and temperature.	Not Applicable. Not a proven technology. Ineffective for military debris.
		Chemical	Oxidizing agent such as hydrogen peroxide or potassium permanganate solution mixed into soil.	Not Applicable. Not a proven technology. Ineffective for military debris.
		Microwave plasma	Microwave frequency electromagnetic radiation applied to soil.	Not Applicable. Not a proven technology. Ineffective for military debris.
	Chemical-extraction	Supercritical extraction	Constituents extracted in countercurrent process using carbon dioxide, propane or other highly volatile solvent under supercritical temperature and pressure conditions. Solvent is separated from extracted constituents (flashed or distilled) and recycled.	Not Applicable. Not practical for volume of soil at SEAD-12. .Ineffective for military debris.
		Aqueous solvent	Constituents extracted using aqueous solvent such as acid, base, salt or surfactant solutions. Extracted soil is rinsed. Solvent and rinsewater treated and recycled.	Not Applicable. Not practical for volume of soil at SEAD-12. Ineffective for military debris.
		Amine Extraction	Constituents extracted using secondary or tertiary amines. Amines are separated from solids and recycled.	Not Applicable. Not practical for volume of soil at SEAD-12. Ineffective for military debris.
Disposal	Solids Handling	Backfill on-site	Reuse of non-contaminated soils as backfill in excavated areas.	Applicable.

(shaded box) = screened

(white box) = retained

Table 2-5
TECHNOLOGY SCREENING FOR SOIL/DEBRIS REMEDIATION
SEAD-12 Feasibility Study
Seneca Army Depot Activity

SOIL/ DEBRIS GENERAL RESPONSE ACTION	REMEDIAL TECHNOLOGY	PROCESS	DESCRIPTION	SCREENING COMMENTS
		Subtitle D landfill	Disposal of non-hazardous. Local or regional landfill, that accepts industrial solid waste (off-site or constructed on-site)	Applicable. Must comply with EPA Subtitle D and 6 NYCRR Part 360 requirements.
		Landfill for radiologiclally-impacted material	Disposal of radiologically-impacted soil/debris (off-site).	Applicable. Required for radiologically-impacted soil/debris.

(shaded box)	=	screened
(blank box)	=	retained

Table 3-1
ASSEMBLED REMEDIAL ACTION ALTERNATIVES
SEAD-12 FEASIBILITY STUDY
Seneca Army Depot Activity

Alternatives	Technologies and Processes
1	No-Action.
2	Excavation and Disposal in Off-Site Landfill/Environmental Easement
3	On-Site Capping and Containment/Environmental Easement
4	Excavation/Disposal/Building Demolition for Unrestricted Use

Table 3-2
SCREENING OF REMEDIAL ACTION ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

ALT.	TECHNOLOGY AND PROCESS	EFFECTIVENESS						IMPLEMENTIBILITY			TOTAL SCORE	OVERALL RANKING
		SHORT-TERM HUMAN HEALTH AND ENVIRONMENTAL PROTECTIVENESS	LONG-TERM HUMAN HEALTH & ENVIRONMENTAL PROTECT-IVENESS	REDUCTION OF TOXICITY	REDUCTION OF MOBILITY	REDUCTION OF VOLUME	PERM-ANENCE	TECH-NICAL FEASI-BILITY.	ADMINIS-. TRATIVE FEASI-BILITY.	AVAI-. LABILITY OF SERVICES AND MATERIALS		
1	No Action	6	1	1	1	1	1	6	1	6	24	3
2	Excavation Off-Site Disposal Environmental Easement	3	4	1	3	3	4	3	4	4	29	2
3	Capping/Containment Environmental Easement	4	3	1	1	1	2	2	3	5	22	4
4	Excavation Off-Site Disposal Building Demolition for Unrestricted Use	2	4	1	4	3	5	3	4	4	30	1

Note: Alternatives were scored from 1 to 6 for each screening criterion. The score of 1 represents the least favorable score and 6 represents the most favorable score.
The alternative with the highest total score represents the most favorable alternative. Within each screening criterion, alternatives were scored from one to six for each subcategory.
The total score of all subcategories is the basis for the scoring for the screening criterion.

Table 4-1
COST ESTIMATE SUMMARY FOR REMEDIAL ACTION ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Costs	**Reference Table**	**Alternative 2 Excavation of Soil/Debris, Off-site Disposal of Debris, and Environmental Easement**		**Alternative 4 (unrestricted) Excavation of Soil/Debris, Off-site Disposal of Debris, Vapor Intrusion Study, and Buildings 813/814 Demolition**	
Disposal Pits A/B and C					
Capital Costs					
Remedial Design	A-2	$	158,000	$	158,000
Mobilization/Demobilization	A-2	$	39,000	$	39,000
Rad Sampling, Testing, & Air Monitoring	A-2	$	41,000	$	41,000
Site Services	A-2	$	355,000	$	355,000
Soil/Debris Excavation, Backfill and Disp.	A-2	$	1,124,000	$	1,124,000
Cost to Prime		**$**	**1,717,000**	**$**	**1,717,000**
Field Office Support (5%)		$	86,000	$	86,000
Home Office Support (15%)		$	270,000	$	270,000
Profit (10%)		$	207,000	$	207,000
Bond (4%)		$	91,000	$	91,000
Cost to Owner		**$**	**2,371,000**	**$**	**2,371,000**
Buildings 813/814 Area					
Capital Costs					
Vapor Intrusion Study	A-4		NA	$	94,000
Building Demolition	A-6		NA	$	224,000
Cost to Prime		**$**	**-**	**$**	**318,000**
Field Office Support (5%)		$	-	$	16,000
Home Office Support (15%)		$	-	$	50,000
Profit (10%)		$	-	$	38,000
Bond (4%)		$	-	$	17,000
O&M Costs					
Environmental Easement [1]	A-2	$	74,000		NA
Cost to Owner		**$**	**74,000**	**$**	**440,000**
SEAD-12 Total					
TOTAL PRESENT WORTH COST (±25-50%)		**$**	**2,445,000**	**$**	**2,811,000**

Notes:
1.The present worth cost associated with environmental easement was calculated based on an annual $3,000 cost, along with a discount rate of 7% and a 30-year time interval.
2. Refer to Appendix A, Tables A-1 through A-6, for cost estimate information and backup quantity estimate information.

Table 4-2
INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Criteria	Alternative 1 No Action	Alternative 2 Excavation, Disposal, Environmental Easement	Alternative 4 Excavation, Disposal, Buildings 813/814 Demolition for Unrestricted Use
OVERALL PROTECTIVENESS			
Human Health Protection			
- Direct Contact/Soil Ingestion	No risk exists. Removal of military debris not addressed.	No risk exists. Alternative addresses removal of military debris.	No risk exists. Alternative addresses removal of military debris.
- Groundwater Ingestion for Existing Users	No risk exists.	No risk exists.	No risk exists.
-Groundwater Ingestion of Future Users	No risk exists.	No risk exists.	No risk exists.
-Indoor Air Inhalation by Future Users	No reduction in risk.	Environmental Easement reduces potential exposure to indoor air potentially impacted by contaminated soil.	Building demolition and excavation of contaminated soil underneath building foundation eliminates exposure to indoor air potentially impacted by contaminated soil.
Environmental Protection	Allows military debris to remain on site and TCE in soil over unrestricted use value.	Removes potential contact with military debris and limits potential exposure to indoor air potentially impacted by TCE contaminated soil.	Removes potential contact with military debris. Removes TCE levels exceeding NYSDEC unrestricted use soil cleanup goal.
COMPLIANCE WITH ARARs			
Chemical-Specific ARARs	Not identified for SEAD-12. Chemicals Of Concern were not identified during the risk assessment.	See Alternative 1	See Alternative 1
Location-Specific ARARs	Not identified for SEAD-12.	See Alternative 1	See Alternative 1
Action-Specific ARARs	Not applicable, the precise action specific ARARs to be used will be subsequently determined by the Army based upon the technology chosen.	See Alternative 1	See Alternative 1
Other Criteria and Guidance	Not applicable.	See Alternative 1	See Alternative 1

Table 4-2
INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Criteria	**Alternative 1** **No Action**	**Alternative 2** **Excavation, Disposal, Environmental Easement**	**Alternative 4** **Excavation, Disposal, Buildings 813/814 Demolition for Unrestricted Use**
LONG-TERM EFFECTIVENESS AND PERMANENCE			
Magnitude of Residual Risk			
- Direct Contact/Soil Ingestion	No risk exists. Potential contact with military debris not removed or reduced.	No risk exists. Alternative addresses potential contact with military debris.	No risk exists. Alternative addresses potential contact with military debris.
- Groundwater Ingestion for Existing Users	No risk exists.	No risk exists.	No risk exists.
- Groundwater Ingestion of Future Users	No risk exists.	No risk exists.	No risk exists.
-Indoor Air Inhalation by Future Users	No reduction in risk.	Environmental Easement reduces potential risks via exposure to indoor air potentially impacted by contaminated soil.	Building demolition and excavation of contaminated soil underneath building foundation eliminates exposure to indoor air potentially impacted by contaminated soil.
Adequacy and Reliability of Controls	No controls over remaining contamination. No reliability.	Excavation of the military debris are permanent solutions. Easement on the property ensures that any potential future land owner considering occupancy of these buildings must conduct an indoor air assessment.	Excavation of the military debris and building demolition are permanent solutions.
Need for 5-Year Review	Review would be required to ensure adequate protection of human health and environment is maintained.	See Alternative 1. TCE would remain onsite under Building 813-814 foundation.	Not needed.
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT			
Treatment Process Used	None	Excavation	Excavation/Demolition
Amount Destroyed or Treated	None	None.	None.
Reduction of Toxicity, Mobility, or Volume	None	Significant reduction due to the removal of the military debris.	Significant reduction due to the removal of the military debris and soil potentially impacted by TCE.
Irreversible Treatment	None	None.	None.
Type and Quantity of Residuals Remaining After Treatment	Military debris and TCE contaminated soil still remain at SEAD-12.	Detectable residuals of TCE under Building 813-814.	None.
Statutory Preference for Treatment	Does not satisfy.	To be determined.	To be determined.

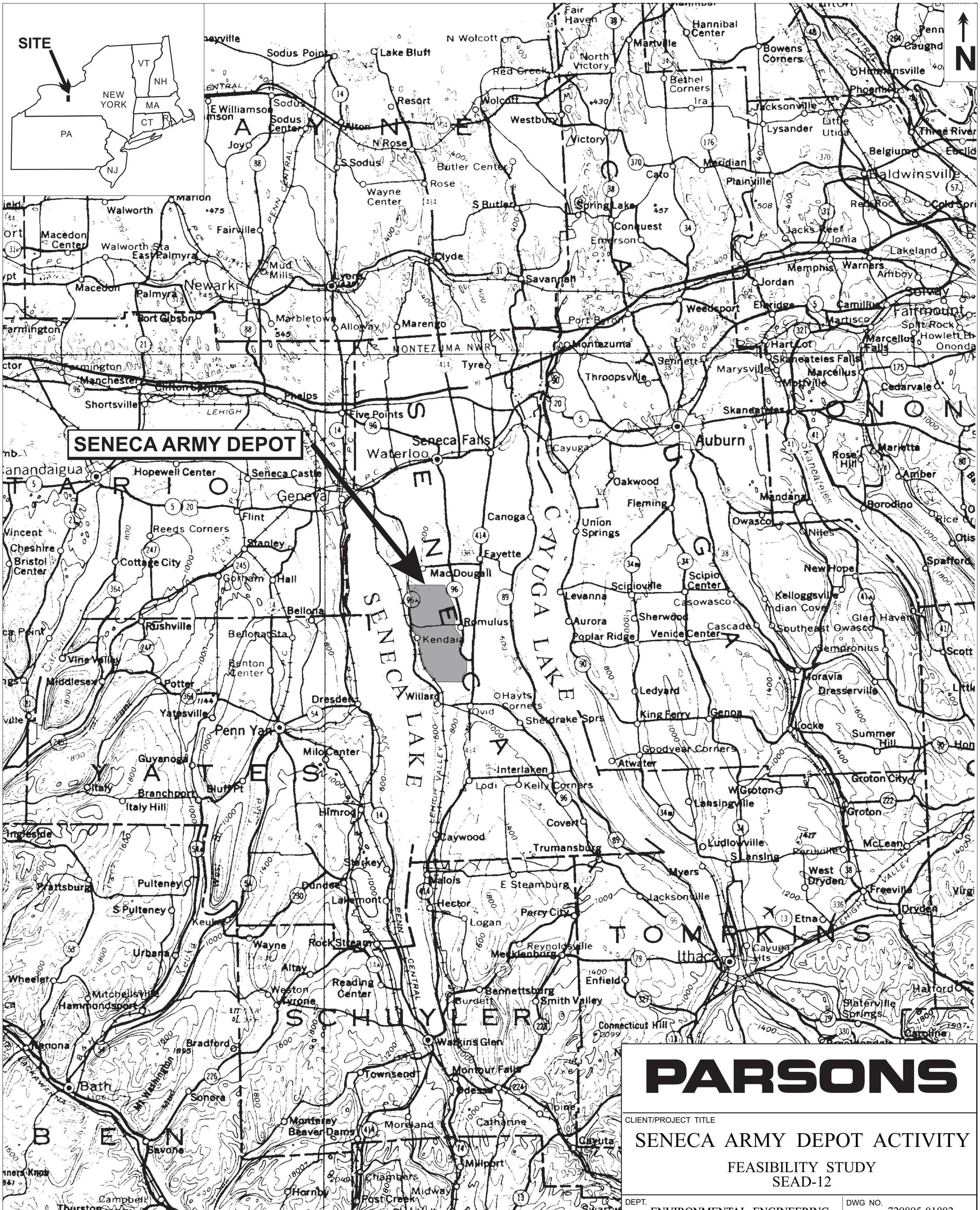
Table 4-2
INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Criteria	**Alternative 1** **No Action**	**Alternative 2** **Excavation, Disposal, Environmental Easement**	**Alternative 4** **Excavation, Disposal, Buildings 813/814 Demolition for Unrestricted Use**
		SHORT-TERM EFFECTIVENESS	
Community Protection	Risk to community not increased by remedy implementation.	Dust generation from excavation, treatment, and hauling operations; limited impact on community due to remoteness of site. Increase traffic in area from hauling operation.	Dust generation from excavation, treatment, building demolition, and hauling operations; limited impact on community due to remoteness of site. Increase traffic in area from hauling operation.
Worker Protection	Not applicable	Dermal contact and inhalation of particulates. Indoor air quality review required before any buildings are occupied.	Dermal contact and inhalation of particulates.
Environmental Impacts	Continued impact from existing conditions.	Potential surface runoff and airborne dust and particulates could be generated during excavation, treatment, and hauling operations.	Potential surface runoff and airborne dust and particulates could be generated during excavation, treatment, building demolition, and hauling operations.
Time Until Action is Complete	Not applicable	2 months.	5 months.

Table 4-2
INDIVIDUAL EVALUATION OF FINAL ALTERNATIVES
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Criteria	Alternative 1 No Action	Alternative 2 Excavation, Disposal, Environmental Easement	Alternative 4 Excavation, Disposal, Buildings 813/814 Demolition for Unrestricted Use
		IMPLEMENTABILITY	
Ability to Construct and Operate	No construction or operation.	Simple to operate excavation, treatment, and hauling activities.	Simple to operate excavation, treatment, building demolition, and hauling activities.
Ease of Doing More Action if Needed	If monitoring indicates more action is necessary, may need to go through the FS/ROD process again.	Expansion of excavation area based on visual observation and radiological screening	Expansion of excavation area based on visual observation and radiological screening
Ability to Monitor Effectiveness	No monitoring actives are planned.	Visual observation and radiological screening to be used to monitor effectiveness.	Visual observation and radiological screening to be used to monitor effectiveness. Chemical analysis for TCE screening.
Ability to Obtain Approvals and Coordinate with Other Agencies	No approval necessary.	Likely to receive approval from agencies	Likely to receive approval from agencies
Availability of Services and Capacities	No services or capacities required.	EPA and NYSDEC are involved in the entire remedial program allowing the selection of a remedy that all parties find acceptable. Radiologically-impacted debris and soils will need to be disposed at an out-of-state disposal facility and interstate travel may be required.	EPA and NYSDEC are involved in the entire remedial program allowing the selection of a remedy that all parties find acceptable. Radiologically-impacted debris and soils will need to be disposed at an out-of-state disposal facility and interstate travel may be required.
Availability of Equipment, Specialists, and Materials	None required.	All of the equipment and services required for implementation are currently readily available from a number of qualified contractors.	All of the equipment and services required for implementation are currently readily available from a number of qualified contractors.
Availability of Technology	None required.	All of the equipment/technology required for implementation are currently readily available from a number of qualified contractors.	All of the equipment/technology required for implementation are currently readily available from a number of qualified contractors.
		COST	
Capital Cost	No cost	$ 2,371,000	$ 2,811,000
Annual O&M Cost	No cost	$ 3,000	No cost
Present Worth Cost	No cost	$ 2,445,000	$ 2,811,000

FIGURES



PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

FEASIBILITY STUDY
SEAD-12

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 729895-01002

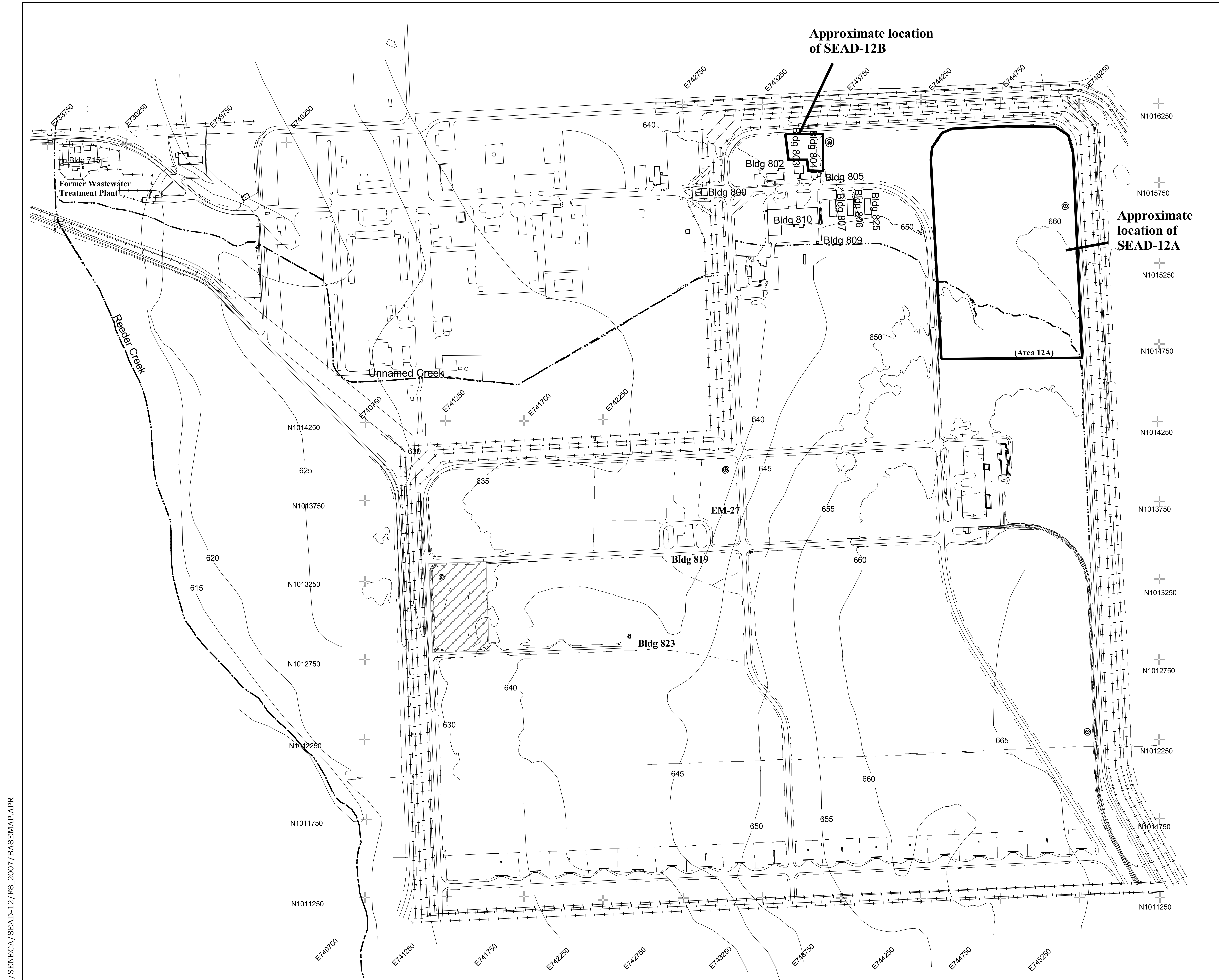
FIGURE 1-1

LOCATION MAP

SCALE 1"= 8 MILES APPROX.

DATE MARCH 2007

R:\PROJECT-GRAPHICS\SENECA\LOCMP1-1.CDR(CLD)



LEGEND

POTENTIAL RELEASE AREA

BUILDINGS (Bldg)

SEAD-63

FENCE

ROADS

WATER

DRAINAGE

630
GROUND ELEVATION CONTOURS (5 FOOT INTERVALS)

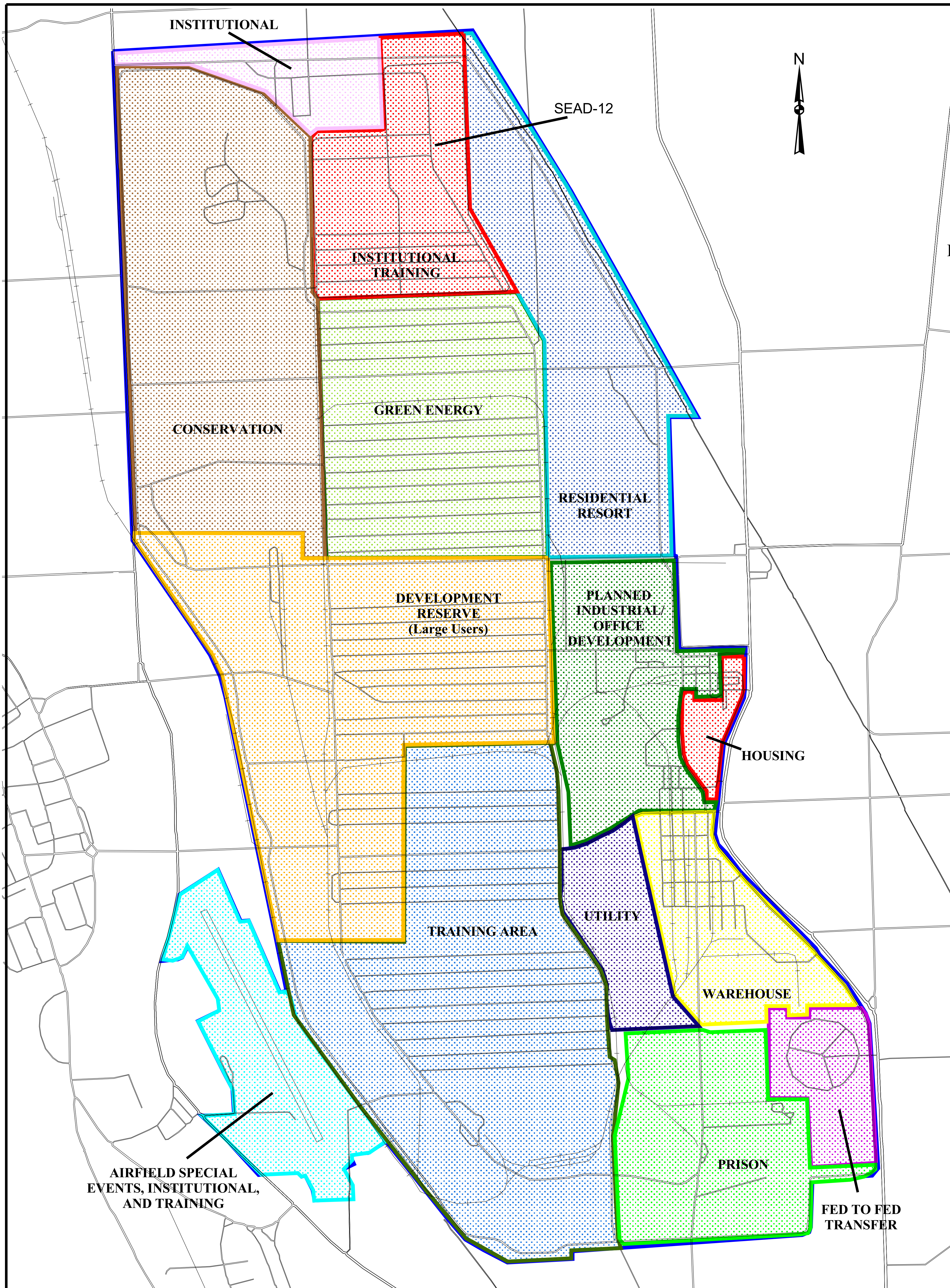
300 0 300 600 900 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 1-2
SITE PLAN - SEAD-12

SCALE	DATE	REV	
1:600	JAN 2008		Sheet 1 of 1



LEGEND

4000 0 4000 8000 Feet

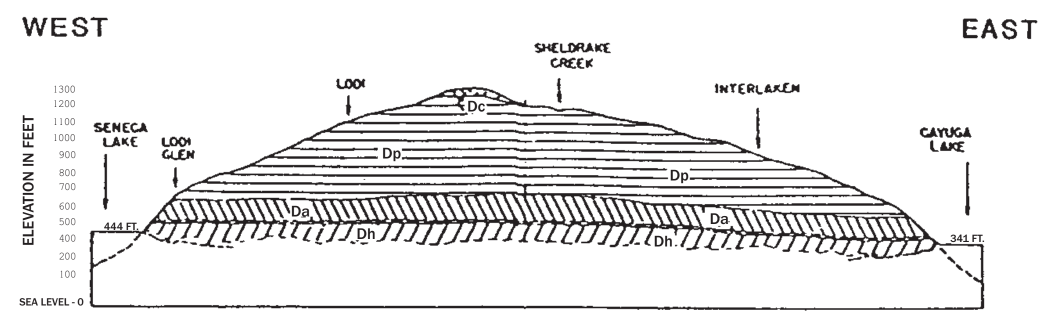
PARSONS

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

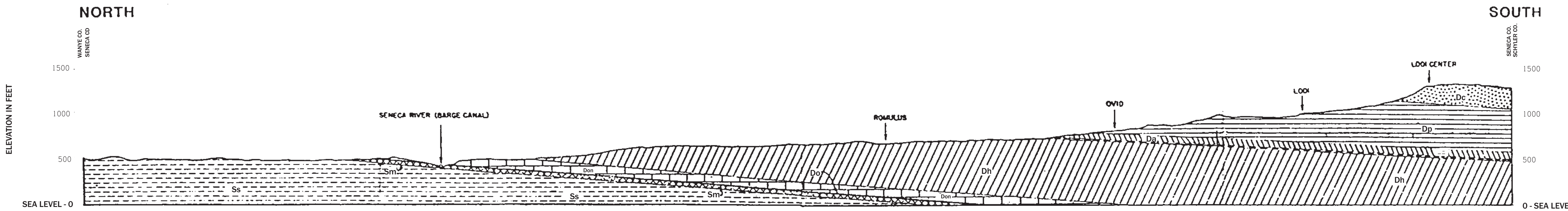
FIGURE 1-3
FUTURE LAND USE AND
SITE LOCATION

SEDA | March 2007

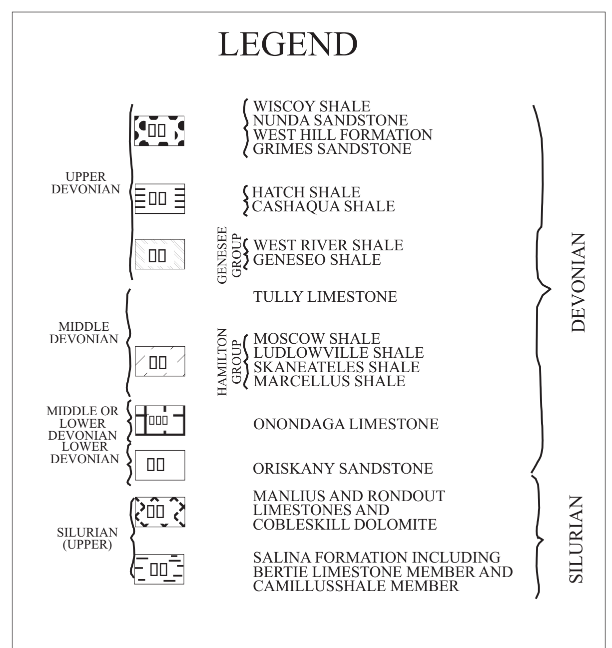
O:\Seneca\Sead-12\s-12_future_landuses.apr\Figure 1 - Land Use & Site Locations

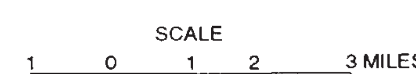


EAST-WEST SECTION ALONG A- A'



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





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

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

FEASIBILITY STUDY
SEAD-12

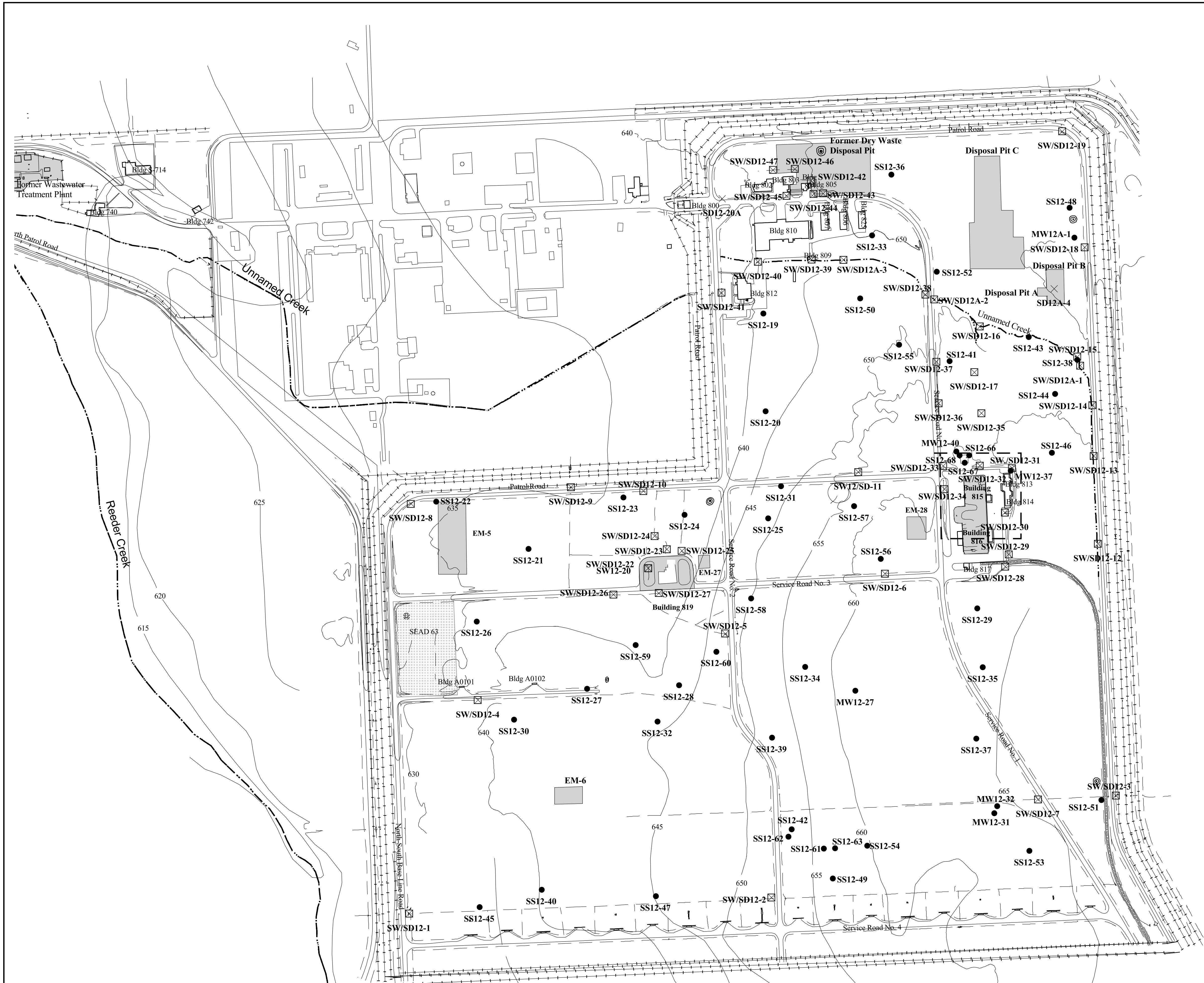
DEPT. ENVIRONMENTAL ENGINEERING	DWG NO. 7346026-01001

FIGURE 1-4

REGIONAL GEOLOGIC CROSS SECTIONS

SCALE AS NOTED	DATE MARCH 2007

R:\GRAPHICS\SENECA\SEAD-12\GEOXSEC.CDR(CVM)



LEGEND

- ● SS12-153 Surface Soil sample with Loc_ID
- × SD12-153 Sediment sample with Loc_ID
- □ SW12-153 Surface Water sample with Loc_ID
- Potential Release Area
- See Figure 1-7 for SRI Temporary and Permenant Monitoring Wells, and Surface Water and Ditch Soil Sample Locations

N

300 0 300 600 Feet

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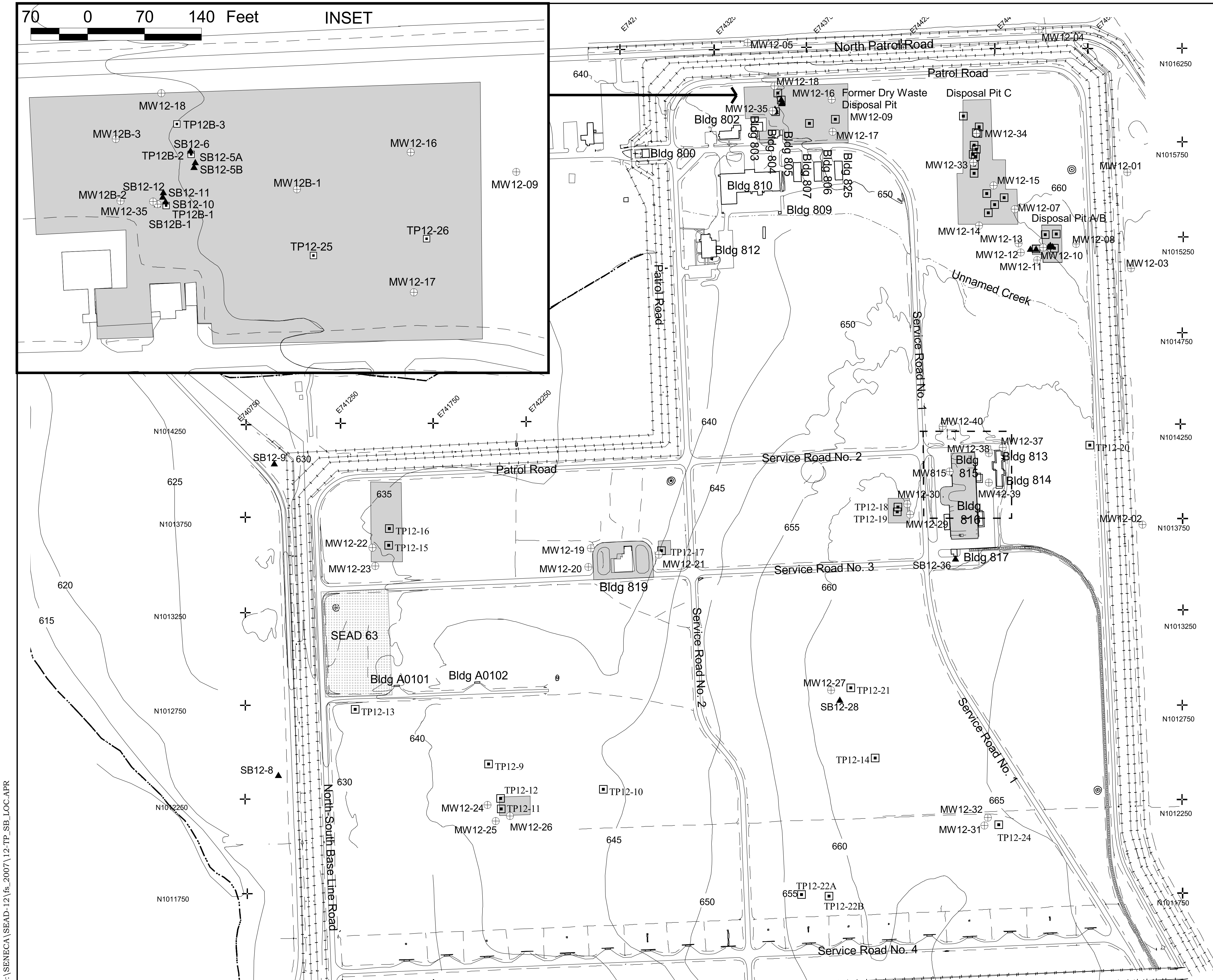
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 1-5
SURFACE SOIL, SEDIMENT, AND SURFACE WATER SAMPLING LOCATIONS

SCALE	DATE	REV	
SEE SCALE	JUN 2007		Sheet 1 of 1

O:\SENECA\SEAD-12\FS_2007\SS_LOCS.APR



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FEASIBILITY STUDY
SEAD-12

FIGURE 1-6
SOIL BORING, MONITORING WELL, AND TEST PIT LOCATIONS

SCALE 1:500	DATE JUN 2007	REV	Sheet 1 of 1

LEGEND

MW12-37 657.98 — PERMANENT MONITORING WELL LOCATION - RI AND JUNE 2004 GROUNDWATER ELEVATION (FT ABOVE MSL)

TW12-3 659.56 — TEMPORARY WELL LOCATION AND JUNE 2004 GROUNDWATER ELEVATION (FT ABOVE MSL)

Green Symbol - 1st Round
Red Symbol - 2nd Round

SW/SD12-72 — SURFACE WATER/DITCH SOIL SAMPLE LOCATION - SRI

TW12-3 — WELLS REMAINING POST SUPPLEMENTAL RI INVESTIGATION

MW12-38 — WELLS REMAINING POST SUPPLEMENTAL RI INVESTIGATION

50 0 50 Feet

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FEASIBILITY STUDY
SEAD-12

FIGURE 1-7
SRI TEMPORARY WELL AND SURFACE WATER/DITCH SOIL SAMPLE LOCATIONS

SCALE 1:50 DATE JUNE 2007

o:\seneca\sead-12\supp_ri_phase 2.apr\sri 2-3 tw and sw sampling locations

Stockpile	Samples Collected	Date	TCE Concentration	Average Stockpile Concentration
(approx. 150 tons)	SP813-3 SP813-3(D) SP813-4 SP813-5	12/9/04 12/9/04 12/9/04 12/9/04	3,100 ug/Kg 190 ug/Kg 110 ug/Kg 9.3 ug/Kg	588.1 ug/Kg * (backfilled)
(approx. 120 tons)	SP813-6 SP813-7 SP813-12 SP813-13 SP813-14	12/9/04 12/9/04 7/22/05 7/22/05 7/22/05	7,400 ug/Kg 1,700 ug/Kg 510J ug/Kg 240J ug/Kg 130J ug/Kg	4,550 ug/Kg 293 ug/Kg (plan to backfill)
(approx. 40 tons)	SP813-8 SP813-9 SP813-10 SP813-11 SP813-17	12/21/04 7/22/05 7/22/05 7/22/05 11/28/05	18,000 ug/Kg 160J ug/Kg 110J ug/Kg 410J ug/Kg 3.4J ug/Kg	171 ug/Kg (plan to backfill)
(approx. 40 tons)	SP813-15 SP813-16	7/22/05 7/22/05	670U ug/Kg 22,000J ug/Kg	11,168 ug/Kg (additional testing)

* Concentration used for SP813-3 = (SA + DU)/2

LEGEND

TP813-2T
Soil Sample Location in Excavation
T suffix - temporary sample location removed during next phase of excavation
F suffix - final confirmatory sample location

SP813-2
Stockpile Sample Location

Approximate Area of Excavation

Stockpile Groups

Phase I and Phase II - visually unimpacted Returned to excavation

Phase II - visually impacted Plan to backfill

Phase IIIA - visually impacted Plan to backfill

Phase IIIB - visually impacted Stockpiled pending further analysis

N

20 0 20 40 Feet

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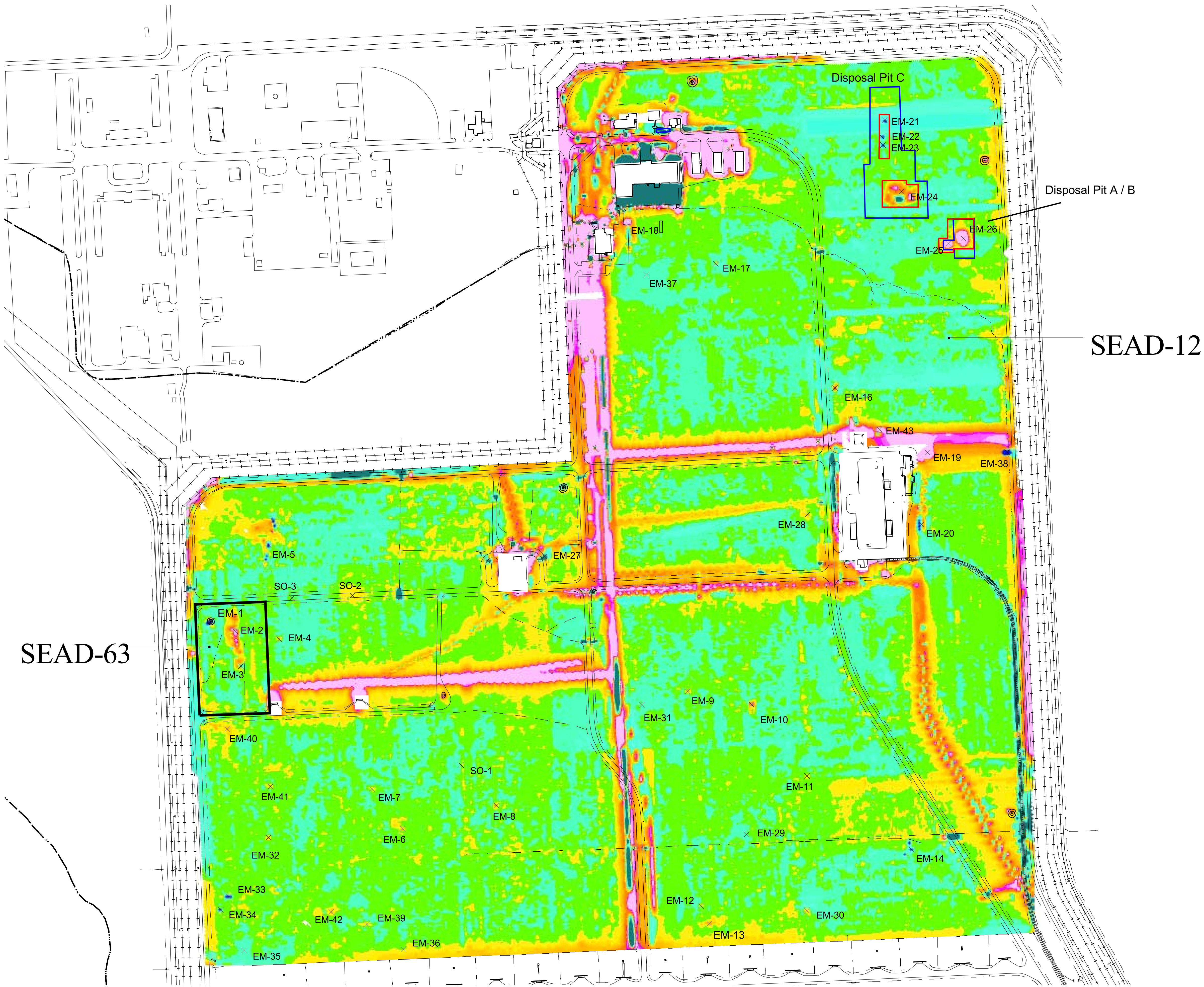
FEASIBILITY STUDY
SEAD-12

FIGURE 1-8
SRI SAMPLE LOCATIONS FROM TEST PIT AND STOCKPILE

SCALE 1:30 | DATE JUNE 2007

o:\seneca\sead-12\supp_ri.apr\sri 3-3 stockpile concentrations



LEGEND

× EM-24

INTERPRETED EM-31 IN-PHASE ELECTROMAGNETIC ANOMALY

DISPOSAL PIT BOUNDARY

AREA TO BE EXCAVATED

500 0 500 Feet

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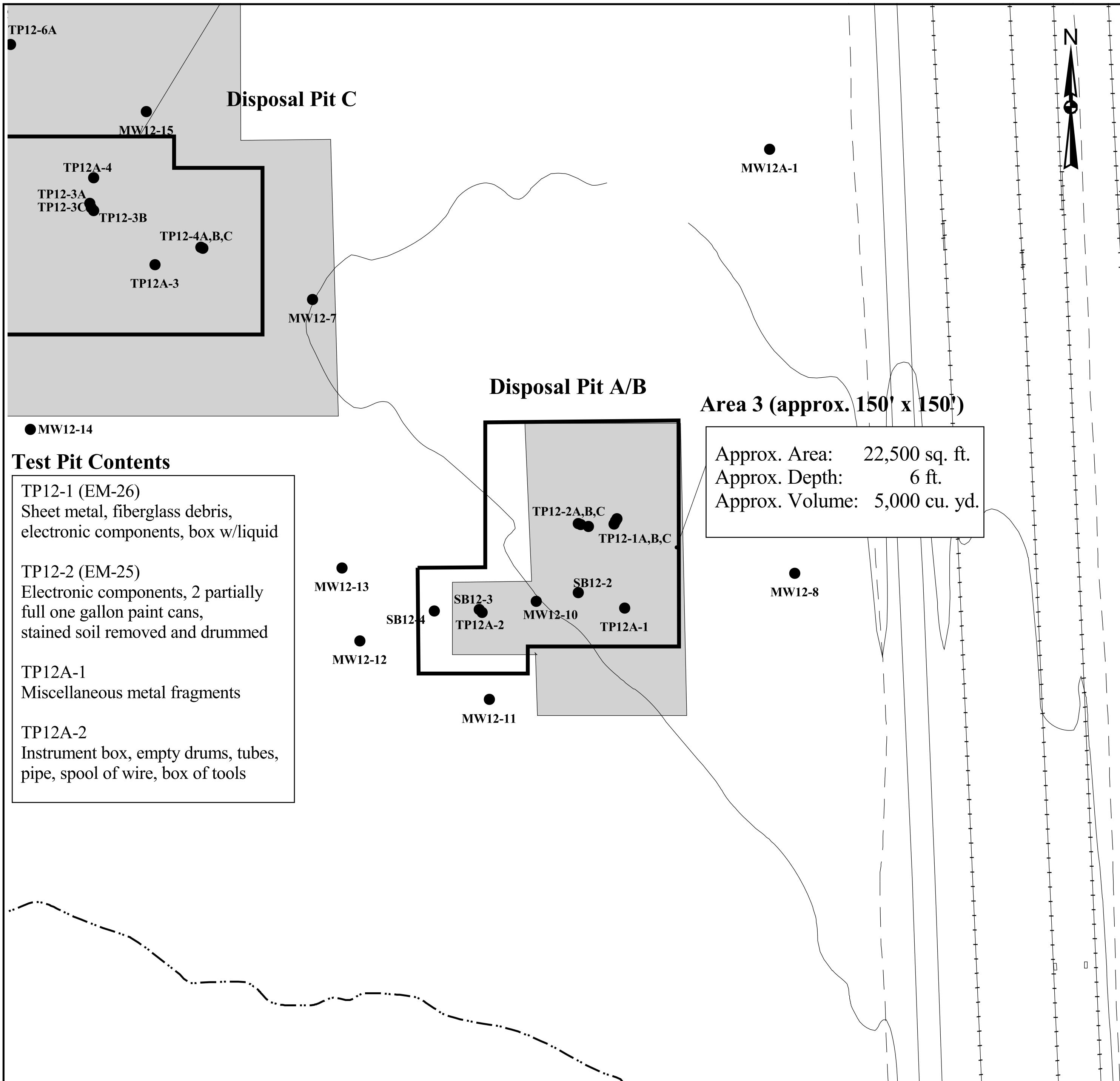
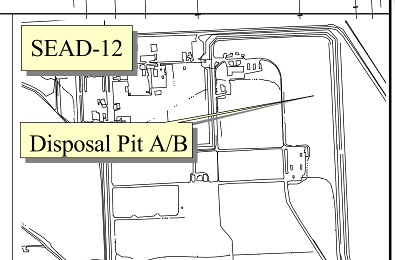
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 2-1
COLOR ELECTROMAGNETIC DATA MAP FOR SEAD-12 AND SEAD-63

SCALE	DATE	REV	
1:500	MAR 2007		Sheet 1 of 1

O:\AV_GIS30\SENECA\SEAD12\SAMPLELO\EM31BLOB.APR





LEGEND

MW12-15 Sub-surface Soil sample with Loc_ID.

Potential Release Area

Area to be Excavated

100 0 100 Feet

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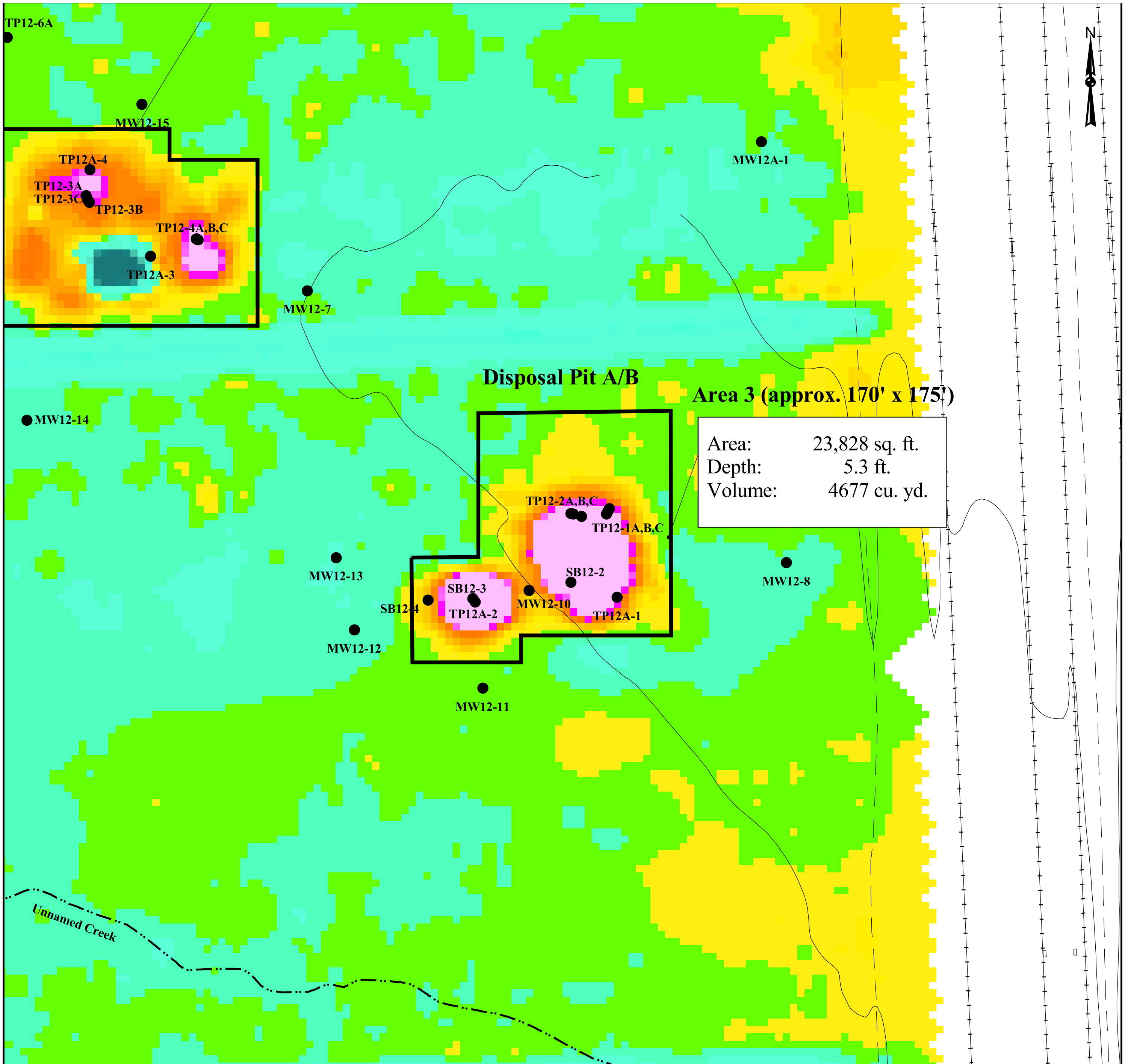
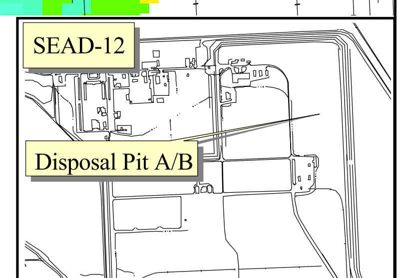
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 2-2
REMEDIATION VOLUME ESTIMATE
FOR SOIL AT DISPOSAL PIT A/B

SCALE	DATE	REV	
1:100	DEC 2007		Sheet 1 of 1

O:\SENECA\SEAD-12\FS_2007\SUB_SOIL.APR\(1)Disposal Pit a/b (8.5 x 11)(FIG 2-2)





LEGEND

● MW12-15 — Sub-surface Soil sample with Loc_ID.

▬ Area to be Excavated

100 0 100 Feet

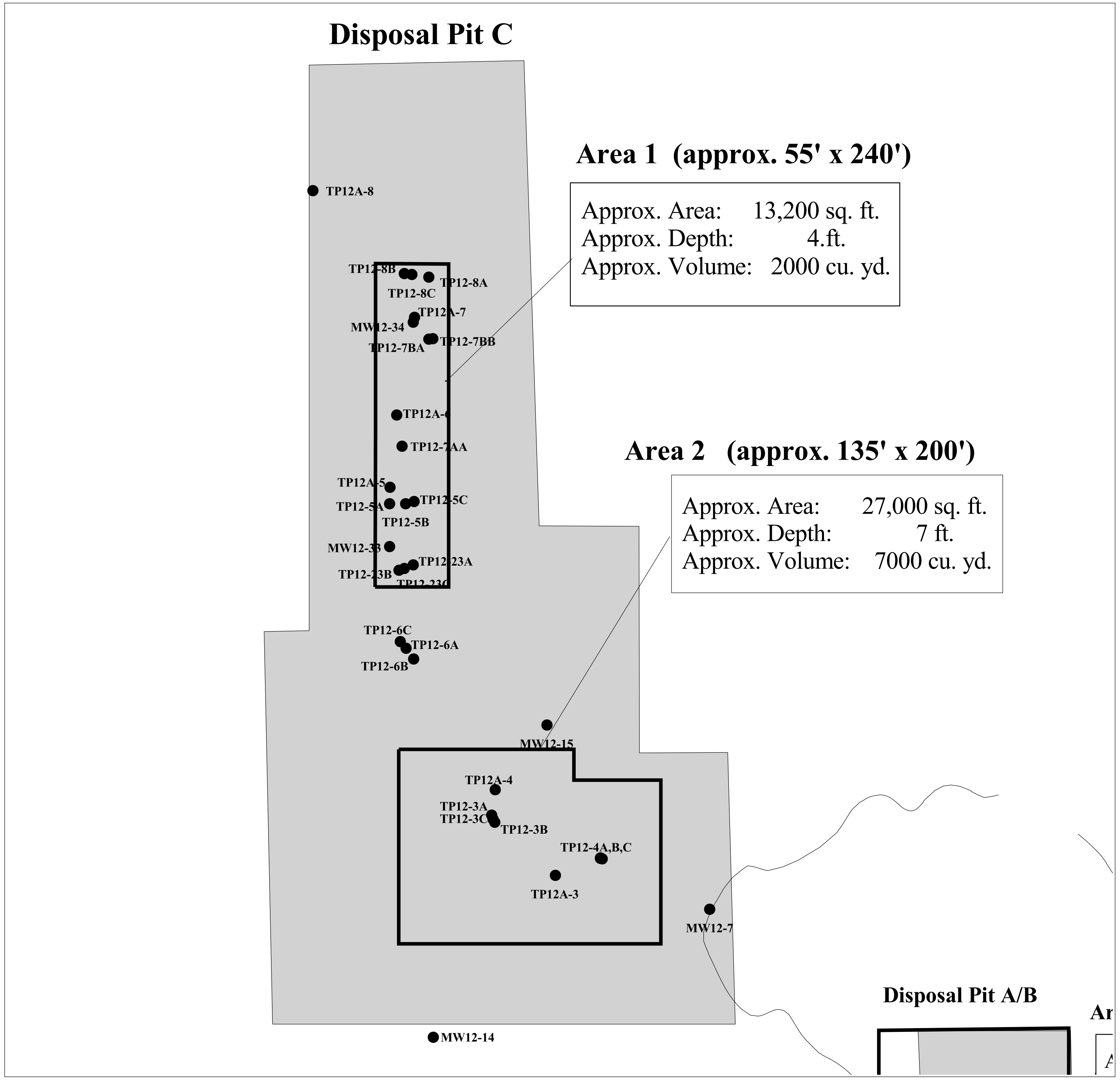
O:\SENECA\SEAD-12\FS_2007\SUB_SOIL.APR

PARSONS

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 2-3
ELECTROMAGNETIC DATA AND
REMEDIATION VOLUME ESTIMATE
FOR SOIL AT DISPOSAL PIT A/B

SCALE	DATE	REV	
1:100	MAR 2007		Sheet 1 of 1



Test Pit Contents

TP12-8 (EM-21)
Concrete, rebar and wire construction debris

TP12-7A (EM-22)
Steel pipe, culvert sections

TP12-5 (EM-23)
Concrete and rebar construction debris

TP12-23 (EM-23)
Steel posts, pipe, lumber

TP12-6 (EM-23)
Concrete and rebar construction debris, asphalt road

TP12-3 (EM-24)
Sheet metal, fiberglass, styrofoam, electrical debris,
cone shaped military items removed and drummed

TP12-4 (EM-24)
Large stainless steel cylinder found but not removed

TP12A-8
None

TP12A-7
None

TP12-7B
Culvert pipe, fired NATO 7.62 black casing,
heavy gauge wire, aluminum foil

TP12A-6
None

TP12A-5
Piece of glass

TP12A-4
Large cylindrical object composed
of concrete and styrofoam

TP12A-3
Foreign components,
(4) SEAD 'Trainer' 1950's style

N

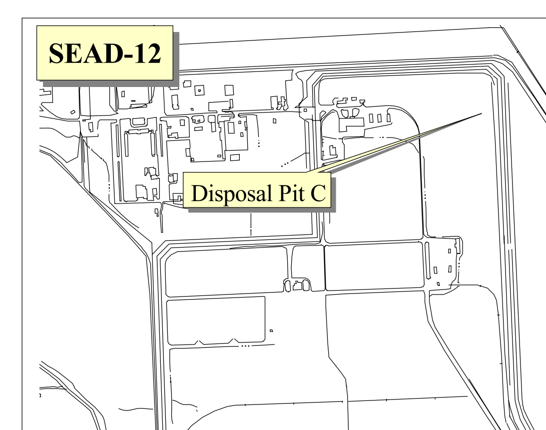
LEGEND

MW12-15 Sub-surface Soil sample with Loc_ID.

Potential Release Area

Area to be Excavated

100 0 100 Feet



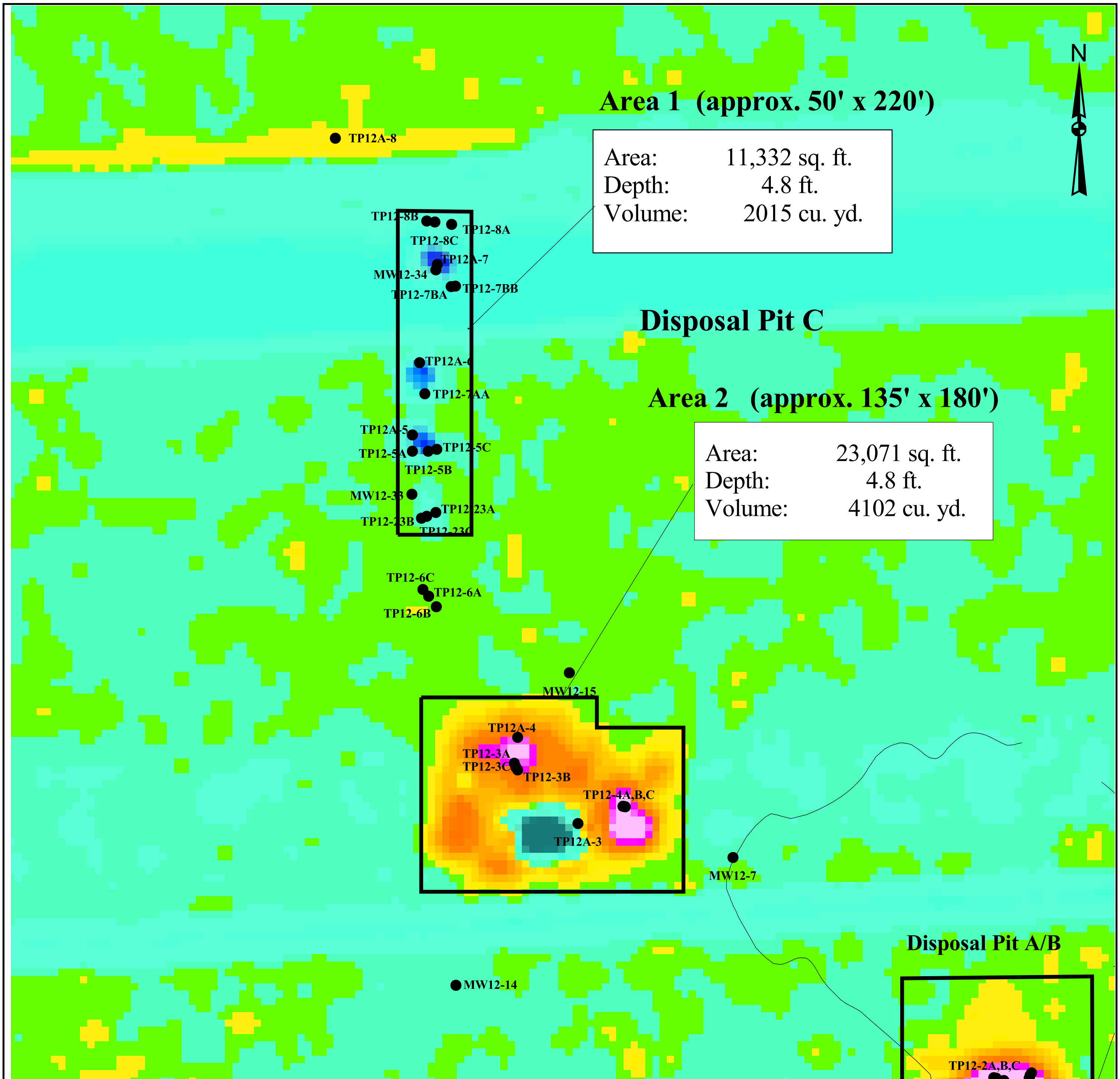
PARSONS

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 2-4
REMEDIATION VOLUME ESTIMATE
FOR SOIL AT DISPOSAL PIT C

SCALE	DATE	REV	
1:100	DEC 2007		Sheet 1 of 1

O:\SENECA\SEAD-12\FS_2007\SUB_SOIL.APR\(4)Fig2-4 Disposal Pit C 11 x 17

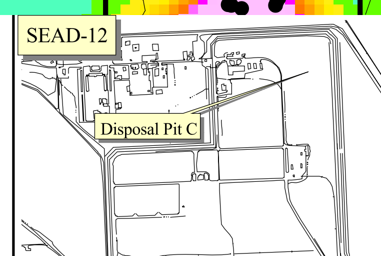


LEGEND

MW12-15 Sub-surface Soil sample with Loc_ID.

Area to be Excavated

100 0 100 Feet



PARSONS

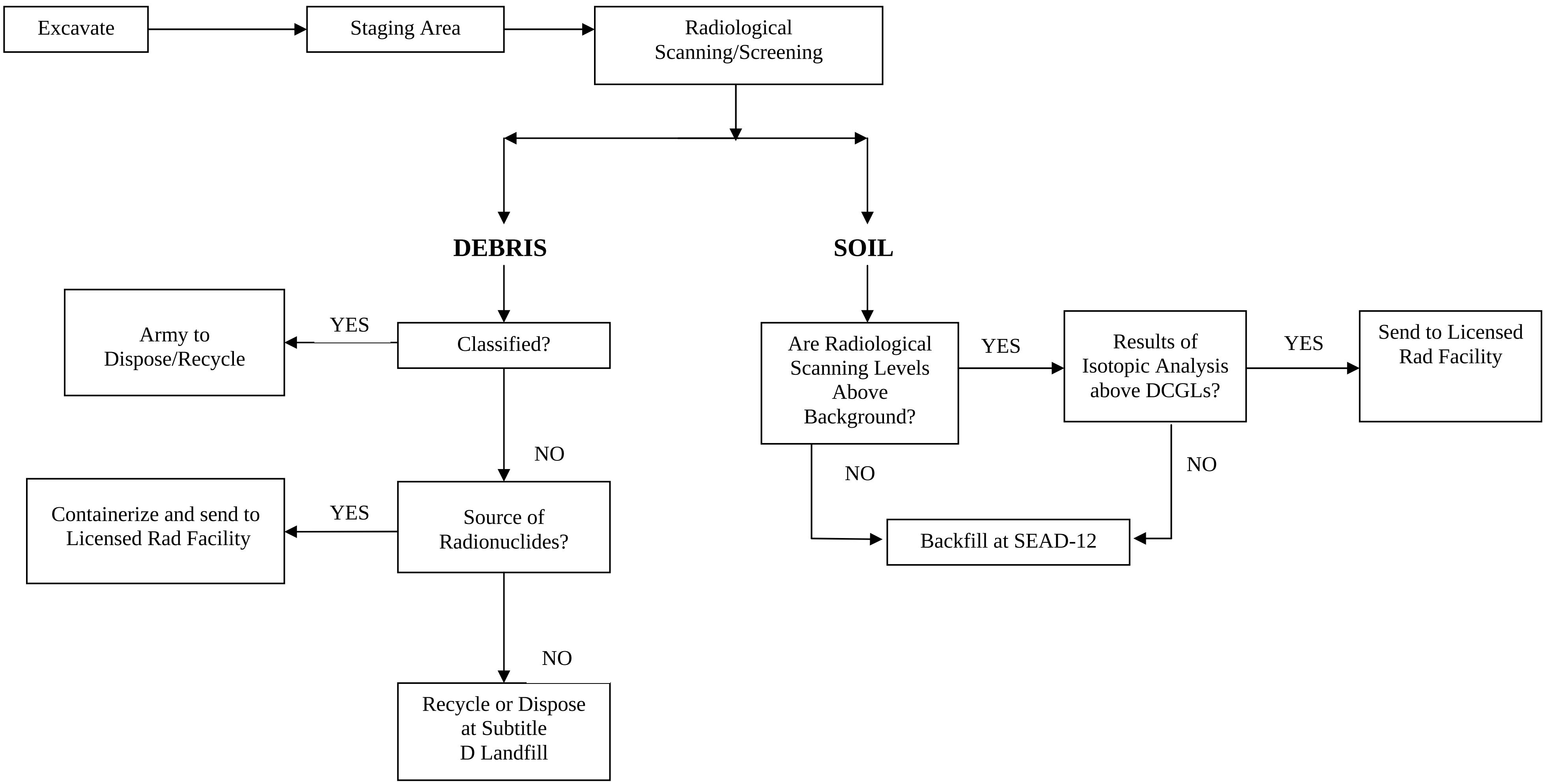
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY
SEAD-12

FIGURE 2-5
ELECTROMAGNETIC DATA AND REMEDIAL VOLUME ESTIMATE FOR SOIL AT DISPOSAL PIT C

SCALE 1:100	DATE MAR 2007	REV	Sheet 1 of 1

O:\SENECA\SEAD-12\FS_2007\SUB_SOIL.APR

FIGURE 4-1
DISPOSAL DECISION FLOW CHART
SEAD-12 FINAL FEASIBILITY STUDY
SENECA ARMY DEPOT ACTIVITY, ROMULUS, N.Y.



APPENDICES

APPENDIX A

DETAILED COST ESTIMATE FOR REMEDIAL ACTION ALTERNATIVE 2 AND ALTERNATIVE 4

- Table A-1: Volume Estimates for Debris Disposal Areas (Alternative 2)
- Table A-2: Cost Estimate for Excavation of Debris Disposal Areas (Alternative 2)
- Table A-3a: Disposal Pit A/B Debris Volume Estimate
- Table A-3b: Disposal Pit C Debris Volume Estimate
- Table A-4: Cost Estimate for Vapor Intrusion Study (Alternative 4)
- Table A-5: Quantity Calculations for Building Demolition (Alternative 4)
- Table A-6: Cost Estimate for Building Demolition (Alternative 4)

TABLE A-1
Volume Estimates for Disposal Areas
Cost Estimate Backup for Alternative 2
SEAD-12 Feasibility Study
Seneca Army Depot Activity

I. Excavation Volume Estimates - Total Soil and Debris Quantities

		Pit Dimension sq. ft. (Figure 2-2 and 2-4)	Avg Depth - ft (Table A-3)	Volume - CY*	% debris Table A-3	Vol. of debris - CY*	Vol. of soil - CY*
Disposal Pits A/B		**22,500**	**6**	**5,000**	**10%**	**500**	**4,500**
Total for Disposal Pit C		**40,200**		**9,000**		**1300**	**7,700**
	Disposal Pit C - North	13,200	4	2,000	30%	600	1,400
	Disposal Pit C - South	27,000	7	7,000	10%	700	6,300
TOTAL				**14,000**		**2,000**	**12,000**

* Rounded to the nearest 1000

II. Breakdown of Soil and Debris Quantities

Soil/Debris Type	**Basis/Assumption**	**Approximate Qty***
Rad soil (Off-site disposal)	1% of total soil volume	100 cy
Non-rad soil (Backfill on site)		11900 cy
Additional Soil for Off-Site Disposal	25% of Non-Rad soil volume	3000 cy
Classified debris	50% of debris volume	1000 cy
Non-classified debris		1000 cy
Rad Debris	5% of classified debris	50 cy
Borrow source fill material needed (total debris + off-site disposal soil)	total debris and rad & add soil volume	5100 cy

* Rounded to the nearest 100 CY. Note that these estimates do not include expansion or contigency factors.

TABLE A-2
Excavation and Disposal Cost Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.:		Description: Excavate, Screen, and Dispose SEAD-12 Disposal Pits	MTO by:	Est Date:	**Nov 8 2007**
Project:	SEAD-12		Est by: TC Andrews	Print Date:	24-Jan-08
Client:	US Army		Review by: B Wasserman	Rev.	
Location:	**Seneca Army Depot**		Constr. Duration:		

Account Code	Description	Quantity	Unit	Price Source[1]	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
04000	Site Services									99,847	2,560	219,328	35,800	-		354,975
05000	Mobilization/Demobilization									6,000	168	8,119	3,353	21,500		38,972
06000	Excavate and Stockpile (Soil/Debris Excavation)									-	2,987	115,689	146,076	-		261,765
07000	Screen and separate (Soil/Debris Excavation)									650	3,435	171,908	127,216	-		299,774
08000	Disposal (Soil/Debris Excavation)									2,790	653	32,673	12,972	365,118		413,553
09000	Backfill (Soil/Debris Excavation)									48,300	1,037	44,017	47,184	-		139,501
10000	Restoration (Soil/Debris Excavation)									-	-	-	-	9,000		9,000
11000	Remedial Design									-	1,752	157,680	-	-		157,680
12000	Environmental Easement (Annual Cost - Not Included in Capital Cost Sum)									-	15	3,000	-	-		3,000
13000	Rad Sampling, Testing, and Air Monitoring									-	-	-	5,143	36,209		41,352
	Subtotal									-	-	-	-	-		-
	Sales Tax: Material & Equipment 0.00%	-														-
	Design Growth															
								Direct Construction Costs		157,587	12,591	749,414	374,744	431,827	-	**1,716,572**

						Quantity	Unit	Price Source	Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs	**04000**	**Site Services**	5 months		8 Hrs/day	**93**	days													
Sup	Labor	Superintendent		1 man		93	mday			8	131.36	-	-	-	747	98,083	-	-		98,083
HS		H&S Technician		1 man		93	mday		-	8	89.48	-	-	-	747	66,809	-	-		66,809
Team		Teamster for Water Truck		1 man		93	mday			8	27.42	-	-	-	747	20,473	-	-		20,473
Rad tech		Rad technician		1 man		40	mday			8	106.14	-	-	-	320	33,963	-	-		33,963
	Trav/PD	Per Diem	2 men		93 days	187	mdays	GSA	134.00	-		-	-	25,013	-	-	-	-		25,013
		Travel 2 men	4 trips/mo	5 mo		40	trips		300.00	-		-	-	12,000	-	-	-	-		12,000
	Equip	F-250 or equal	1 ea		5 mo	5	eqmo	Hertz	-	-		1,974.00	-	-	-	-	9,870	-		9,870
		Trailers - Office 12 x 50	1 ea		5 mo	5	eqmo	Williams	-	-		400.00	-	-	-	-	1,000	-		1,000
		Trailers - Tool	1 ea		5 mo	5	eqmo	Hertz	-	-		200.00	-	-	-	-	2,000	-		2,000
		Rad Meter	1 ea		0 mo	5	eqmo					1,000.00		-	-	-	5,000	-		5,000
		Water Truck	1 ea		5 mo	5	eqmo	Hertz	-	-		3,586.00	-	-	-	-	17,930	-		17,930
	Material	Office Supplies				5	mo		200.00	-		-	-	1,000	-	-	-	-		1,000
		Office Dumpster				5	mo		400.00	-		-	-	2,000	-	-	-	-		2,000
		Drinking Water				5	mo		50.00	-		-	-	250	-	-	-	-		250
		First Aid Supplies				5	mo		50.00	-		-	-	250	-	-	-	-		250
		Electric Usage				5	mo		400.00	-		-	-	2,000	-	-	-	-		2,000
		Telephone Usage - Field Trailer				5	mo		500.00	-		-	-	2,500	-	-	-	-		2,500
		Cell Phone				5	mo		200.00	-		-	-	1,000	-	-	-	-		1,000
		Dust Monitors	1 ea		5 mo	5	eqmo		200.00	-		-	-	1,000	-	-	-	-		1,000
		PPE			8 mhr/mday	1,574	mday		5.00	-		-	-	7,869		-	-	-		7,869
		Small Tools/Misc Materials as % of raw labor				749,414	$$		6%	-		-	-	44,965		-	-	-		44,965
		04000 Site Services Subtotal				5	mo							99,847	2,560	219,328	35,800	-	70,995	354,975

TABLE A-2
Excavation and Disposal Cost Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.:
Project: SEAD-12
Client: US Army
Location: **Seneca Army Depot**

Description: Excavate, Screen, and Dispose SEAD-12 Disposal Pits

MTO by:
Est by: TC Andrews
Review by: B Wasserman
Constr. Duration:

Est Date: **Nov 8 2007**
Print Date: 24-Jan-08
Rev.

	Account Code	Description			Quantity	Unit	Price Source[1]	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs	**05000**	**Mobilization/Demobilization**		8 Hrs/day															
		Mobilization			5	days													
Oper	Labor	Operator	1 men	5 days	5	mday			8	57.28	-		-	40	2,291	-	-		2,291
Lab		Laborer	2 men	5 days	10	mday			8	42.82	-		-	80	3,425	-	-		3,425
	Equip.	Cat 416	1 ea	5 days	40	hrs					17.39		-	-	-	696	-		696
	Subcon.	Temporary Decon Pad			1	ea			-		-	1,000.00	-	-	-	-	1,000		1,000
		Drug Tests			5	ea						200.00	-	-	-	-	1,000		1,000
		40 hr training			5	ea						1,200.00	-	-	-	-	6,000		6,000
		Physicals	5 men	2 ea	10	ea			-		-	300.00	-	-	-	-	3,000		3,000
		Silt fence			2000	lf		3.00					6,000	-	-	-	-		6,000
		Clearing			1.3	ac	Site acreage				818.00		-	-	-	1,063	-		1,063
		Survey			10	days					145.45					1,455			1,455
	Freight	Mob Equipment			6	lds						500.00	-	-	-	-	3,000		3,000
		Mob Trailers			1	lds						500.00	-	-	-	-	500		500
		Mob Misc Equipment			1	lds						500.00	-	-	-	-	500		500
		SubTotal											6,000	120	5,716	3,214	15,000		29,930
		Demobilization			3	days													
Oper		Operator	1 men	3 days	3	mday			8	57.28	-	-	-	24	1,375	-	-		1,375
Lab		Laborer	1 men	3 days	3	mday			8	42.82	-	-	-	24	1,028	-	-		1,028
	Equip.	Cat 416	ea	3 days	8	hrs					17.39		-	-	-	139	-		139
	Subcon.	Final Physicals			5	ea			-		-	300.00	-	-	-	-	1,500		1,500
	Freight	De Mob Equipment			6	lds			-		-	500.00	-	-	-	-	3,000		3,000
		De Mob Trailers			1	lds			-		-	500.00	-	-	-	-	500		500
		De Mob Misc Equipment			1	lds						500.00	-	-	-	-	500		500
	Disp.	Final Clean Up			20	tns			-		-	50.00	-	-	-	-	1,000		1,000
		SubTotal											-	48	2,403	139	6,500		9,042
		05000 Mobilization/Demobilization Subtotal											6,000	168	8,119	3,353	21,500		38,972
hrs	**06000**	**Excavate and Stockpile (Soil/Debris Excavation)**		8 Hrs/day															
					93	Days													
			14,000 cy		150	cy/day													
			16,100 trk cys		173	trcy/da													
			25,760 tns		276	tn/day													
			1,030 loads		11	ld/day													
Oper	Labor	Oper	1 men	93 days	93	mday		-	8	57.28	-	-	-	747	42,772	-	-		42,772
Lab		Labor	1 men	93 days	93	mday		-	8	42.82	-	-	-	747	31,971	-	-		31,971
Team		Teamster	2 men	93 days	187	mday		-	8	27.42	-	-	-	1,493	40,946	-	-		40,946
	Equip	Excavator	1 ea	93 days	747	hrs		-	-		67.54	-	-	-	-	50,428	-		50,428
		Off rd truck	2 ea	93 days	1493	hrs		-	-		64.05	-	-	-	-	95,648	-		95,648
		06000 Excavate and Stockpile (Soil/Debris Excavation) Subtotal			14000	cy							-	2,987	115,689	146,076	-	19	261,765

TABLE A-2
Excavation and Disposal Cost Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.:		Description:	Excavate, Screen, and Dispose SEAD-12 Disposal Pits	MTO by:		Est Date:	**Nov 8 2007**
Project:	SEAD-12			Est by:	TC Andrews	Print Date:	24-Jan-08
Client:	US Army			Review by:	B Wasserman	Rev.	
Location:	**Seneca Army Depot**			Constr. Duration:			

	Account Code	Description			Quantity	Unit	Price Source[1]	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs	**07000**	**Screen and separate (Soil/Debris Excavation)**		8 Hrs/day															
					107	Days													
			16,100 cy		150	cy/day													
Oper	Labor	Oper	2 men	107 days	215	mday		-	8	57.28	-	-	-	1,717	98,375	-	-		98,375
Lab		Labor	2 men	107 days	215	mday		-	8	42.82	-	-	-	1,717	73,533	-	-		73,533
	Equip	Excavator	1 ea	107 days	859	hrs		-	-		67.54	-	-	-	-	57,992	-		57,992
		Loader	1 ea	107 days	859	hrs		-	-		39.74	-	-	-	-	34,126	-		34,126
		Screen	1 ea	107 days	859	hrs					40.88		-	-	-	35,098	-		35,098
	Material	Poly			10	rolls		65.00	-		-	-	650	-	-	-	-		650
								-			-	-	-	-	-	-	-		
		07000 Screen and separate (Soil/Debris Excavation) Subtotal			16,100	cy							650	3,435	171,908	127,216	-	19	299,774
hrs	**08000**	**Disposal (Soil/Debris Excavation)**		8 Hrs/day															
					41	Days													
			5100 cy		125	cy/day													
			6120 trk cys		150	trcy/da													
			8160 tns		200	tn/day													
			408 loads		10	ld/day													
Oper	Labor	Oper	1 men	40.8 days	40.8	mday		-	8	57.28	-	-	-	326	18,697	-	-		18,697
Lab		Labor	1 men	40.8 days	40.8	mday		-	8	42.82	-	-	-	326	13,976	-	-		13,976
	Equip	Loader	1 ea	40.8 days	326.4	hrs		-	-		39.74	-	-	-	-	12,972	-		12,972
	Material	Poly			20	rolls		65.00	-		-	-	1,300	-	-	-	-		1,300
	Freight	Rad Disposal freight includes 300/ load decon			10	lds	Corbett	-	-		-	9,000.00	-	-	-	-	90,000		90,000
		Soil for nonhaz disposal	3600 cy	includes 20%	5400	tons	Riccelli	-	-		-	28.00	-	-	-	-	151,200		151,200
	Disp.	C&D	1000 cy	freight included	1300	tns	Riccelli		-		-	50.00	-	-	-	-	65,000		65,000
		Soil for rad disp	100 cy		160	tns	Corbett					215.00					34,400		34,400
		Debris for Rad Disposal	50 cy		50	cy	Corbett					230.00					11,500		11,500
		Classified Debris	1000 cy	N/C Army disposes	1300	tns													
		Drums-overpacks		EPS environmental	10	ea	EPS	149.00	-		-	-	1,490	-	-	-	-		1,490
		Soil testing		VOCs, SVOCs, metals	24	ea	STL					350.00					8,568		8,568
Sub		Drum testing (TCLP)		TCLP metals, VOCs, SVOCs, charac	10	ea	STL	-	-		-	445.00	-	-	-	-	4,450		4,450
		08000 Disposal (Soil/Debris Excavation) Subtotal			5100	cy							2,790	653	32,673	12,972	365,118	81	413,553
hrs	**09000**	**Backfill (Soil/Debris Excavation)**		8 Hrs/day															
					26	Days													
			14,000 cy		540	cy/day													
			16,100 trk cys		621	trcy/da													
			22,400 tns		864	tn/day													
			1,120 loads		43	ld/day													
Oper	Labor	Oper	2 men	26 days	52	mday		-	8	57.28	-	-	-	415	23,762	-	-		23,762
Lab		Labor	1 men	26 days	26	mday		-	8	42.82	-	-	-	207	8,881	-	-		8,881
Team		Teamster	2 men	26 days	52	mday		-	8	27.42	-	-	-	415	11,374	-	-		11,374
	Equip	Loader	1 ea	26 days	207	hrs		-	-		39.74	-	-	-	-	8,243	-		8,243
		Dozer	1 ea	26 days	207	hrs		-	-		59.65	-	-	-	-	12,372	-		12,372
		off rd trucks	2 ea	26 days	415	hrs					64.05		-	-	-	26,569	-		26,569
	Material	off site borrow	4200 cy	7/tn	4830	trkcy	Riccelli	10.00	-		-	-	48,300	-	-	-	-		48,300
		09000 Backfill (Soil/Debris Excavation) Subtotal			14000	cy							48,300	1,037	44,017	47,184	-	10	139,501

TABLE A-2
Excavation and Disposal Cost Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.:
Project: SEAD-12
Client: US Army
Location: **Seneca Army Depot**

Description: Excavate, Screen, and Dispose SEAD-12 Disposal Pits

MTO by:
Est by: TC Andrews
Review by: B Wasserman
Constr. Duration:

Est Date: **Nov 8 2007**
Print Date: 24-Jan-08
Rev.

	Account Code	Description	Quantity	Unit	Price Source[1]	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs	**10000**	**Restoration (Soil/Debris Excavation)** 8 Hrs/day															
				Days													
		3 Ac		cy/day													
Subcon.		Fine Grade seed and mulch	3	Ac		-	-		-	3,000.00	-	-	-	-	9,000		9,000
		10000 Restoration (Soil/Debris Excavation) Subtotal	3	Ac							-	-	-	-	9,000	3,000	9,000
hrs	**11000**	**Remedial Design** 8 Hrs/day															
			219	Days													
		cy	0	cy/day													
		trk cys	0	trcy/da													
		tns	0	tn/day													
		loads	0	ld/day													
Office	Labor	Engineer 1 men 219 days	219	mday		-	8	90.00	-	-	-	1,752	157,680	-	-		157,680
		11000 Remedial Design Subtotal									-	1,752	157,680	-	-		157,680
hrs	**12000**	**Environmental Easement (Annual Cost - Not Included in Ca** 8 Hrs/day															
			2	Days													
				cy/day													
				trcy/da													
				tn/day													
				ld/day													
	Labor	Lawyer 1 men 2 days	2	mday		-	8	200.00	-	-	-	15	3,000	-	-		3,000
		12000 Environmental Easement (Annual Cost - Not Included in Capital Cost Sum) Subtotal									-	15	3,000	-	-		3,000
hrs	**13000**	**Rad Sampling, Testing, and Air Monitoring** 8 Hrs/day															
	Subcon.	Laboratory				-	-		-	-	-	-	-	-	-		-
		Uranium testing - soil	25	Samp	GEL	-	-		-	135.00	-	-	-	-	3,375		3,375
		Plutonium testing - soil	25	Samp	GEL	-	-		-	286.66	-	-	-	-	7,167		7,167
		Radium-226, 228 - soil	25	Samp	GEL	-	-		-	246.66	-	-	-	-	6,167		6,167
		Americum - soil	25	Samp	GEL					280.00					7,000		7,000
		Gross beta - soil	25	Samp	GEL	-	-		-	100.00	-	-	-	-	2,500		2,500
		Tritrium - soil	25	Samp	GEL	-	-		-	120.00	-	-	-	-	3,000		3,000
		Thorium - soil	25	Samp	GEL					280.00				-	7,000		7,000
	Equip	Digital dust sample	1	ea					810.53					811			811
		Ambient Air monitor	1	ea					1,672.00					1,672			1,672
		Micro-R, Fidler, gas prop detector	4	weeks					665.00					2,660			2,660
		13000 Rad Sampling, Testing, and Air Monitoring Subtotal									-	-	-	5,143	36,209		41,352
		Total (See Summary Page for Other Costs and Assumptions.)									157,587	12,606	752,414	377,744	431,827		1,719,572

Notes
1. Prices are based on contractor bids from previous work conducted by Parsons at SEDA, unless otherwise noted.

Table A-3a
Disposal Pit A/B Debris Volume Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Debris Volume Estimates Summary for Test Pits in Disposal Pit A/B

	Location	Pit Dimensions*	Pit volume (CF)	Approximate Debris Volume (CF)*	Approximate % debris	Ave. depth (Ft)
TP12-1	Disposal Pit A/B	33' x 3' x 6'	594	48	10%	6
TP12-2	Disposal Pit A/B	34' x 3' x 6'	612	48	10%	6
Totals			1206	96	**10%**	**6**

*Debris Volume based on description and quantity of debris described in RI test pit logs found in Appendix B of the RI (Parsons, Feb. 2002)

Table A-3b
Disposal Pit C Debris Volume Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Debris Volume Estimates Summary for Test Pits in Disposal Pit C

	Location	Pit Dimensions*	Pit volume (CF)	Approximate Debris Volume (CF)*	Approximate % debris	Ave. depth (Ft)
Northern Area 1						
TP12-7B	Disp Pit C	8' x 3' x 6.5'	156	42	30%	4
TP12-7A	Disp Pit C	8' x 3' x 5.5'	132	48	40%	2
TP12-8	Disposal Pit C	25' x 3' x 7.2'	540	300	60%	4
TP12-5	Disposal Pit C	50' x 3' x 9'	1350	128	10%	4
TP12-23	Disposal Pit C	20' x 3.5' x 3 to 6'	315	120	40%	4
Southern Area 2						
TP12-3 (North)	Disposal Pit C	40' x 3.5' x 6'	840	263	30%	6
TP12-3 (South)	Disposal Pit C	118' x 3' x 5.5'	1947	180	10%	7
TP12-4	Disposal Pit C	100' x 3' x 9.5'	2850	96	0%	7
Northern Area 1 total			2493	638	**30%**	**4**
Southern Area 2 total			5,637	539	**10%**	**7**

*Debris Volume based on description and quantity of debris described in RI test pit logs found in Appendix B of the RI (Parsons, Feb. 2002)

TABLE A-4
Vapor Intrusion Cost Estimate
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.: Seneca Army Depot	Description:	Vapor Intrusion Study	MTO by:		Est Date: 6/18/2007
Project: SEAD 12		Bldg 813/814	Est by:	TC Andrews	Print Date: 19-Dec-07
Client: Huntsville			Review by:	B Wasserman	Rev.
Location: **Romulus NY**			Constr. Duration:		

Account Code	Description	Quantity	Unit	Price Source	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
04000	Vapor Intrusion									31,270	840	57,613	5,240	-		94,123
	Subtotal									-	-	-	-	-		-
	Sales Tax: Material & Equipment 0.00%	-	0	IL Tax Ref Manual												-
	Design Growth															
							Direct Construction Costs			31,270	840	57,613	5,240	-	-	94,123
							Risk									
							Subtotal									94,123
							Bond								2%	
							Insurance								2%	
							Margin								20%	
							Sell								$	123,036.60
															Total $	**123,036.60**

Account Code	Description	Quantity	Unit	Price Source	Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs **04000**	**Vapor Intrusion** 1 months 8 Hrs/day	**10**	days													
PM Labor	Project Manager 1 man	25	mday			8	101.64			-	200	20,329	-	-		20,329
Sup	Superintendent 1 man	10	mday			8	81.00	-	-	-	80	6,480	-	-		6,480
	project engineer 1 man	60	mday			8	64.17				480	30,804				30,804
Trav/PD	Per Diem 3 men 10 days	30	mdays	GSA	134.00	-		-	-	4,020	-	-	-	-		4,020
	Travel 3 men 1 trips/mo 1 mo airfare	3	trips		300.00	-		-	-	900	-	-	-	-		900
	F-250 or equal 1 ea 1 mo	1	eqmo	Hertz	-	-		1,894.00	-	-	-	-	1,894	-		1,894
	Water Truck 0 ea 1 mo	1	eqmo	Hertz	-	-		3,346.00	-	-	-	-	3,346	-		3,346
Material	PortaJohns 2 ea 1 mo	2	emo		85.00	-		-	-	170	-	-	-	-		170
	Drinking Water	1	mo		50.00	-		-	-	50	-	-	-	-		50
	First Aid Supplies	1	mo		50.00	-		-	-	50	-	-	-	-		50
	Cell Phone	1	mo		400.00	-		-	-	400	-	-	-	-		400
sub-slab sampling	install permaenet soil gas points	10	pts	Recent well installation costs	2,000.00					20,000						20,000
	sample soil gas pts (USEPA Method To-15 in 1L summa canister)	10	samp	STL (7/13/06)	355.00					3,550						3,550
indoor air sampling	analysis in 6L SUMMA canisters for TO-15	4	samp	STL (7/13/06)	355.00					1,420						1,420
outdoor air sampling	analysis in 6L SUMMA canisters for TO-15	2	samp	STL (7/13/06)	355.00					710						710
	04000 Vapor Intrusion Subtotal	1	mo							31,270	840	57,613	5,240	-	94,123	94,123
	Total (See Summary Page for Other Costs and Assumptions.)									31,270	840	57,613	5,240	-		94,123

Table A-5
Quantity Calculations for Building Demolition (Alternative 4)
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Estimate of surface area of buildings to be demolished, based on building floor plans in the RI.

Building	Surface Area (building dimensions)		
Bldg 813	4429	sf	(105 ft x 34 ft; 2.4 ft x 1.7 ft; and 16 ft x 43 ft)
Bldg 814	3700	sf	(105 ft x 32 ft and 29 ft x 12 ft)
Total SA	8130	sf	surface area of Buildings 813/814

Excavation, backfill, and T&D

Excavation & Backfill Quantity	903	cy	Assumes quantity of soil excavated and backfilled equals the excavation of half the building surface area to depth of 6 ft.
SOG	151	cy	Assumes removal of half-foot of building surface area.
T&D	1656	cy	

Table A-6
Cost Estimate for Building Demolition (Alternative 4)
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.: Seneca Army Depot
Project: SEAD 12
Client: Huntsville
Location: **Romulus NY**

Description: Demo of Bldg 813/814

MTO by:
Est by:
Review by:
Constr. Duration:

Est Date: 7/25/2007
Print Date: 19-Dec-07
Rev.

Account Code	Description	Quantity	Unit	Price Source	Cost per Unit: Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
04000	Site Services									7,405	280	26,809	1,894	-		36,108
05000	Mobilization/Demobilization									-	48	2,652	-	11,655		14,307
06000	Erosion Controls									750	32	1,535	-	-		2,285
07000	Demolition															40,070
08000	Excavate NON Haz Soil									-	160	7,675	4,709	38,530		50,914
09000	Blend Stockpile Haz Soil									357	32	1,535	774	-		2,666
10000	Load out for T&D									-	64	3,070	1,906	49,680		54,656
11000	Backfill									18,060	16	767	-	-		18,827
12000	Regrade Site									-	24	1,326	525	-		1,851
13000	Seed and Mulch									-	-	-	-	2,600		2,600
	Subtotal									-	-	-	-	-		-
	Sales Tax: Material & Equipment 0.00%	-	0 .	Tax Ref Manual												-
	Design Growth															
	Direct Construction Costs									26,572	656	45,369	9,808	102,465	-	**224,284**

	Account Code	Description				Quantity	Unit	Price Source	Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
hrs	**04000**	**Site Services**	1 months		8 Hrs/day	**10**	days													
PM	Labor	Project Manager		1 man		25	mday			8	101.64			-	200	20,329	-	-		20,329
Sup		Superintendent		1 man		10	mday			8	81.00	-	-	-	80	6,480	-	-		6,480
	Trav/PD	Per Diem	3 men		10 days	30	mdays	GSA	134.00	-		-	-	4,020	-	-	-	-		4,020
		Travel 3 men 1 trips/mo		1 mo	airfare	3	trips		300.00	-		-	-	900	-	-	-	-		900
	Equip	F-250 or equal	1 ea		1 mo	1	eqmo	Hertz	-	-		1,894.00	-	-	-	-	1,894	-		1,894
	Material	PortaJohns	2 ea		1 mo	2	emo		85.00	-		-	-	170	-	-	-	-		170
		Drinking Water				1	mo		50.00	-		-	-	50	-	-	-	-		50
		First Aid Supplies				1	mo		50.00	-		-	-	50	-	-	-	-		50
		Cell Phone				1	mo		400.00	-		-	-	400	-	-	-	-		400
		Small Tools/Misc Materials as % of raw labor				45,369	$$		4%	-		-	-	1,815	-	-	-	-		1,815
		04000 Site Services Subtotal				1	mo							7,405	280	26,809	1,894	-	36,108	36,108
hrs	**05000**	**Mobilization/Demobilization**			8 Hrs/day															
		Mobilization				2	days													
Oper	Labor	Operator	2 men		2 days	4	mday		-	8	55.26	-		-	32	1,768	-	-		1,768
	Subcon.	Temporary Decon Pad				1	ea		-	-		-	1,000.00	-	-	-	-	1,000		1,000
		Trailer set up				1	ea	Williams					1,055.00	-	-	-	-	1,055		1,055
	Freight	Mob Equipment				4	lds						1,200.00	-	-	-	-	4,800		4,800
		SubTotal												-	32	1,768	-	6,855	#DIV/0!	8,623
		Demobilization				1	days													
Oper		Operator	2 men		1 days	2	mday		-	8	55.26	-	-	-	16	884	-	-		884
	Freight	De Mob Equipment				4	lds		-	-		-	1,200.00	-	-	-	-	4,800		4,800
		SubTotal												-	16	884	-	4,800	#DIV/0!	5,684
		05000 Mobilization/Demobilization Subtotal												-	48	2,652	-	11,655	#DIV/0!	14,307
hrs	**06000**	**Erosion Controls**			8 Hrs/day															
		Silt Fence				2	Days													
				1000 lf		500	lf/day													
Oper	Labor	Oper	1 men		2 days	2	mday		-	8	55.26	-	-	-	16	884	-	-		884
Lab		Labor	1 men		2 days	2	mday		-	8	40.68	-	-	-	16	651	-	-		651
	Material	Silt Fence				1000	lf		0.75	-		-	-	750	-	-	-	-		750
		06000 Erosion Controls Subtotal				1000	lf							750	32	1,535	-	-	2	2,285
hrs	**07000**	**Demolition**			8 Hrs/day															
						5	Days													
				800 cy		160	cy/day													
				920 trk cys		184	trcy/da													
				1360 tns		272	tn/day													
				54.4 loads		10.88	ld/day													
	Subcon	Demolition				8130	sf		-	-		-	4.00	-	-	-	-	32,520		32,520
		Slab on grade				151	cy		-	-		-	50.00	-	-	-	-	7,550		7,550

Table A-6
Cost Estimate for Building Demolition (Alternative 4)
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.: Seneca Army Depot | Description: Demo of Bldg 813/814 | MTO by: | Est Date: 7/25/2007
Project: SEAD 12 | Est by: | Print Date: 19-Dec-07
Client: Huntsville | Review by: | Rev.
Location: **Romulus NY** | Constr. Duration:

Account	Code	Description			Quantity	Unit	Price Source	Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
		07000 Demolition Subtotal			800	cy							-	-	-	-	40,070	50	40,070
hrs	**08000**	**Excavate NON Haz Soil**		8 Hrs/day															
					5	Days													
			903 cy		180.6	cy/day													
			1038.45 trk cys		207.69	trcy/da													
			1535.1 tns		307.02	tn/day													
			61.404 loads		12.2808	ld/day													
Oper	Labor	Oper	2 men	5 days	10	mday		-	8	55.26	-	-	-	80	4,421	-	-		4,421
Lab		Labor	2 men	5 days	10	mday		-	8	40.68	-	-	-	80	3,254	-	-		3,254
	Equip	Excavator	1 ea	5 days	40	hrs		-	-		37.68	-	-	-	-	1,507	-		1,507
		Dozer	1 ea	5 days	40	hrs		-	-		21.86	-	-	-	-	875	-		875
		Loader	1 ea	5 days	40	hrs		-	-		37.24	-	-	-	-	1,490	-		1,490
		Water Truck	1 ea	5 days	40	hrs		-	-		20.91	-	-	-	-	837	-		837
	Subcon	Excavation			903	cy		-	-		-	10.00	-	-	-	-	9,030		9,030
		Analytical			59	samp		-	-		-	500.00	-	-	-	-	29,500		29,500
		08000 Excavate NON Haz Soil Subtotal			903	cy							-	160	7,675	4,709	38,530	56	50,914
hrs	**09000**	**Blend Stockpile Haz Soil**		8 Hrs/day															
					1	Days													
			50 cy		50	cy/day													
			57.5 trk cys		57.5	trcy/da													
			97.75 tns		97.75	tn/day													
			3.91 loads		3.91	ld/day													
Oper	Labor	Oper	2 men	1 days	2	mday		-	8	55.26	-	-	-	16	884	-	-		884
Lab		Labor	2 men	1 days	2	mday		-	8	40.68	-	-	-	16	651	-	-		651
	Equip	Excavator	1 ea	1 days	8	hrs		-	-		37.68	-	-	-	-	301	-		301
		Dozer	1 ea	1 days	8	hrs		-	-		21.86	-	-	-	-	175	-		175
		Loader	1 ea	1 days	8	hrs		-	-		37.24	-	-	-	-	298	-		298
	Material	Portland Cement			35	bags		10.21	-		-	-	357	-	-	-	-		357
		09000 Blend Stockpile Haz Soil Subtotal			50	cy							357	32	1,535	774	-	53	2,666
hrs	**10000**	**Load out for T&D**		8 Hrs/day															
					4	Days													
			903 cy		225.75	cy/day													
			1038.45 trk cys		259.6125	trcy/da													
			1535.1 tns		383.775	tn/day													
			61.404 loads		15.351	ld/day													
Oper	Labor	Oper	1 men	4 days	4	mday		-	8	55.26	-	-	-	32	1,768	-	-		1,768
Lab		Labor	1 men	4 days	4	mday		-	8	40.68	-	-	-	32	1,302	-	-		1,302
	Equip	Excavator	1 ea	4 days	32	hrs		-	-		37.68	-	-	-	-	1,206	-		1,206
		Dozer	1 ea	4 days	32	hrs		-	-		21.86	-	-	-	-	700	-		700
	Material	T&D			1656	ton		-	-		-	30.00	-	-	-	-	49,680		49,680
		10000 Load out for T&D Subtotal			903	cy							-	64	3,070	1,906	49,680	61	54,656
hrs	**11000**	**Backfill**		8 Hrs/day															
					1	Days													
			903 cy		903	cy/day													
			115 trk cys		115	trcy/da													
			1535.1 tns		1535.1	tn/day													
			61.404 loads		61.404	ld/day													
Oper	Labor	Oper	1 men	1 days	1	mday		-	8	55.26	-	-	-	8	442	-	-		442
Lab		Labor	1 men	1 days	1	mday		-	8	40.68	-	-	-	8	325	-	-		325
	Material	Borrow			903	cy	Riccelli	20.00	-		-	-	18,060	-	-	-	-		18,060
		11000 Backfill Subtotal			903	cy							18,060	16	767	-	-	21	18,827
hrs	**12000**	**Regrade Site**		8 Hrs/day															
					3	Days													
			3 Ac		1	Ac/day													
Oper	Labor	Oper	1 men	3 days	3	mday		-	8	55.26	-	-	-	24	1,326	-	-		1,326
	Equip	Dozer	1 ea	3 days	24	hrs		-	-		21.86	-	-	-	-	525	-		525
		12000 Regrade Site Subtotal			3	Ac							-	24	1,326	525	-	617	1,851
hrs	**13000**	**Seed and Mulch**		8 Hrs/day															

P:\PIT\Projects\Huntsville HTW\TO #31 SEAD-12 FS, PRAP_ROD\FS\Final\Appendix A - Cost estimates\Table A-6 bldg cost est.xls-Estimate

Table A-6
Cost Estimate for Building Demolition (Alternative 4)
SEAD-12 Feasibility Study
Seneca Army Depot Activity

PARSONS I & T - ESTIMATE WORKSHEET

Job No.: Seneca Army Depot
Project: SEAD 12
Client: Huntsville
Location: **Romulus NY**

Description: Demo of Bldg 813/814

MTO by:
Est by:
Review by:
Constr. Duration:

Est Date: 7/25/2007
Print Date: 19-Dec-07
Rev.

Account Code	Description	Quantity	Unit	Price Source	Cost per Unit Material	Hrs/Day	Rate	Equipment	Sub	MATERIAL $	LABOR-HRs	LABOR $	EQUIP. $	SUB $	Unit Price/Item	TOTAL $
	1 Ac	#DIV/0!	Days cy/day													
Material	Seed	1	ls		-	-		-	500.00	-	-	-	-	500		500
Subcon.	Sub	1	ls		-	-		-	2,000.00	-	-	-	-	2,000		2,000
	Cornell Testing	1	ls		-	-		-	100.00	-	-	-	-	100		100
	13000 Seed and Mulch Subtotal	1	Ac							-	-	-	-	2,600	2,600	2,600
	Total (See Summary Page for Other Costs and Assumptions.)									26,572	656	45,369	9,808	142,535		224,284

APPENDIX B

DISPOSAL PIT A/B, DISPOSAL PIT C, AND BUILDINGS 813/814 SOIL ANALYTICAL DATA

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-11	MW12-12	MW12-13	MW12-8	SB12-1	SB12-1	SB12-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123007	123010	123013	123016	123183	12209	12534	123112
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		9/29/1998	9/29/1998	9/30/1998	10/1/1998	10/28/1998	11/11/1997	11/11/1997	10/14/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,1,2-Trichloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,1-Dichloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,1-Dichloroethene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,2-Dichloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
1,2-Dichloropropane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Acetone	UG/KG	11 U	11 U	12 U	12 UJ	52	3 J	10 J	12 U
Benzene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Bromodichloromethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Bromoform	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Carbon disulfide	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Carbon tetrachloride	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Chlorobenzene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Chlorodibromomethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Chloroethane	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Chloroform	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Cis-1,3-Dichloropropene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Ethyl benzene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methyl bromide	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methyl butyl ketone	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methyl chloride	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methyl ethyl ketone	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methyl isobutyl ketone	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Methylene chloride	UG/KG	11 U	11 U	1 J	12 U	13 U	12 U	12 U	11 U
Styrene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Tetrachloroethene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Toluene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Total Xylenes	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Trans-1,3-Dichloropropene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Trichloroethene	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Vinyl chloride	UG/KG	11 U	11 U	12 U	12 U	13 U	12 U	12 U	11 U
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
1,2-Dichlorobenzene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
1,3-Dichlorobenzene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
1,4-Dichlorobenzene	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2,4,5-Trichlorophenol	UG/KG	190 U	180 U	190 U	190 U	200 U	190 U	190 U	180 U

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-11	MW12-12	MW12-13	MW12-8	SB12-1	SB12-1	SB12-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123007	123010	123013	123016	123183	12209	12534	123112
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		9/29/1998	9/29/1998	9/30/1998	10/1/1998	10/28/1998	11/11/1997	11/11/1997	10/14/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4,6-Trichlorophenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2,4-Dichlorophenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2,4-Dimethylphenol	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	78 U	78 U	75 UJ
2,4-Dinitrophenol	UG/KG	190 U	180 U	190 U	190 UR	200 U	190 U	190 U	180 UJ
2,4-Dinitrotoluene	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2,6-Dinitrotoluene	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2-Chloronaphthalene	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	78 U	78 U	75 U
2-Chlorophenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2-Methylnaphthalene	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	78 U	78 U	75 U
2-Methylphenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
2-Nitroaniline	UG/KG	190 U	180 U	190 U	190 U	200 U	190 U	190 U	180 U
2-Nitrophenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
3,3'-Dichlorobenzidine	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
3-Nitroaniline	UG/KG	190 U	180 U	190 UJ	190 UJ	200 U	190 U	190 U	180 U
4,6-Dinitro-2-methylphenol	UG/KG	190 U	180 U	190 U	190 UJ	200 U	190 U	190 U	180 U
4-Bromophenyl phenyl ether	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
4-Chloro-3-methylphenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
4-Chloroaniline	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 UJ	78 U	78 U	75 UJ
4-Chlorophenyl phenyl ether	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
4-Methylphenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
4-Nitroaniline	UG/KG	190 UJ	180 UJ	190 U	190 U	200 U	190 U	190 U	180 UJ
4-Nitrophenol	UG/KG	190 U	180 U	190 U	190 UJ	200 U	190 U	190 U	180 U
Acenaphthene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Acenaphthylene	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	78 U	78 U	75 U
Anthracene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Benzo(a)anthracene	UG/KG	77 U	72 U	80 U	4.5 J	6.4 J	11 J	78 U	75 U
Benzo(a)pyrene	UG/KG	77 UJ	72 UJ	80 UJ	5 J	8 J	15 J	78 U	75 U
Benzo(b)fluoranthene	UG/KG	77 U	72 U	80 U	5.9 J	9.7 J	30 J	78 U	75 U
Benzo(ghi)perylene	UG/KG	77 U	72 U	80 U	4 J	6.6 J	23 J	78 U	75 UJ
Benzo(k)fluoranthene	UG/KG	77 U	72 U	80 U	7.6 J	7.4 J	78 U	78 U	75 U
Bis(2-Chloroethoxy)methane	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Bis(2-Chloroethyl)ether	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Bis(2-Chloroisopropyl)ether	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Bis(2-Ethylhexyl)phthalate	UG/KG	77 U	72 U	210	11 J	83 U	78 U	78 U	75 U
Butylbenzylphthalate	UG/KG	77 U	72 U	80 U	78 U	83 U	6.7 J	78 U	75 U
Carbazole	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	16 J	78 U	75 UJ
Chrysene	UG/KG	4.3 J	72 UJ	80 UJ	6.8 J	9.1 J	17 J	78 U	75 U
Di-n-butylphthalate	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	68 J	78 U	75 U
Di-n-octylphthalate	UG/KG	77 U	72 U	80 U	78 U	83 U	7.8 J	78 U	6 J
Dibenz(a,h)anthracene	UG/KG	77 U	72 U	80 U	78 U	83 U	16 J	78 U	75 UJ

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-11	MW12-12	MW12-13	MW12-8	SB12-1	SB12-1	SB12-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123007	123010	123013	123016	123183	12209	12534	123112
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		9/29/1998	9/29/1998	9/30/1998	10/1/1998	10/28/1998	11/11/1997	11/11/1997	10/14/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Dibenzofuran	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	5.6 J	78 U	75 U
Diethyl phthalate	UG/KG	77 UJ	72 UJ	80 UJ	78 UJ	83 U	78 U	78 U	75 U
Dimethylphthalate	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Fluoranthene	UG/KG	5.5 J	72 UJ	80 UJ	9.1 J	14 J	9.7 J	78 U	75 U
Fluorene	UG/KG	77 U	72 U	80 U	78 U	83 U	5.4 J	78 U	75 U
Hexachlorobenzene	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Hexachlorobutadiene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 UJ
Hexachlorocyclopentadiene	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Hexachloroethane	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Indeno(1,2,3-cd)pyrene	UG/KG	77 U	72 U	80 U	78 U	6.1 J	18 J	78 U	75 UJ
Isophorone	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
N-Nitrosodiphenylamine	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
N-Nitrosodipropylamine	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Naphthalene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Nitrobenzene	UG/KG	77 UJ	72 UJ	80 UJ	78 U	83 U	78 U	78 U	75 U
Pentachlorophenol	UG/KG	190 U	180 U	190 UR	190 U	200 U	190 U	190 U	180 UJ
Phenanthrene	UG/KG	77 U	72 U	80 U	6.5 J	7.8 J	8.5 J	78 U	75 U
Phenol	UG/KG	77 U	72 U	80 U	78 U	83 U	78 U	78 U	75 U
Pyrene	UG/KG	4.2 J	72 U	80 U	9.1 J	22 J	10 J	4.5 J	75 U
Pesticides/PCBs									
4,4'-DDD	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
4,4'-DDE	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
4,4'-DDT	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	1.8 J	3.8 U
Aldrin	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Alpha-BHC	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Alpha-Chlordane	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Aroclor-1016	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Aroclor-1221	UG/KG	78 U	74 U	81 U	81 U	85 U	80 U	79 U	76 U
Aroclor-1232	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Aroclor-1242	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Aroclor-1248	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Aroclor-1254	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Aroclor-1260	UG/KG	38 U	36 U	40 U	40 U	42 U	39 U	39 U	38 U
Beta-BHC	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Delta-BHC	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Dieldrin	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
Endosulfan I	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Endosulfan II	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
Endosulfan sulfate	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
Endrin	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-11	MW12-12	MW12-13	MW12-8	SB12-1	SB12-1	SB12-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123007	123010	123013	123016	123183	12209	12534	123112
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		9/29/1998	9/29/1998	9/30/1998	10/1/1998	10/28/1998	11/11/1997	11/11/1997	10/14/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Endrin aldehyde	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
Endrin ketone	UG/KG	3.8 U	3.6 U	4 U	4 U	4.2 U	3.9 U	3.9 U	3.8 U
Gamma-BHC/Lindane	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Gamma-Chlordane	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	3.2	2 U	1.9 U
Heptachlor	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Heptachlor epoxide	UG/KG	2 U	1.9 U	2 U	2 U	2.2 U	2 U	2 U	1.9 U
Methoxychlor	UG/KG	20 U	19 U	20 U	20 U	22 U	20 U	20 U	19 U
Toxaphene	UG/KG	200 U	190 U	200 U	200 U	220 U	200 U	200 U	190 U
Metals									
Aluminum	MG/KG	10100	10600	11800	9960	11700	10200	8590	7160 J
Antimony	MG/KG	1.1 UR	1.1 UR	1.3 UR	1.2 UR	1.5 UR	0.81 J	0.87 J	0.96 UR
Arsenic	MG/KG	3.5	4	3.3	3.2	3.1	4.9	3.9	4 J
Barium	MG/KG	64.5	50.3	58.9	78.6	76.1	89.2	74.2	75.2
Beryllium	MG/KG	0.38 J	0.39 J	0.44 J	0.32 J	0.58 J	0.38	0.38	0.25 J
Cadmium	MG/KG	0.06 U	0.05 U	0.06 U	0.06 U	0.43 U	1.1	0.86	3.2
Calcium	MG/KG	46500	1230	11800	1640 J	4240	30600	52700	77600 J
Chromium	MG/KG	15.2	14.4	21.5	13	15.1 J	22.8	16.7	18.2
Cobalt	MG/KG	8.9 J	8.2 J	13.1	8 J	8.6 J	9.5	8.3	9.2
Copper	MG/KG	20.1	14.9	32.5	13.4	15.1	27.5	21.3	23.6
Cyanide	MG/KG	0.58 U	0.56 U	0.64 U	1.2 J	1.6	0.66 UJ	0.67 UJ	0.56 U
Iron	MG/KG	20800 J	19700 J	27100 J	16300	19500	22700	17900	16400
Lead	MG/KG	11.4	13.1	15.5	15.2 J	15.7 J	16.3 J	13.4 J	12 J
Magnesium	MG/KG	9420	3150	6460	2340	3120	7050	7270	21500 J
Manganese	MG/KG	478	327	501	783	701	536	499	417
Mercury	MG/KG	0.11 J	0.05 UJ	0.06 UJ	0.09 J	0.06 U	0.05 U	0.05 U	0.06 U
Nickel	MG/KG	24	17.6	39.9	16.2	16.3 UJ	30.4	22.7	24.4 J
Potassium	MG/KG	1190	925	1270	806 J	1170 J	1320	993	1540
Selenium	MG/KG	0.86 U	0.83 U	0.94 U	0.89 UJ	0.55 U	2.1	2.5	0.72 U
Silver	MG/KG	0.22 U	0.22 U	0.25 U	0.23 U	0.29 U	0.48 U	0.49 U	0.2 J
Sodium	MG/KG	47 U	45.7 U	51.7 U	48.9 U	60 U	115	207	56.1 J
Thallium	MG/KG	0.97 U	0.94 U	1.1 U	1.6 U	1.8 J	1.5	1.5 U	1.2 J
Vanadium	MG/KG	17.6	18.3	17.7	17.6	20.8	17.6	14.7	13.6
Zinc	MG/KG	50.1	45	81.4	46.1	53.6 J	64.2	60.7	83.7 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2B	SB12-3	SB12-4	SS12-15	SS12-16	SS12-17	SS12-183
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123064	12524	12530	123211	123102	123212	123377
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/4/1998	11/9/1997	11/10/1997	11/3/1998	10/13/1998	11/3/1998	11/17/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds								
1,1,1-Trichloroethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,1,2-Trichloroethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,1-Dichloroethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,1-Dichloroethene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,2-Dichloroethane	UG/KG	12 UJ	12 U	12 U	12 U	12 U	12 U	12 U
1,2-Dichloroethene (total)	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
1,2-Dichloropropane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Acetone	UG/KG	12 UJ	4 J	5 J	12 U	12 U	9 J	7 J
Benzene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Bromodichloromethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Bromoform	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Carbon disulfide	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Carbon tetrachloride	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Chlorobenzene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Chlorodibromomethane	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Chloroethane	UG/KG	12 UJ	12 U	12 U	12 U	12 U	12 U	12 U
Chloroform	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Cis-1,3-Dichloropropene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Ethyl benzene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Methyl bromide	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Methyl butyl ketone	UG/KG	12 U	12 U	1 J	12 U	12 U	12 U	12 U
Methyl chloride	UG/KG	12 UJ	12 U	12 U	12 U	12 U	12 U	12 U
Methyl ethyl ketone	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Methyl isobutyl ketone	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Methylene chloride	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Styrene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Tetrachloroethene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Toluene	UG/KG	12 U	3 J	4 J	12 U	1 J	12 U	2 J
Total Xylenes	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Trans-1,3-Dichloropropene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Trichloroethene	UG/KG	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Vinyl chloride	UG/KG	12 UJ	12 U	12 U	12 U	12 U	12 U	12 U
Semivolatile Organic Compounds								
1,2,4-Trichlorobenzene	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
1,2-Dichlorobenzene	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
1,3-Dichlorobenzene	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
1,4-Dichlorobenzene	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
2,4,5-Trichlorophenol	UG/KG	180 U	200 U	200 U	200 U	190 U	200 U	200 U

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2B	SB12-3	SB12-4	SS12-15	SS12-16	SS12-17	SS12-183
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123064	12524	12530	123211	123102	123212	123377
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/4/1998	11/9/1997	11/10/1997	11/3/1998	10/13/1998	11/3/1998	11/17/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4,6-Trichlorophenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
2,4-Dichlorophenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
2,4-Dimethylphenol	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 UJ
2,4-Dinitrophenol	UG/KG	180 U	200 UJ	200 UJ	200 UR	190 UJ	200 UR	200 UJ
2,4-Dinitrotoluene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
2,6-Dinitrotoluene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
2-Chloronaphthalene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
2-Chlorophenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
2-Methylnaphthalene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
2-Methylphenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
2-Nitroaniline	UG/KG	180 U	200 U	200 U	200 UJ	190 U	200 UJ	200 U
2-Nitrophenol	UG/KG	73 UJ	82 U	84 U	80 U	80 U	80 U	82 UJ
3,3'-Dichlorobenzidine	UG/KG	73 U	82 UJ	84 UJ	80 UJ	80 UJ	80 UJ	82 U
3-Nitroaniline	UG/KG	180 U	200 UJ	200 UJ	200 UJ	190 U	200 UJ	200 UJ
4,6-Dinitro-2-methylphenol	UG/KG	180 U	200 U	200 U	200 UJ	190 U	200 UJ	200 UJ
4-Bromophenyl phenyl ether	UG/KG	73 U	82 U	84 U	80 U	80 U	80 UJ	82 U
4-Chloro-3-methylphenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
4-Chloroaniline	UG/KG	73 UJ	82 UJ	84 UJ	80 U	80 U	80 U	82 UJ
4-Chlorophenyl phenyl ether	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
4-Methylphenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
4-Nitroaniline	UG/KG	180 UJ	200 UJ	200 UJ	200 UJ	190 UJ	200 UJ	200 UJ
4-Nitrophenol	UG/KG	180 U	200 U	200 U	200 U	190 UJ	200 U	200 U
Acenaphthene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Acenaphthylene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Anthracene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Benzo(a)anthracene	UG/KG	4 J	82 U	84 U	80 UJ	80 U	80 UJ	27 J
Benzo(a)pyrene	UG/KG	5.7 J	82 U	84 U	80 UJ	80 UJ	80 UJ	18 J
Benzo(b)fluoranthene	UG/KG	6.2 J	82 U	84 U	4.2 J	80 U	80 U	36 J
Benzo(ghi)perylene	UG/KG	4.6 J	82 U	84 U	80 U	80 U	80 U	14 J
Benzo(k)fluoranthene	UG/KG	7 J	82 U	84 U	80 U	80 U	80 U	26 J
Bis(2-Chloroethoxy)methane	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Bis(2-Chloroethyl)ether	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Bis(2-Chloroisopropyl)ether	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
Bis(2-Ethylhexyl)phthalate	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	10 J	82 UJ
Butylbenzylphthalate	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 UJ
Carbazole	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Chrysene	UG/KG	7 J	82 U	5.1 J	80 UJ	80 U	80 UJ	51 J
Di-n-butylphthalate	UG/KG	73 U	82 U	84 U	7.2 J	80 U	6 J	82 U
Di-n-octylphthalate	UG/KG	73 UJ	82 U	84 U	80 U	80 U	80 U	82 U
Dibenz(a,h)anthracene	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	6.3 J

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2B	SB12-3	SB12-4	SS12-15	SS12-16	SS12-17	SS12-183
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123064	12524	12530	123211	123102	123212	123377
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/4/1998	11/9/1997	11/10/1997	11/3/1998	10/13/1998	11/3/1998	11/17/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Dibenzofuran	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Diethyl phthalate	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Dimethylphthalate	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Fluoranthene	UG/KG	8.2 J	82 U	7 J	80 UJ	80 U	4.1 J	24 J
Fluorene	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
Hexachlorobenzene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Hexachlorobutadiene	UG/KG	73 UJ	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Hexachlorocyclopentadiene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 U	82 UJ
Hexachloroethane	UG/KG	73 UJ	82 U	84 U	80 U	80 U	80 U	82 U
Indeno(1,2,3-cd)pyrene	UG/KG	4.3 J	82 U	84 U	80 U	80 U	80 UJ	12 J
Isophorone	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
N-Nitrosodiphenylamine	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
N-Nitrosodipropylamine	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
Naphthalene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Nitrobenzene	UG/KG	73 U	82 U	84 U	80 UJ	80 U	80 UJ	82 U
Pentachlorophenol	UG/KG	180 U	200 U	200 U	200 U	190 UJ	200 U	200 UR
Phenanthrene	UG/KG	5.8 J	82 U	84 U	80 UJ	80 U	80 U	5.1 J
Phenol	UG/KG	73 U	82 U	84 U	80 U	80 U	80 U	82 U
Pyrene	UG/KG	10 J	82 U	6.1 J	80 U	80 U	80 U	21 J
Pesticides/PCBs								
4,4'-DDD	UG/KG	4.1 U	4.1 U	4.2 U	4 U	4 U	4 U	4.1 U
4,4'-DDE	UG/KG	4.1 U	4.8 J	4.2 U	4 U	4 U	15	4.1 U
4,4'-DDT	UG/KG	4.1 U	4.1 U	4.2 U	4 U	4 U	42	4.1 U
Aldrin	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Alpha-BHC	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Alpha-Chlordane	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Aroclor-1016	UG/KG	41 U	41 U	42 U	40 U	40 U	40 U	41 U
Aroclor-1221	UG/KG	84 U	84 U	85 U	82 U	81 U	82 U	84 U
Aroclor-1232	UG/KG	41 U	41 U	42 U	40 U	40 U	40 U	41 U
Aroclor-1242	UG/KG	41 U	41 U	42 U	40 U	40 U	40 U	41 U
Aroclor-1248	UG/KG	41 U	41 U	42 U	40 U	40 U	40 U	41 U
Aroclor-1254	UG/KG	41 U	440	24 J	40 U	40 U	670 J	41 U
Aroclor-1260	UG/KG	41 U	41 U	42 U	40 U	40 U	40 U	41 U
Beta-BHC	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Delta-BHC	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Dieldrin	UG/KG	4.1 U	5.8 J	4.2 U	4 U	4 U	14 J	4.1 U
Endosulfan I	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	1.8 J	2.1 U
Endosulfan II	UG/KG	4.1 U	2.7 J	4.2 U	4 U	4 U	4 U	4.1 U
Endosulfan sulfate	UG/KG	4.1 U	4.1 U	4.2 U	4 U	4 U	4 U	4.1 U
Endrin	UG/KG	4.1 U	2.6 J	4.2 U	4 U	4 U	4.2 J	4.1 U

Table B-1
Disposal Pit A/B Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2B	SB12-3	SB12-4	SS12-15	SS12-16	SS12-17	SS12-183
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123064	12524	12530	123211	123102	123212	123377
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/4/1998	11/9/1997	11/10/1997	11/3/1998	10/13/1998	11/3/1998	11/17/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Endrin aldehyde	UG/KG	4.1 U	3.5 J	4.2 U	4 U	4 U	5.6 J	4.1 U
Endrin ketone	UG/KG	4.1 U	4.1 U	4.2 U	4 U	4 U	4 U	4.1 U
Gamma-BHC/Lindane	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Gamma-Chlordane	UG/KG	2.1 U	9 J	2.2 U	2.1 U	2 U	11 J	2.1 U
Heptachlor	UG/KG	2.1 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	2.1 U
Heptachlor epoxide	UG/KG	2.1 U	3.3 J	2.2 U	2.1 U	2 U	4.6 J	2.1 U
Methoxychlor	UG/KG	21 U	21 U	22 U	21 U	20 U	21 U	21 U
Toxaphene	UG/KG	210 U	210 U	220 U	210 U	200 U	210 U	210 U
Metals								
Aluminum	MG/KG	15800	10500	14400	10200	11900	10500	13900 J
Antimony	MG/KG	1.4 UR	0.83 UJ	0.86 UJ	1.2 UJ	1.4 UR	1.1 UJ	1.4 UR
Arsenic	MG/KG	4.9	3.6	4.2	3.5	3.8	2.8	3.9 J
Barium	MG/KG	86.2	67.4	84	67.5	85.9	70.8	86.2
Beryllium	MG/KG	0.43 J	0.35 J	0.38	0.44 J	0.44 J	0.4 J	0.59 J
Cadmium	MG/KG	0.07 U	0.07 U	0.07 U	0.06 U	0.07 U	0.05 U	0.4 U
Calcium	MG/KG	3140	32300	12800	30700	15200 J	23600	16200
Chromium	MG/KG	23.3	16.9	18.7	15.8	17.5	15.6	19.4
Cobalt	MG/KG	17.5	9.5	10.7	9.1 J	9.8 J	10.7	15
Copper	MG/KG	13.4	19.3	16.7	22.3	19.6	21.4	23.7
Cyanide	MG/KG	0.63 UJ	0.75 U	0.68 U	0.62 U	0.62 U	0.6 U	0.66 U
Iron	MG/KG	26900	18400	20900	20500 J	21700 J	19900 J	26000 J
Lead	MG/KG	22.2	11.3	15.9	13.2	14.6	13.6	13.6
Magnesium	MG/KG	3820 J	6950	5420	7330	5160	7070	5780
Manganese	MG/KG	1420	584	781	555 J	641	607 J	663
Mercury	MG/KG	0.06 U	0.06 U	0.06 U	0.06 U	0.07 J	0.06 U	0.06 U
Nickel	MG/KG	27.1	25.4	23.2	27.2	24.7	26.3	29.2 J
Potassium	MG/KG	1020 J	1660 J	1740 J	1210	1250	1260	1310
Selenium	MG/KG	1.1 U	1.1 U	1.2 U	0.89 U	1 U	0.82 U	0.52 UJ
Silver	MG/KG	0.28 U	0.5 U	0.52 U	0.23 U	0.27 U	0.21 U	0.27 U
Sodium	MG/KG	59.8 U	144 U	150 U	48.5 U	60.2 J	44.8 U	56.6 U
Thallium	MG/KG	1.2 U	1.5 U	1.6 U	1.2 J	1.2 U	1.4 J	1.2 U
Vanadium	MG/KG	23.4	17.7	24	18.3	20.2	18.1	21.2
Zinc	MG/KG	66.5	61.9 J	63.5 J	54.3 J	57 J	58 J	63.8 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-10	MW12-11	MW12-11	MW12-12	MW12-12	MW12-13	MW12-13	MW12-8	MW12-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123008	123009	123011	123012	123014	123015	123017	123018	123184	123185
DEPTH TO TOP OF SAMPLE		4	8	4	8	4	9	4	8	4	8
DEPTH TO BOTTOM OF SAMPLE		5.7	9.8	5.6	10	6	11	6	9.6	6	10
SAMPLE DATE		9/29/1998	9/29/1998	9/29/1998	9/29/1998	9/30/1998	9/30/1998	10/1/1998	10/1/1998	10/28/1998	10/28/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds											
1,1,1-Trichloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,1,2-Trichloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,1-Dichloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,1-Dichloroethene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,2-Dichloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,2-Dichloroethene (total)	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
1,2-Dichloropropane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Acetone	UG/KG	3 J	4 J	4 J	4 J	12 U	12 U	11 UJ	12 UJ	11 U	12
Benzene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Bromodichloromethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Bromoform	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Carbon disulfide	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Carbon tetrachloride	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Chlorobenzene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Chlorodibromomethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Chloroethane	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Chloroform	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Cis-1,3-Dichloropropene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Ethyl benzene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methyl bromide	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methyl butyl ketone	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methyl chloride	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methyl ethyl ketone	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methyl isobutyl ketone	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Methylene chloride	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Styrene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Tetrachloroethene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Toluene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	8 J	14	11 U	11 U
Total Xylenes	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Trans-1,3-Dichloropropene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Trichloroethene	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Vinyl chloride	UG/KG	11 U	12 U	11 U	11 U	12 U	12 U	11 U	12 U	11 U	11 U
Semivolatile Organic Compounds											
1,2,4-Trichlorobenzene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
1,2-Dichlorobenzene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
1,3-Dichlorobenzene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
1,4-Dichlorobenzene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2,2'-oxybis(1-Chloropropane)	UG/KG										
2,4,5-Trichlorophenol	UG/KG	180 U	180 U	180 U	170 U	200 U	200 U	180 U	180 U	180 U	180 U
2,4,6-Trichlorophenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2,4-Dichlorophenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2,4-Dimethylphenol	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-10	MW12-11	MW12-11	MW12-12	MW12-12	MW12-13	MW12-13	MW12-8	MW12-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123008	123009	123011	123012	123014	123015	123017	123018	123184	123185
DEPTH TO TOP OF SAMPLE		4	8	4	8	4	9	4	8	4	8
DEPTH TO BOTTOM OF SAMPLE		5.7	9.8	5.6	10	6	11	6	9.6	6	10
SAMPLE DATE		9/29/1998	9/29/1998	9/29/1998	9/29/1998	9/30/1998	9/30/1998	10/1/1998	10/1/1998	10/28/1998	10/28/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dinitrophenol	UG/KG	180 U	180 U	180 U	170 U	200 U	200 U	180 UR	180 UR	180 U	180 U
2,4-Dinitrotoluene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2,6-Dinitrotoluene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2-Chloronaphthalene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U
2-Chlorophenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2-Methylnaphthalene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U
2-Methylphenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
2-Nitroaniline	UG/KG	180 U	180 U	180 U	170 U	200 U	200 U	180 U	180 U	180 U	180 U
2-Nitrophenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
3,3'-Dichlorobenzidine	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
3-Nitroaniline	UG/KG	180 U	180 U	180 UJ	170 UJ	200 UJ	200 UJ	180 UJ	180 UJ	180 U	180 U
4,6-Dinitro-2-methylphenol	UG/KG	180 U	180 U	180 U	170 U	200 U	200 U	180 UJ	180 UJ	180 U	180 U
4-Bromophenyl phenyl ether	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
4-Chloro-3-methylphenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
4-Chloroaniline	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 UJ	72 UJ
4-Chlorophenyl phenyl ether	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
4-Methylphenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
4-Nitroaniline	UG/KG	180 UJ	180 UJ	180 U	170 U	200 U	200 U	180 U	180 U	180 U	180 U
4-Nitrophenol	UG/KG	180 U	180 U	180 U	170 U	200 U	200 U	180 UJ	180 UJ	180 U	180 U
Acenaphthene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Acenaphthylene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U
Anthracene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Benzo(a)anthracene	UG/KG	73 UJ	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Benzo(a)pyrene	UG/KG	73 U	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Benzo(b)fluoranthene	UG/KG	73 UJ	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Benzo(ghi)perylene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Benzo(k)fluoranthene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Bis(2-Chloroethoxy)methane	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Bis(2-Chloroethyl)ether	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Bis(2-Chloroisopropyl)ether	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Bis(2-Ethylhexyl)phthalate	UG/KG	73 U	74 U	72 U	180	81 U	81 U	83	11 J	73 U	72 U
Butylbenzylphthalate	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Carbazole	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U
Chrysene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Di-n-butylphthalate	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	4 J	73 U	72 U
Di-n-octylphthalate	UG/KG	73 U	74 U	72 U	13 J	81 U	4.9 J	12 J	6.9 J	19 J	45 J
Dibenz(a,h)anthracene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Dibenzofuran	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Diethyl phthalate	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 UJ	76 UJ	73 U	72 U
Dimethylphthalate	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Fluoranthene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Fluorene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-10	MW12-11	MW12-11	MW12-12	MW12-12	MW12-13	MW12-13	MW12-8	MW12-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123008	123009	123011	123012	123014	123015	123017	123018	123184	123185
DEPTH TO TOP OF SAMPLE		4	8	4	8	4	9	4	8	4	8
DEPTH TO BOTTOM OF SAMPLE		5.7	9.8	5.6	10	6	11	6	9.6	6	10
SAMPLE DATE		9/29/1998	9/29/1998	9/29/1998	9/29/1998	9/30/1998	9/30/1998	10/1/1998	10/1/1998	10/28/1998	10/28/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Hexachlorobutadiene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Hexachlorocyclopentadiene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Hexachloroethane	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Indeno(1,2,3-cd)pyrene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Isophorone	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
N-Nitrosodiphenylamine	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
N-Nitrosodipropylamine	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Naphthalene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Nitrobenzene	UG/KG	73 UJ	74 UJ	72 UJ	70 UJ	81 UJ	81 UJ	73 U	76 U	73 U	72 U
Pentachlorophenol	UG/KG	180 U	180 U	180 UR	170 UR	200 UR	200 UR	180 U	180 U	180 U	180 U
Phenanthrene	UG/KG	73 U	74 U	72 U	4.6 J	81 U	81 U	73 U	76 U	73 U	72 U
Phenol	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Pyrene	UG/KG	73 U	74 U	72 U	70 U	81 U	81 U	73 U	76 U	73 U	72 U
Pesticides/PCBs											
4,4'-DDD	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
4,4'-DDE	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
4,4'-DDT	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Aldrin	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Alpha-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Alpha-Chlordane	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Aroclor-1016	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Aroclor-1221	UG/KG	74 U	75 U	73 U	71 U	83 U	83 U	74 U	77 U	74 U	74 U
Aroclor-1232	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Aroclor-1242	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Aroclor-1248	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Aroclor-1254	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Aroclor-1260	UG/KG	37 U	37 U	36 U	35 U	41 U	41 U	37 U	38 U	37 U	36 U
Beta-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Delta-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Dieldrin	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Endosulfan I	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Endosulfan II	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Endosulfan sulfate	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Endrin	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Endrin aldehyde	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Endrin ketone	UG/KG	3.7 U	3.7 U	3.6 U	3.5 U	4.1 U	4.1 U	3.7 U	3.8 U	3.7 U	3.6 U
Gamma-BHC/Lindane	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Gamma-Chlordane	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Heptachlor	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Heptachlor epoxide	UG/KG	1.9 U	1.9 U	1.9 U	1.8 U	2.1 U	2.1 U	1.9 U	2 U	1.9 U	1.9 U
Methoxychlor	UG/KG	19 U	19 U	19 U	18 U	21 U	21 U	19 U	20 U	19 U	19 U
Toxaphene	UG/KG	190 U	190 U	190 U	180 U	210 U	210 U	190 U	200 U	190 U	190 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-10	MW12-10	MW12-11	MW12-11	MW12-12	MW12-12	MW12-13	MW12-13	MW12-8	MW12-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123008	123009	123011	123012	123014	123015	123017	123018	123184	123185
DEPTH TO TOP OF SAMPLE		4	8	4	8	4	9	4	8	4	8
DEPTH TO BOTTOM OF SAMPLE		5.7	9.8	5.6	10	6	11	6	9.6	6	10
SAMPLE DATE		9/29/1998	9/29/1998	9/29/1998	9/29/1998	9/30/1998	9/30/1998	10/1/1998	10/1/1998	10/28/1998	10/28/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals											
Aluminum	MG/KG	8370	7210	10900	4460	14200	11200	4820	11200	7440	7550
Antimony	MG/KG	1.3 UR	1.2 UR	1 UR	0.9 UR	1.5 UR	1.3 UR	1.2 UR	1.2 UR	1.2 UR	1.2 UR
Arsenic	MG/KG	3.5	3.4	2.9	0.88 J	5.9	5.8	2.5	3.9	3.1	3.3
Barium	MG/KG	63.9	68.7	55	17 J	112	100	51.3	63.4	73.2	65.8
Beryllium	MG/KG	0.31 J	0.27 J	0.44 J	0.17 J	0.51 J	0.38 J	0.14 J	0.46 J	0.45 J	0.43 J
Cadmium	MG/KG	0.06 U	0.06 U	0.05 U	0.04 U	0.07 U	0.06 U	0.06 U	0.06 U	0.36 U	0.35 U
Calcium	MG/KG	83200	73900	46100	6980	54600	42900	75600 J	43100 J	87500	64400
Chromium	MG/KG	13.9	12.4	20.4	8.5	21.1	16.2	8.2	20.5	12 J	13.3 J
Cobalt	MG/KG	7.7 J	7 J	12.9	9.1	14.3	12.9	5.1 J	15.2	8.1 J	12.1
Copper	MG/KG	20.3	20.5	33.7	11.5	28.4	23.9	13.3	31.5	20	21.9
Cyanide	MG/KG	0.55 U	0.6 U	0.53 U	0.53 U	0.63 U	0.64 U	0.57 UJ	0.64 UJ	1.5	0.72
Iron	MG/KG	19100 J	18100 J	27000 J	11000 J	27800 J	22800 J	10100	25500	16500	17300
Lead	MG/KG	7.3	6.6	16	9	11.9	9.1	3.4 J	11.5 J	5.9 J	7.6 J
Magnesium	MG/KG	13200	17200	9010	2090	13200	13700	34300	8350	16500	13400
Manganese	MG/KG	408	364	383	169	631	540	339	393	406	416
Mercury	MG/KG	0.05 UJ	0.06 UJ	0.05 UJ	0.06 J	0.06 UJ	0.06 UJ	0.05 U	0.06 U	0.05 U	0.05 U
Nickel	MG/KG	23.2	20.3	44	20	34.1 J	25.8 J	12.1	44.2	22.9 UJ	27.6 UJ
Potassium	MG/KG	1270	1250	1240	397 J	1980	1770	760 J	1340	1300	1260
Selenium	MG/KG	0.95 U	0.92 U	0.76 U	0.68 U	1.1 U	0.97 U	0.94 UJ	0.92 UJ	0.46 U	0.57 J
Silver	MG/KG	0.25 U	0.24 U	0.2 U	0.18 U	0.29 U	0.25 U	0.24 U	0.24 U	0.24 U	0.23 U
Sodium	MG/KG	96.5 J	84.9 J	81.8 J	37.1 U	61.3 U	53 U	51.4 U	84 J	99 J	49.2 U
Thallium	MG/KG	1.1 U	1 U	0.86 U	0.77 U	1.3 U	1.1 U	1.4 U	1.2 U	1.7 J	1.5 J
Vanadium	MG/KG	14.7	13.1	16.5	5.8 J	25.6	21.3	10.5	17	13.9	13.5
Zinc	MG/KG	50.3	51.6	94.9	41.5	66.8	52.4	31.6	105	45.4 J	57.2 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2	SB12-2	SB12-2	SB12-2	SB12-3	SB12-3	SB12-3	SB12-4	SB12-4	TP12-1A
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		12532	123113	12533	123114	12525	12527	12526	12528	12529	123142
DEPTH TO TOP OF SAMPLE		0.2	6	8	10	1	8	10	2	4	0.5
DEPTH TO BOTTOM OF SAMPLE		2	8	10	12	4	10	11.9	4	6	0.5
SAMPLE DATE		11/10/1997	10/14/1998	11/10/1997	10/14/1998	11/9/1997	11/9/1997	11/9/1997	11/9/1997	11/9/1997	10/16/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds											
1,1,1-Trichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,1,2-Trichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,1-Dichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,1-Dichloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,2-Dichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
1,2-Dichloropropane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Acetone	UG/KG	5 J	11 U	17 J	11 U	9 J	30 J	20 J	17 J	34 J	11 UJ
Benzene	UG/KG	12 U	11 U	11 U	11 U	12 U	6 J	12 U	12 U	12 U	11 U
Bromodichloromethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Bromoform	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Carbon disulfide	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Carbon tetrachloride	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Chlorobenzene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Chlorodibromomethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Chloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Chloroform	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Cis-1,3-Dichloropropene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Ethyl benzene	UG/KG	12 U	11 U	11 U	11 U	12 U	66	12 U	12 U	12 U	11 U
Methyl bromide	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Methyl butyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 UJ
Methyl chloride	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Methyl ethyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 UJ
Methyl isobutyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Methylene chloride	UG/KG	12 U	11 U	1 J	11 U	12 U	3 J	12 U	12 U	12 U	11 U
Styrene	UG/KG	12 U	11 U	11 U	11 U	12 U	33	12 U	12 U	12 U	11 U
Tetrachloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Toluene	UG/KG	15	11 U	10 J	11 U	12 U	2 J	6 J	6 J	2 J	11 U
Total Xylenes	UG/KG	12 U	11 U	11 U	11 U	12 U	10 J	12 U	12 U	12 U	11 U
Trans-1,3-Dichloropropene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Trichloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	1 J	11 U
Vinyl chloride	UG/KG	12 U	11 U	11 U	11 U	12 U	16 U	12 U	12 U	12 U	11 U
Semivolatile Organic Compounds											
1,2,4-Trichlorobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
1,2-Dichlorobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
1,3-Dichlorobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
1,4-Dichlorobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2,2'-oxybis(1-Chloropropane)	UG/KG										
2,4,5-Trichlorophenol	UG/KG	190 U	180 UJ	180 U	180 U	200 U		190 U	190 U	180 U	190 U
2,4,6-Trichlorophenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2,4-Dichlorophenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2,4-Dimethylphenol	UG/KG	77 U	72 UJ	74 U	73 UJ	85 U		77 U	80 U	75 U	77 UJ

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2	SB12-2	SB12-2	SB12-2	SB12-3	SB12-3	SB12-3	SB12-4	SB12-4	TP12-1A
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		12532	123113	12533	123114	12525	12527	12526	12528	12529	123142
DEPTH TO TOP OF SAMPLE		0.2	6	8	10	1	8	10	2	4	0.5
DEPTH TO BOTTOM OF SAMPLE		2	8	10	12	4	10	11.9	4	6	0.5
SAMPLE DATE		11/10/1997	10/14/1998	11/10/1997	10/14/1998	11/9/1997	11/9/1997	11/9/1997	11/9/1997	11/9/1997	10/16/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dinitrophenol	UG/KG	190 UJ	180 UJ	180 UJ	180 UJ	200 UJ		190 UJ	190 UJ	180 UJ	190 U
2,4-Dinitrotoluene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2,6-Dinitrotoluene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2-Chloronaphthalene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
2-Chlorophenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2-Methylnaphthalene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
2-Methylphenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
2-Nitroaniline	UG/KG	190 U	180 U	180 U	180 U	200 U		190 U	190 U	180 U	190 U
2-Nitrophenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
3,3'-Dichlorobenzidine	UG/KG	77 UJ	72 U	74 UJ	73 U	85 UJ		77 UJ	80 UJ	75 UJ	77 U
3-Nitroaniline	UG/KG	190 UJ	180 U	180 UJ	180 U	200 UJ		190 UJ	190 UJ	180 UJ	190 UJ
4,6-Dinitro-2-methylphenol	UG/KG	190 U	180 UJ	180 U	180 U	200 U		190 U	190 U	180 U	190 U
4-Bromophenyl phenyl ether	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
4-Chloro-3-methylphenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
4-Chloroaniline	UG/KG	77 UJ	72 UJ	74 UJ	73 UJ	85 UJ		77 UJ	80 UJ	75 UJ	77 UJ
4-Chlorophenyl phenyl ether	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
4-Methylphenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
4-Nitroaniline	UG/KG	190 UJ	180 U	180 UJ	180 UJ	200 UJ		190 UJ	190 UJ	180 UJ	190 UJ
4-Nitrophenol	UG/KG	190 U	180 UJ	180 U	180 UJ	200 U		190 U	190 U	180 U	190 UJ
Acenaphthene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Acenaphthylene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Anthracene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	4.4 J	77 UJ
Benzo(a)anthracene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	5.8 J	77 U
Benzo(a)pyrene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	7.1 J	77 UJ
Benzo(b)fluoranthene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	6 J	77 U
Benzo(ghi)perylene	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	6.7 J	77 U
Benzo(k)fluoranthene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	6.4 J	77 U
Bis(2-Chloroethoxy)methane	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Bis(2-Chloroethyl)ether	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Bis(2-Chloroisopropyl)ether	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Bis(2-Ethylhexyl)phthalate	UG/KG	77 U	72 UJ	74 U	73 UJ	85 U		390	80 U	75 U	77 U
Butylbenzylphthalate	UG/KG	77 U	72 UJ	74 U	73 UJ	85 U		77 U	80 U	5.1 J	77 U
Carbazole	UG/KG	77 U	72 UJ	74 U	73 UJ	85 U		77 U	80 U	75 U	77 UJ
Chrysene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	5.7 J	77 U
Di-n-butylphthalate	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Di-n-octylphthalate	UG/KG	77 U	6.2 J	74 U	10 J	7.9 J		54 J	5.2 J	7 J	77 UJ
Dibenz(a,h)anthracene	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	6 J	77 U
Dibenzofuran	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
Diethyl phthalate	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Dimethylphthalate	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Fluoranthene	UG/KG	4 J	72 U	74 U	73 U	4.5 J		77 U	80 U	5.1 J	77 U
Fluorene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2	SB12-2	SB12-2	SB12-2	SB12-3	SB12-3	SB12-3	SB12-4	SB12-4	TP12-1A
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		12532	123113	12533	123114	12525	12527	12526	12528	12529	123142
DEPTH TO TOP OF SAMPLE		0.2	6	8	10	1	8	10	2	4	0.5
DEPTH TO BOTTOM OF SAMPLE		2	8	10	12	4	10	11.9	4	6	0.5
SAMPLE DATE		11/10/1997	10/14/1998	11/10/1997	10/14/1998	11/9/1997	11/9/1997	11/9/1997	11/9/1997	11/9/1997	10/16/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Hexachlorobutadiene	UG/KG	77 U	72 UJ	74 U	73 UJ	85 U		77 U	80 U	75 U	77 UJ
Hexachlorocyclopentadiene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Hexachloroethane	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Indeno(1,2,3-cd)pyrene	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	5.7 J	77 U
Isophorone	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
N-Nitrosodiphenylamine	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
N-Nitrosodipropylamine	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Naphthalene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
Nitrobenzene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	75 U	77 UJ
Pentachlorophenol	UG/KG	190 U	180 UJ	180 U	180 UJ	200 U		77 U	190 U	180 U	190 UR
Phenanthrene	UG/KG	77 U	72 U	74 U	73 U	85 U		77 U	80 U	4.7 J	77 U
Phenol	UG/KG	77 U	72 UJ	74 U	73 U	85 U		77 U	80 U	75 U	77 U
Pyrene	UG/KG	77 U	72 U	74 U	73 U	4.6 J		77 U	80 U	4.4 J	77 UJ
Pesticides/PCBs											
4,4'-DDD	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	13 U		3.8 U	4 U	3.8 U	3.8 U
4,4'-DDE	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	42 J		26 J	4 U	3.8 U	3.8 U
4,4'-DDT	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	13 U		3.8 U	4 U	3.8 U	3.8 U
Aldrin	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Alpha-BHC	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Alpha-Chlordane	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		4.6 J	2 U	1.9 U	2 U
Aroclor-1016	UG/KG	38 U	36 U	37 U	37 U	130 U		38 U	40 U	38 U	38 U
Aroclor-1221	UG/KG	78 U	74 U	75 U	74 U	260 U		78 U	81 U	76 U	78 U
Aroclor-1232	UG/KG	38 U	36 U	37 U	37 U	130 U		38 U	40 U	38 U	38 U
Aroclor-1242	UG/KG	38 U	36 U	37 U	37 U	130 U		38 U	40 U	38 U	38 U
Aroclor-1248	UG/KG	38 U	36 U	37 U	37 U	130 U		38 U	40 U	38 U	38 U
Aroclor-1254	UG/KG	38 U	36 U	37 U	37 U	3000		1900	40 U	38 U	38 U
Aroclor-1260	UG/KG	38 U	36 U	37 U	37 U	130 U		38 U	40 U	38 U	38 U
Beta-BHC	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Delta-BHC	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Dieldrin	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	40 J		25 J	4 U	3.8 U	3.8 U
Endosulfan I	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Endosulfan II	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	19 J		9.5 J	4 U	3.8 U	3.8 U
Endosulfan sulfate	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	13 U		3.8 U	4 U	3.8 U	3.8 U
Endrin	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	16 J		8.6 J	4 U	3.8 U	3.8 U
Endrin aldehyde	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	13 U		3.8 U	4 U	3.8 U	3.8 U
Endrin ketone	UG/KG	3.8 U	3.6 U	3.7 U	3.7 U	13 U		3.8 U	4 U	3.8 U	3.8 U
Gamma-BHC/Lindane	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Gamma-Chlordane	UG/KG	2 U	1.9 U	1.9 U	1.9 U	58 J		44 J	2 U	1.9 U	2 U
Heptachlor	UG/KG	2 U	1.9 U	1.9 U	1.9 U	6.5 U		2 U	2 U	1.9 U	2 U
Heptachlor epoxide	UG/KG	2 U	1.9 U	1.9 U	1.9 U	22 J		2 U	2 U	1.9 U	2 U
Methoxychlor	UG/KG	20 U	19 U	19 U	19 U	65 U		20 U	20 U	19 U	20 U
Toxaphene	UG/KG	200 U	190 U	190 U	190 U	650 U		200 U	200 U	190 U	200 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SB12-2	SB12-2	SB12-2	SB12-2	SB12-3	SB12-3	SB12-3	SB12-4	SB12-4	TP12-1A
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		12532	123113	12533	123114	12525	12527	12526	12528	12529	123142
DEPTH TO TOP OF SAMPLE		0.2	6	8	10	1	8	10	2	4	0.5
DEPTH TO BOTTOM OF SAMPLE		2	8	10	12	4	10	11.9	4	6	0.5
SAMPLE DATE		11/10/1997	10/14/1998	11/10/1997	10/14/1998	11/9/1997	11/9/1997	11/9/1997	11/9/1997	11/9/1997	10/16/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals											
Aluminum	MG/KG	13200	7890 J	9570	7010 J	12900		15700	11900	13100	8910 J
Antimony	MG/KG	0.73 J	1.1 UR	0.74 UJ	1.2 UR	1.3 J		0.76 UJ	0.75 UJ	0.81 J	1.2 UR
Arsenic	MG/KG	4.3	3.8 J	4	3.7 J	4.3		3.6	5.5	3.8	3.7
Barium	MG/KG	125	63.3	90.5	76.4	86.1		74.5	67.4	82.1	65 J
Beryllium	MG/KG	0.39	0.3 J	0.36	0.24 J	0.43 J		0.72 J	0.36	0.52	0.33 J
Cadmium	MG/KG	3.9	0.05 U	0.06 U	0.06 U	1.1		6	0.06 U	0.07 U	0.06 U
Calcium	MG/KG	46100	97000 J	90900	82100 J	37200		5510	35900	52000	43000
Chromium	MG/KG	53.5	14.2	14.9	11.8	19.5		30.2	16.6	23.4	13
Cobalt	MG/KG	9.9	7.6 J	7.5	7.9 J	11		15.4	11.9	15	9.4 J
Copper	MG/KG	24.9	22.5	19.6	24.6	27.8		63.2	18.6	32.2	20.2
Cyanide	MG/KG	0.68 U	0.58 U	0.64 U	0.59 U	0.76 U		0.7 U	0.73 U	0.66 U	0.59 U
Iron	MG/KG	22300	16300	18400	16500	21900		35700	20500	27800	19600 J
Lead	MG/KG	27.2	9.4 J	7.4	7.2 J	15		63.9	11.8	17.9	11 J
Magnesium	MG/KG	12500	16400 J	18200	17100 J	8000		7120	8050	9610	8410 J
Manganese	MG/KG	507	448	375	451	619		395	561	430	569
Mercury	MG/KG	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U		0.05 U	0.06 U	0.04 U	0.06 U
Nickel	MG/KG	42.5	22.7 J	21	24.4 J	29		76.4	23.6	48.9	24.9 J
Potassium	MG/KG	1840 J	1120	2090 J	1220	1650 J		1740 J	1380 J	1740 J	897 J
Selenium	MG/KG	0.94 U	0.84 U	1 U	0.89 U	1.1 U		1 U	1 U	1.1 U	0.88 UJ
Silver	MG/KG	0.42 U	0.22 U	0.45 U	0.23 U	0.5 U		1.6	0.45 U	0.48 U	0.23 U
Sodium	MG/KG	121 U	134 J	129 U	78.9 J	145 U		131 U	129 U	138 U	48.4 U
Thallium	MG/KG	1.3 U	0.95 U	1.3 U	1.1 J	1.5 U		1.4 U	1.3 U	1.4 U	1 U
Vanadium	MG/KG	22.4	13.5	18.2	12.7	21.2		21	20.3	19.5	14.7
Zinc	MG/KG	104 J	45.3 J	45.3 J	51.3 J	79.4 J		160 J	61.7 J	110 J	50.9 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected durir data validation.

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-1B	TP12-1C	TP12-2A	TP12-2B	TP12-2C	TP12A-1	TP12A-1	TP12A-2	TP12A-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123143	123144	123145	123146	123147	TP12A-1-1	TP12A-1-2	TP12A-2-2	TP12A-2-1
DEPTH TO TOP OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
DEPTH TO BOTTOM OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
SAMPLE DATE		10/16/1998	10/16/1998	10/16/1998	10/16/1998	10/16/1998	6/24/1994	6/24/1994	6/22/1994	6/22/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds										
1,1,1-Trichloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,1,2,2-Tetrachloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,1,2-Trichloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,1-Dichloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,1-Dichloroethene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,2-Dichloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,2-Dichloroethene (total)	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
1,2-Dichloropropane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Acetone	UG/KG	11 UJ	12 UJ	11 UJ	28 UJ	30 UJ	12 U	11 U	12 U	14 U
Benzene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Bromodichloromethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Bromoform	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Carbon disulfide	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Carbon tetrachloride	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Chlorobenzene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Chlorodibromomethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Chloroethane	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Chloroform	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Cis-1,3-Dichloropropene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Ethyl benzene	UG/KG	11 U	12 U	11 U	49	24 J	12 U	11 U	12 U	14 U
Methyl bromide	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Methyl butyl ketone	UG/KG	11 UJ	12 UJ	11 UJ	28 UJ	30 UJ	12 U	11 U	12 U	14 U
Methyl chloride	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Methyl ethyl ketone	UG/KG	11 UJ	12 UJ	11 UJ	28 UJ	30 UJ	12 U	11 U	12 U	14 U
Methyl isobutyl ketone	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Methylene chloride	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Styrene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Tetrachloroethene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Toluene	UG/KG	11 U	12 U	11 U	15 J	6 J	12 U	11 U	12 U	14 U
Total Xylenes	UG/KG	11 U	12 U	11 U	520	260	12 U	11 U	12 U	14 U
Trans-1,3-Dichloropropene	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Trichloroethene	UG/KG	11 U	12 U	11 U	11 J	30 U	3 J	26	12 U	14 U
Vinyl chloride	UG/KG	11 U	12 U	11 U	28 U	30 U	12 U	11 U	12 U	14 U
Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
1,2-Dichlorobenzene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
1,3-Dichlorobenzene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
1,4-Dichlorobenzene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2,2'-oxybis(1-Chloropropane)	UG/KG						400 U	380 U	390 U	4500 U
2,4,5-Trichlorophenol	UG/KG	180 U	180 U	180 U	180 U	190 U	980 U	920 U	940 U	11000 U
2,4,6-Trichlorophenol	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2,4-Dichlorophenol	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2,4-Dimethylphenol	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 UJ	25 J	380 U	390 U	4500 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-1B	TP12-1C	TP12-2A	TP12-2B	TP12-2C	TP12A-1	TP12A-1	TP12A-2	TP12A-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123143	123144	123145	123146	123147	TP12A-1-1	TP12A-1-2	TP12A-2-2	TP12A-2-1
DEPTH TO TOP OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
DEPTH TO BOTTOM OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
SAMPLE DATE		10/16/1998	10/16/1998	10/16/1998	10/16/1998	10/16/1998	6/24/1994	6/24/1994	6/22/1994	6/22/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dinitrophenol	UG/KG	180 U	180 U	180 U	180 UJ	190 UJ	980 U	920 U	940 U	11000 U
2,4-Dinitrotoluene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2,6-Dinitrotoluene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2-Chloronaphthalene	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 UJ	400 U	380 U	390 U	4500 U
2-Chlorophenol	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2-Methylnaphthalene	UG/KG	73 UJ	75 UJ	74 UJ	56 J	10 J	400 U	21 J	390 U	4500 U
2-Methylphenol	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
2-Nitroaniline	UG/KG	180 U	180 U	180 U	180 U	190 UJ	980 U	920 U	940 U	11000 U
2-Nitrophenol	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
3,3'-Dichlorobenzidine	UG/KG	73 U	75 U	74 U	75 UJ	79 U	400 U	380 U	390 U	4500 U
3-Nitroaniline	UG/KG	180 UJ	180 UJ	180 UJ	180 UJ	190 UJ	980 U	920 U	940 U	11000 U
4,6-Dinitro-2-methylphenol	UG/KG	180 U	180 U	180 U	180 U	190 U	980 U	920 U	940 U	11000 U
4-Bromophenyl phenyl ether	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
4-Chloro-3-methylphenol	UG/KG	73 UJ	75 UJ	74 UJ	75 U	79 U	400 U	380 U	390 U	4500 U
4-Chloroaniline	UG/KG	73 UJ	75 UJ	74 UJ	75 U	79 U	400 U	380 U	390 U	4500 U
4-Chlorophenyl phenyl ether	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
4-Methylphenol	UG/KG	73 U	75 U	74 U	75 U	79 U	140 J	380 U	390 U	4500 U
4-Nitroaniline	UG/KG	180 UJ	180 UJ	180 UJ	180 UJ	190 UJ	980 U	920 U	940 U	11000 U
4-Nitrophenol	UG/KG	180 UJ	180 UJ	180 UJ	180 U	190 U	980 U	920 U	940 U	11000 U
Acenaphthene	UG/KG	73 U	75 U	74 U	75 U	23 J	400 U	380 U	390 U	4500 U
Acenaphthylene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	33 J	390 U	4500 U
Anthracene	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	40 J	400 U	96 J	390 U	4500 U
Benzo(a)anthracene	UG/KG	73 U	75 U	74 U	75 UJ	74 J	21 J	180 J	390 U	4500 U
Benzo(a)pyrene	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	41 J	30 J	200 J	390 U	4500 U
Benzo(b)fluoranthene	UG/KG	73 U	75 U	74 U	75 UJ	23 J	28 J	190 J	390 U	4500 U
Benzo(ghi)perylene	UG/KG	73 U	75 U	74 U	75 UJ	79 U	400 U	120 J	390 U	4500 U
Benzo(k)fluoranthene	UG/KG	73 U	75 U	74 U	75 UJ	79 U	32 J	160 J	390 U	4500 U
Bis(2-Chloroethoxy)methane	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Bis(2-Chloroethyl)ether	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Bis(2-Chloroisopropyl)ether	UG/KG	73 U	75 U	74 U	75 U	79 U				
Bis(2-Ethylhexyl)phthalate	UG/KG	73 U	75 U	74 U	930 J	79 U	230 J	860	390 U	4500 U
Butylbenzylphthalate	UG/KG	73 U	75 U	74 U	75 UJ	79 U	400 U	380 U	390 U	4500 U
Carbazole	UG/KG	73 UJ	75 UJ	74 UJ	75 U	79 U	400 U	380 U	390 U	4500 U
Chrysene	UG/KG	73 U	75 U	74 U	75 UJ	98	28 J	240 J	390 U	4500 U
Di-n-butylphthalate	UG/KG	73 U	75 U	74 U	75 U	79 U	79 J	1700	390 U	4500 U
Di-n-octylphthalate	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 U	400 U	380 U	390 U	4500 U
Dibenz(a,h)anthracene	UG/KG	73 U	75 U	74 U	75 UJ	79 U	400 U	57 J	390 U	4500 U
Dibenzofuran	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 UJ	400 U	380 U	390 U	4500 U
Diethyl phthalate	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Dimethylphthalate	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Fluoranthene	UG/KG	73 U	75 U	74 U	75 U	69 J	40 J	420	390 U	4500 U
Fluorene	UG/KG	73 U	75 U	74 U	75 U	10 J	400 U	52 J	390 U	4500 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-1B	TP12-1C	TP12-2A	TP12-2B	TP12-2C	TP12A-1	TP12A-1	TP12A-2	TP12A-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123143	123144	123145	123146	123147	TP12A-1-1	TP12A-1-2	TP12A-2-2	TP12A-2-1
DEPTH TO TOP OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
DEPTH TO BOTTOM OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
SAMPLE DATE		10/16/1998	10/16/1998	10/16/1998	10/16/1998	10/16/1998	6/24/1994	6/24/1994	6/22/1994	6/22/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Hexachlorobutadiene	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 UJ	400 U	380 U	390 U	4500 U
Hexachlorocyclopentadiene	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Hexachloroethane	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Indeno(1,2,3-cd)pyrene	UG/KG	73 U	75 U	74 U	75 UJ	79 U	400 U	120 J	390 U	4500 U
Isophorone	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	79 UJ	400 U	380 U	390 U	4500 U
N-Nitrosodiphenylamine	UG/KG	73 UJ	75 UJ	74 UJ	75 U	79 U	400 U	380 U	390 U	4500 U
N-Nitrosodipropylamine	UG/KG	73 U	75 U	74 U	75 U	79 U	400 U	380 U	390 U	4500 U
Naphthalene	UG/KG	73 UJ	75 UJ	74 UJ	600 J	72 J	400 U	380 U	390 U	4500 U
Nitrobenzene	UG/KG	73 UJ	75 UJ	74 UJ	75 U	79 U	400 U	380 U	390 U	4500 U
Pentachlorophenol	UG/KG	180 UR	180 UR	180 UR	180 UR	190 UR	980 U	920 U	940 U	11000 U
Phenanthrene	UG/KG	73 U	75 U	74 U	75 U	130	27 J	340 J	390 U	4500 U
Phenol	UG/KG	73 U	75 U	74 U	75 U	79 U	300 J	48 J	390 U	4500 U
Pyrene	UG/KG	73 UJ	75 UJ	74 UJ	75 UJ	260	37 J	380	390 U	4500 U
Pesticides/PCBs										
4,4'-DDD	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
4,4'-DDE	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	2.2 J	3.9 U	9 U
4,4'-DDT	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	2.1 J	9 U
Aldrin	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	0.79 J	2 U	2 U	4.7 U
Alpha-BHC	UG/KG	1.9 U	1.9 U	1.9 U	2.8	24	2.1 U	2 U	2 U	4.7 U
Alpha-Chlordane	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.1 U	1.5 J	2 U	4.7 U
Aroclor-1016	UG/KG	36 U	37 U	37 U	38 U	40 U	40 U	38 U	39 U	90 U
Aroclor-1221	UG/KG	74 U	75 U	75 U	76 U	81 U	82 U	77 U	79 U	180 U
Aroclor-1232	UG/KG	36 U	37 U	37 U	38 U	40 U	40 U	38 U	39 U	90 U
Aroclor-1242	UG/KG	36 U	37 U	37 U	38 U	40 U	40 U	38 U	39 U	90 U
Aroclor-1248	UG/KG	36 U	37 U	37 U	38 U	40 U	40 U	38 U	39 U	90 U
Aroclor-1254	UG/KG	36 U	37 U	37 U	38 U	40 U	49	73	500	2300
Aroclor-1260	UG/KG	36 U	37 U	37 U	38 U	40 U	40 U	38 U	31 J	150
Beta-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2.2 J	2.1 U	2 U	2 U	4.7 U
Delta-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.1 U	2 U	2 U	4.7 U
Dieldrin	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
Endosulfan I	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.1 U	2 U	2 U	4.7 U
Endosulfan II	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
Endosulfan sulfate	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
Endrin	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.8 J	20 J
Endrin aldehyde	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
Endrin ketone	UG/KG	3.6 U	3.7 U	3.7 U	3.8 U	4 U	4 U	3.8 U	3.9 U	9 U
Gamma-BHC/Lindane	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.1 U	2 U	2 U	4.7 U
Gamma-Chlordane	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	2.1 U	2 U	2.1 J	4.7 U
Heptachlor	UG/KG	1.9 U	1.9 U	1.9 U	2.6	13	2.1 U	2 U	2 U	4.7 U
Heptachlor epoxide	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	1.7 J	2.1 U	2 U	2 U	4.7 U
Methoxychlor	UG/KG	19 U	19 U	19 U	19 U	20 U	21 U	20 U	20 U	47 U
Toxaphene	UG/KG	190 U	190 U	190 U	190 U	200 U	210 U	200 U	200 U	470 U

Table B-2
Disposal Pit A/B Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-1B	TP12-1C	TP12-2A	TP12-2B	TP12-2C	TP12A-1	TP12A-1	TP12A-2	TP12A-2
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123143	123144	123145	123146	123147	TP12A-1-1	TP12A-1-2	TP12A-2-2	TP12A-2-1
DEPTH TO TOP OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
DEPTH TO BOTTOM OF SAMPLE		3	6	3	3.5	6	2.5	3	5	6
SAMPLE DATE		10/16/1998	10/16/1998	10/16/1998	10/16/1998	10/16/1998	6/24/1994	6/24/1994	6/22/1994	6/22/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals										
Aluminum	MG/KG	6100 J	6650 J	9100 J	7410 J	6500 J	11400	11400	17100	10900
Antimony	MG/KG	1.2 UR	84 UR	1.2 UR	1.1 UR	1.3 UR	0.31 J	1.9 J	1.9 J	7.2 J
Arsenic	MG/KG	3.4	3.2	3.4	3	2.9	3.8	5.2	4.9	4.7
Barium	MG/KG	79.2 J	58.2 J	70.7 J	65.3 J	55.3 J	96.3	93.3	73.6	81
Beryllium	MG/KG	0.24 J	0.29 J	0.37 J	0.3 J	0.26 J	0.5 J	0.62 J	0.74 J	0.74 J
Cadmium	MG/KG	0.06 U	3	0.06 U	1.3	1.2	7.8	94.3	37.3	27.3
Calcium	MG/KG	102000	88400	59900	106000	142000	38900 J	81800 J	10900	77700
Chromium	MG/KG	9.5	10.9	13.8	15.7	12.5	27.5	83.3	32.4	16.5
Cobalt	MG/KG	7.5 J	8.6	7.8 J	8.4 J	8 J	9.9	9.4 J	26.5	13.1
Copper	MG/KG	21.4	31.5	18.1	22.6	16.9	25.7	215	128	43.6
Cyanide	MG/KG	0.57 U	0.57 U	0.56 U	0.57 U	0.65 U	0.48 U	0.54 U	0.48 U	0.63 U
Iron	MG/KG	15800	17300 J	18000 J	26700 J	18300 J	20100	24200	27500	19000
Lead	MG/KG	6.9 J	12.8 J	9 J	8.9 J	8.7 J	18.9 J	366 J	20.2	20
Magnesium	MG/KG	14400 J	11700 J	11900 J	12400 J	11300 J	8390	9310	5290	5360
Manganese	MG/KG	358	427	402	411	394	518	495	428	502
Mercury	MG/KG	0.06 U	0.05 U	0.06 U	0.05 U	0.06 U	0.04 J	0.05 J	0.03 J	0.04 J
Nickel	MG/KG	21.1 J	34.1 J	23.3 J	24.7 J	22.2 J	25.3	29.9	201	39
Potassium	MG/KG	945 J	801	1010 J	951	887 J	1640 J	1490 J	1370 J	1530 J
Selenium	MG/KG	0.94 UJ	0.63 UJ	0.93 UJ	0.81 UJ	0.98 UJ	1.1	0.6 J	1	1.2
Silver	MG/KG	0.25 U	0.17 U	0.24 U	0.21 U	0.25 U	0.1 U	11.9	0.33 J	0.49 J
Sodium	MG/KG	70.1 J	70.2 J	69.9 J	107 J	108 J	45.2 J	101 J	66.8 J	46.2 J
Thallium	MG/KG	1.1 U	0.94 J	1.1 U	0.91 U	1.1 U	0.37 U	0.44 J	0.59 J	0.98 J
Vanadium	MG/KG	11.3	11.8	14.7	12.4	11.2	17.9	19.2	19.6	17.9
Zinc	MG/KG	42.4 J	54.5 J	51.9 J	56.6 J	58.6 J	95.4	285	424	93.3

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected durir data validation.

Table B-3
Disposal Pit C Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-15	MW12-33	MW12-34	MW12-7	SS12-150	SS12-155	SS12-155	SS12-18
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123099	123028	123195	123198	123180	123345	123350	123479	123103
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/14/1998	10/1/1998	10/31/1998	10/31/1998	10/28/1998	11/17/1998	11/17/1998	11/17/1998	10/13/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds										
1,1,1-Trichloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,1,2,2-Tetrachloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
1,1,2-Trichloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,1-Dichloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,1-Dichloroethene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloroethene (total)	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
1,2-Dichloropropane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Acetone	UG/KG	14 U	11 UJ	15	8 J	7 J	7 J	13 U	8 J	12 U
Benzene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Bromodichloromethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Bromoform	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
Carbon disulfide	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Carbon tetrachloride	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Chlorobenzene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
Chlorodibromomethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Chloroethane	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Chloroform	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Cis-1,3-Dichloropropene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Ethyl benzene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
Methyl bromide	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Methyl butyl ketone	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Methyl chloride	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Methyl ethyl ketone	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Methyl isobutyl ketone	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Methylene chloride	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Styrene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
Tetrachloroethene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Toluene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Total Xylenes	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 UJ	14 U	12 U
Trans-1,3-Dichloropropene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Trichloroethene	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Vinyl chloride	UG/KG	14 U	11 U	12 U	13 U	13 U	13 U	13 U	14 U	12 U
Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
1,2-Dichlorobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
1,3-Dichlorobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
1,4-Dichlorobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2,4,5-Trichlorophenol	UG/KG	200 U	180 U	210 U	200 U	210 U	200 U	200 U	200 U	180 U
2,4,6-Trichlorophenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2,4-Dichlorophenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2,4-Dimethylphenol	UG/KG	85 UJ	73 UJ	86 U	81 U	85 U	84 UJ	82 UJ	81 UJ	75 U
2,4-Dinitrophenol	UG/KG	200 UJ	180 UR	210 UJ	200 U	210 U	200 UR	200 UR	200 UJ	180 UJ
2,4-Dinitrotoluene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2,6-Dinitrotoluene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U

Table B-3
Disposal Pit C Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-15	MW12-33	MW12-34	MW12-7	SS12-150	SS12-155	SS12-155	SS12-18
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123099	123028	123195	123198	123180	123345	123350	123479	123103
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/14/1998	10/1/1998	10/31/1998	10/31/1998	10/28/1998	11/17/1998	11/17/1998	11/17/1998	10/13/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2-Chloronaphthalene	UG/KG	85 U	73 UJ	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2-Chlorophenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2-Methylnaphthalene	UG/KG	85 U	73 UJ	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2-Methylphenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
2-Nitroaniline	UG/KG	200 U	180 U	210 U	200 U	210 U	200 U	200 U	200 U	180 U
2-Nitrophenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 UJ	75 U
3,3'-Dichlorobenzidine	UG/KG	85 U	73 U	86 UJ	81 UJ	85 U	84 UJ	82 UJ	81 U	75 UJ
3-Nitroaniline	UG/KG	200 U	180 UJ	210 U	200 UJ	210 U	200 U	200 U	200 UJ	180 U
4,6-Dinitro-2-methylphenol	UG/KG	200 U	180 UJ	210 UJ	200 U	210 U	200 UJ	200 UJ	200 UJ	180 U
4-Bromophenyl phenyl ether	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
4-Chloro-3-methylphenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
4-Chloroaniline	UG/KG	85 UJ	73 UJ	86 U	81 U	85 UJ	84 UJ	82 UJ	81 UJ	75 U
4-Chlorophenyl phenyl ether	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
4-Methylphenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
4-Nitroaniline	UG/KG	200 UJ	180 U	210 U	200 UJ	210 U	200 U	200 U	200 UJ	180 UJ
4-Nitrophenol	UG/KG	200 UJ	180 UJ	210 U	200 U	210 U	200 U	200 U	200 U	180 UJ
Acenaphthene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Acenaphthylene	UG/KG	85 U	73 UJ	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Anthracene	UG/KG	85 U	73 U	4.6 J	81 U	85 U	84 U	82 U	81 U	75 U
Benzo(a)anthracene	UG/KG	85 U	73 U	20 J	9.8 J	5.4 J	9.5 J	82 U	11 J	75 U
Benzo(a)pyrene	UG/KG	85 U	73 U	20 J	10 J	6.7 J	9.7 J	4.2 J	13 J	75 UJ
Benzo(b)fluoranthene	UG/KG	85 U	73 U	28 J	12 J	7.4 J	12 J	9 J	12 J	75 U
Benzo(ghi)perylene	UG/KG	85 U	73 U	18 J	9 J	7.5 J	84 U	82 U	12 J	75 U
Benzo(k)fluoranthene	UG/KG	85 U	73 U	19 J	11 J	7.7 J	9.3 J	82 U	14 J	75 U
Bis(2-Chloroethoxy)methane	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Bis(2-Chloroethyl)ether	UG/KG	85 U	73 U	86 U	81 U	85 U	84 UJ	82 UJ	81 U	75 U
Bis(2-Chloroisopropyl)ether	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Bis(2-Ethylhexyl)phthalate	UG/KG	85 UJ	5.8 J	86 U	100 U	85 U	84 UJ	82 UJ	81 UJ	75 U
Butylbenzylphthalate	UG/KG	85 UJ	73 U	86 U	81 U	85 U	84 UJ	82 UJ	81 UJ	75 U
Carbazole	UG/KG	85 UJ	73 UJ	86 UJ	81 UJ	85 U	84 UJ	82 UJ	6.4 J	75 U
Chrysene	UG/KG	5.9 J	4.5 J	27 J	13 J	7.7 J	13 J	5.1 J	13 J	75 U
Di-n-butylphthalate	UG/KG	85 U	4.5 J	86 U	81 U	85 U	4.2 J	82 U	81 U	75 U
Di-n-octylphthalate	UG/KG	85 UJ	73 U	86 U	7.3 J	85 U	84 UJ	82 UJ	81 U	75 U
Dibenz(a,h)anthracene	UG/KG	85 U	73 U	5.8 J	81 U	85 U	84 U	82 U	5.6 J	75 U
Dibenzofuran	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Diethyl phthalate	UG/KG	85 U	73 UJ	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Dimethylphthalate	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Fluoranthene	UG/KG	85 U	73 U	40 J	19 J	11 J	22 J	7.2 J	20 J	75 U
Fluorene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Hexachlorobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Hexachlorobutadiene	UG/KG	85 UJ	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Hexachlorocyclopentadiene	UG/KG	85 U	73 U	86 UJ	81 U	85 U	84 UJ	82 UJ	81 UJ	75 U
Hexachloroethane	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Indeno(1,2,3-cd)pyrene	UG/KG	85 U	73 U	15 J	8.9 J	6 J	84 U	82 U	12 J	75 U
Isophorone	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
N-Nitrosodiphenylamine	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U

Table B-3
Disposal Pit C Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-15	MW12-33	MW12-34	MW12-7	SS12-150	SS12-155	SS12-155	SS12-18
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123099	123028	123195	123198	123180	123345	123350	123479	123103
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/14/1998	10/1/1998	10/31/1998	10/31/1998	10/28/1998	11/17/1998	11/17/1998	11/17/1998	10/13/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
N-Nitrosodipropylamine	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Naphthalene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Nitrobenzene	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Pentachlorophenol	UG/KG	200 UJ	180 U	210 UJ	200 U	210 U	200 UR	200 UR	200 UR	180 UJ
Phenanthrene	UG/KG	6 J	73 U	21 J	9.4 J	6.6 J	19 J	4.6 J	11 J	75 U
Phenol	UG/KG	85 U	73 U	86 U	81 U	85 U	84 U	82 U	81 U	75 U
Pyrene	UG/KG	85 U	73 U	40 J	20 J	13 J	20 J	7.5 J	15 J	75 U
Pesticides/PCBs										
4,4'-DDD	UG/KG	8.6	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
4,4'-DDE	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
4,4'-DDT	UG/KG	4.2 U	3.7 U	2.2 J	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Aldrin	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Alpha-BHC	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Alpha-Chlordane	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Aroclor-1016	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Aroclor-1221	UG/KG	86 U	74 U	87 U	83 U	87 U	85 U	84 U	83 U	76 U
Aroclor-1232	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Aroclor-1242	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Aroclor-1248	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Aroclor-1254	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Aroclor-1260	UG/KG	42 U	37 U	43 U	41 U	43 U	42 U	41 U	41 U	38 U
Beta-BHC	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Delta-BHC	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Dieldrin	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Endosulfan I	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Endosulfan II	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Endosulfan sulfate	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Endrin	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Endrin aldehyde	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Endrin ketone	UG/KG	4.2 U	3.7 U	4.3 U	4.1 U	4.3 U	4.2 U	4.1 U	4.1 U	3.8 U
Gamma-BHC/Lindane	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Gamma-Chlordane	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Heptachlor	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Heptachlor epoxide	UG/KG	2.2 U	1.9 U	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.1 U	1.9 U
Methoxychlor	UG/KG	22 U	19 U	22 U	21 U	22 U	22 U	21 U	21 U	19 U
Toxaphene	UG/KG	220 U	190 U	220 U	210 U	220 U	220 U	210 U	210 U	190 U
Metals										
Aluminum	MG/KG	12000 J	6480	14100	10200	12400	12800 J	13900 J	11600 J	9760
Antimony	MG/KG	1.4 UR	1.2 UR	1.3 UR	1.4 UJ	1.6 UR	1 UR	1.2 UR	1.1 UR	1.2 UR
Arsenic	MG/KG	4.3 J	3.1	3.9	2.9	4.1	3.9 J	3.8 J	3.5 J	3.8
Barium	MG/KG	90.7	58	94.6	93.8	81.6	102	108	96.8	90.2
Beryllium	MG/KG	0.51 J	0.26 J	0.69 J	0.47 J	0.63 J	0.52 J	0.47 J	0.45 J	0.46 J
Cadmium	MG/KG	0.07 U	0.06 U	0.38 U	0.07 U	0.46 U	0.3 U	0.36 U	0.31 U	0.06 U
Calcium	MG/KG	2620 J	75900 J	7570	11000	3720	16200	4400	3960	35700 J
Chromium	MG/KG	16.5	11.2	21.6 J	15.1	16.5 J	16.4	17.7	15.4	15.6
Cobalt	MG/KG	11	7.7 J	10.7 J	9.5 J	9 J	7.7 J	8.6 J	8.2 J	8.9 J

Table B-3
Disposal Pit C Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-15	MW12-33	MW12-34	MW12-7	SS12-150	SS12-155	SS12-155	SS12-18
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123099	123028	123195	123198	123180	123345	123350	123479	123103
DEPTH TO TOP OF SAMPLE		0	0	0	0	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		10/14/1998	10/1/1998	10/31/1998	10/31/1998	10/28/1998	11/17/1998	11/17/1998	11/17/1998	10/13/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Copper	MG/KG	14.6	17.2	20.8	15.8	15.7	16.1	15.8	15.2	22.1
Cyanide	MG/KG	0.68 U	0.56 UJ	0.72 U	0.65 U	0.66 U	0.66 U	0.64 U	0.61 U	0.56 U
Iron	MG/KG	23200	15400	22700 J	20800 J	20300	20300 J	21700 J	20400 J	20200 J
Lead	MG/KG	18.6 J	6.7 J	24.9 J	16.3 J	16 J	15	14	14	9.8
Magnesium	MG/KG	3070 J	18600	4570	4930	3200	5130	3640	3190	8070
Manganese	MG/KG	693	389	700	632 J	640	502	690	607	408
Mercury	MG/KG	0.06 U	0.05 U	0.06 U	0.06 J	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U
Nickel	MG/KG	19.5 J	21.9	22.1 UJ	21.4	17.2 UJ	18.7	19.6	18.3 J	27.6
Potassium	MG/KG	1110 J	891 J	1980	1010 J	1280	1500	1510	1030	989 J
Selenium	MG/KG	1 U	0.9 UJ	0.95 J	1.1 UJ	0.84 J	0.43 J	0.9 J	0.65 J	0.92 U
Silver	MG/KG	0.27 U	0.23 U	0.26 U	0.28 U	0.31 U	0.2 U	0.24 U	0.21 U	0.24 U
Sodium	MG/KG	57.5 U	92.4 J	53.8 U	58.5 U	64.2 U	72.3 J	50.6 U	43.8 U	91.6 J
Thallium	MG/KG	1.7 J	1.3 U	1.6 J	1.5 J	1.3 U	0.88 U	1 U	0.9 U	1 U
Vanadium	MG/KG	21.8	12.2	24.6	18.9	21.8	21.8	22.5	19.1	16.9
Zinc	MG/KG	57.6 J	43.5	97.3 J	55.6 J	54.2 J	52.5 J	58.2 J	51.4 J	54.1 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-14	MW12-15	MW12-15	MW12-33	MW12-33	MW12-34	MW12-34
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123100	123101	123029	123030	123196	123197	123199	123200
DEPTH TO TOP OF SAMPLE		8	10	6	8	6	10	4	10
DEPTH TO BOTTOM OF SAMPLE		10	12	8	10	8	0	6	12
SAMPLE DATE		10/14/1998	10/14/1998	10/1/1998	10/1/1998	10/31/1998	10/31/1998	10/31/1998	10/31/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
1,1,2-Trichloroethane	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,1-Dichloroethane	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,1-Dichloroethene	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,2-Dichloroethane	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,2-Dichloroethene (total)	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
1,2-Dichloropropane	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Acetone	UG/KG	14 UJ	14 UJ	9 J	11 UJ	15	10 J	13	9 J
Benzene	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Bromodichloromethane	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Bromoform	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
Carbon disulfide	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Carbon tetrachloride	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Chlorobenzene	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
Chlorodibromomethane	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Chloroethane	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Chloroform	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Cis-1,3-Dichloropropene	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Ethyl benzene	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
Methyl bromide	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Methyl butyl ketone	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Methyl chloride	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Methyl ethyl ketone	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Methyl isobutyl ketone	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Methylene chloride	UG/KG	11 U	11 UJ	11 U	11 U	11 U	11 UJ	12 U	11 U
Styrene	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
Tetrachloroethene	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Toluene	UG/KG	11 UJ	7 J	10 J	62	11 U	11 UJ	12 U	11 U
Total Xylenes	UG/KG	11 UJ	11 UJ	11 UR	11 UJ	11 U	11 UJ	12 U	11 U
Trans-1,3-Dichloropropene	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Trichloroethene	UG/KG	11 UJ	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Vinyl chloride	UG/KG	11 U	11 UJ	11 UJ	11 U	11 U	11 UJ	12 U	11 U
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
1,2-Dichlorobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
1,3-Dichlorobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
1,4-Dichlorobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
2,2'-oxybis(1-Chloropropane)	UG/KG								
2,4,5-Trichlorophenol	UG/KG	170 U	180 U	180 U	170 U	180 U	180 U	180 U	180 U
2,4,6-Trichlorophenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
2,4-Dichlorophenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-14	MW12-15	MW12-15	MW12-33	MW12-33	MW12-34	MW12-34
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123100	123101	123029	123030	123196	123197	123199	123200
DEPTH TO TOP OF SAMPLE		8	10	6	8	6	10	4	10
DEPTH TO BOTTOM OF SAMPLE		10	12	8	10	8	0	6	12
SAMPLE DATE		10/14/1998	10/14/1998	10/1/1998	10/1/1998	10/31/1998	10/31/1998	10/31/1998	10/31/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dimethylphenol	UG/KG	72 UJ	73 UJ	72 UJ	72 UJ	74 U	72 U	74 U	72 U
2,4-Dinitrophenol	UG/KG	170 U	180 U	180 UR	170 UR	180 UJ	180 U	180 U	180 U
2,4-Dinitrotoluene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
2,6-Dinitrotoluene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
2-Chloronaphthalene	UG/KG	72 U	73 U	72 UJ	72 UJ	74 U	72 U	74 U	72 U
2-Chlorophenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
2-Methylnaphthalene	UG/KG	72 U	73 U	72 UJ	72 UJ	74 U	72 U	74 U	72 U
2-Methylphenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 UJ
2-Nitroaniline	UG/KG	170 U	180 U	180 U	170 U	180 U	180 U	180 U	180 U
2-Nitrophenol	UG/KG	72 UJ	73 UJ	72 U	72 U	74 U	72 U	74 U	72 U
3,3'-Dichlorobenzidine	UG/KG	72 U	73 U	72 U	72 U	74 UJ	72 UJ	74 UJ	72 U
3-Nitroaniline	UG/KG	170 U	180 U	180 UJ	170 UJ	180 U	180 UJ	180 UJ	180 UJ
4,6-Dinitro-2-methylphenol	UG/KG	170 U	180 U	180 UJ	170 UJ	180 UJ	180 U	180 U	180 U
4-Bromophenyl phenyl ether	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
4-Chloro-3-methylphenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
4-Chloroaniline	UG/KG	72 UJ	73 UJ	72 UJ	72 UJ	74 U	72 U	74 U	72 U
4-Chlorophenyl phenyl ether	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
4-Methylphenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 UJ
4-Nitroaniline	UG/KG	170 U	180 U	180 U	170 U	180 U	180 UJ	180 UJ	180 UJ
4-Nitrophenol	UG/KG	170 U	180 U	180 UJ	170 UJ	180 U	180 U	180 U	180 UJ
Acenaphthene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Acenaphthylene	UG/KG	72 U	73 U	72 UJ	72 UJ	74 U	72 U	74 U	72 U
Anthracene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Benzo(a)anthracene	UG/KG	72 U	73 U	72 U	72 U	74 U	6.3 J	4.4 J	72 U
Benzo(a)pyrene	UG/KG	72 U	73 U	72 U	72 U	74 U	8.8 J	5.1 J	72 U
Benzo(b)fluoranthene	UG/KG	72 U	73 U	72 U	72 U	74 U	12 J	7 J	72 U
Benzo(ghi)perylene	UG/KG	72 UJ	73 UJ	72 U	72 U	4.3 J	8.1 J	5.6 J	5 J
Benzo(k)fluoranthene	UG/KG	72 U	73 U	72 U	72 U	74 U	10 J	4.2 J	72 U
Bis(2-Chloroethoxy)methane	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Bis(2-Chloroethyl)ether	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 UJ
Bis(2-Chloroisopropyl)ether	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Bis(2-Ethylhexyl)phthalate	UG/KG	74 UJ	73 UJ	12 J	14 J	74 U	100 U	74 U	130 U
Butylbenzylphthalate	UG/KG	72 UJ	73 UJ	72 U	72 U	74 U	72 U	74 U	72 U
Carbazole	UG/KG	72 UJ	73 UJ	72 UJ	72 U	74 UJ	72 UJ	74 UJ	72 U
Chrysene	UG/KG	72 U	73 U	72 U	72 UJ	74 U	13 J	8.4 J	9.2 J
Di-n-butylphthalate	UG/KG	72 U	73 U	11 J	10 J	74 U	72 U	74 U	72 U
Di-n-octylphthalate	UG/KG	11 J	9.1 J	3.8 J	8.4 J	74 U	15 J	6.1 J	20 J
Dibenz(a,h)anthracene	UG/KG	72 UJ	73 UJ	72 U	72 U	74 U	72 U	74 U	72 U
Dibenzofuran	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Diethyl phthalate	UG/KG	72 U	73 U	72 UJ	72 UJ	74 U	72 U	74 U	72 U
Dimethylphthalate	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Fluoranthene	UG/KG	72 U	73 U	72 U	72 U	74 U	11 J	6.1 J	72 U
Fluorene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-14	MW12-15	MW12-15	MW12-33	MW12-33	MW12-34	MW12-34
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123100	123101	123029	123030	123196	123197	123199	123200
DEPTH TO TOP OF SAMPLE		8	10	6	8	6	10	4	10
DEPTH TO BOTTOM OF SAMPLE		10	12	8	10	8	0	6	12
SAMPLE DATE		10/14/1998	10/14/1998	10/1/1998	10/1/1998	10/31/1998	10/31/1998	10/31/1998	10/31/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Hexachlorobutadiene	UG/KG	72 UJ	73 UJ	72 U	72 U	74 U	72 U	74 U	72 U
Hexachlorocyclopentadiene	UG/KG	72 U	73 U	72 U	72 U	74 UJ	72 U	74 U	72 U
Hexachloroethane	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 UJ
Indeno(1,2,3-cd)pyrene	UG/KG	72 UJ	73 UJ	72 U	72 U	74 U	6.3 J	74 U	72 U
Isophorone	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
N-Nitrosodiphenylamine	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
N-Nitrosodipropylamine	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Naphthalene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Nitrobenzene	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Pentachlorophenol	UG/KG	170 UJ	180 UJ	180 U	170 U	180 UJ	180 U	180 U	180 U
Phenanthrene	UG/KG	72 U	73 U	72 U	72 U	74 U	6.8 J	74 U	4.6 J
Phenol	UG/KG	72 U	73 U	72 U	72 U	74 U	72 U	74 U	72 U
Pyrene	UG/KG	72 U	73 U	72 U	72 U	74 U	17 J	6.2 J	7 J
Pesticides/PCBs									
4,4'-DDD	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
4,4'-DDE	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
4,4'-DDT	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Aldrin	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Alpha-BHC	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Alpha-Chlordane	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Aroclor-1016	UG/KG	36 U	37 U	36 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1221	UG/KG	73 U	74 U	73 U	73 U	75 U	74 U	75 U	74 U
Aroclor-1232	UG/KG	36 U	37 U	36 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1242	UG/KG	36 U	37 U	36 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1248	UG/KG	36 U	37 U	36 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1254	UG/KG	36 U	37 U	36 U	36 U	37 U	36 U	37 U	36 U
Aroclor-1260	UG/KG	36 U	37 U	25 J	36 U	37 U	36 U	37 U	36 U
Beta-BHC	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Delta-BHC	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Dieldrin	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endosulfan I	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Endosulfan II	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endosulfan sulfate	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endrin	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endrin aldehyde	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Endrin ketone	UG/KG	3.6 U	3.7 U	3.6 U	3.6 U	3.7 U	3.6 U	3.7 U	3.6 U
Gamma-BHC/Lindane	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Gamma-Chlordane	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Heptachlor	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Heptachlor epoxide	UG/KG	1.8 U	1.9 U	1.8 U	1.8 U	1.9 U	1.9 U	1.9 U	1.9 U
Methoxychlor	UG/KG	18 U	19 U	18 U	18 U	19 U	19 U	19 U	19 U
Toxaphene	UG/KG	180 U	190 U	180 U	180 U	190 U	190 U	190 U	190 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-14	MW12-14	MW12-15	MW12-15	MW12-33	MW12-33	MW12-34	MW12-34
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123100	123101	123029	123030	123196	123197	123199	123200
DEPTH TO TOP OF SAMPLE		8	10	6	8	6	10	4	10
DEPTH TO BOTTOM OF SAMPLE		10	12	8	10	8	0	6	12
SAMPLE DATE		10/14/1998	10/14/1998	10/1/1998	10/1/1998	10/31/1998	10/31/1998	10/31/1998	10/31/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals									
Aluminum	MG/KG	6380 J	5990 J	7220	5330	8690	6170	6380	6930
Antimony	MG/KG	1 UR	0.83 UR	1.2 UR	1.1 UR	1.1 UR	1.1 UJ	1 UJ	0.95 UJ
Arsenic	MG/KG	3.1 J	3.1 J	3.1	1.9	3.3	2.1	1.3 J	2.5
Barium	MG/KG	69.8	76.7	71.8	63	74.7	90.8	51.9	76.8
Beryllium	MG/KG	0.23 J	0.23 J	0.28 J	0.18 J	0.47 J	0.32 J	0.32 J	0.29 J
Cadmium	MG/KG	0.05 U	0.04 U	0.06 U	0.05 U	0.32 U	0.05 U	0.05 U	0.05 U
Calcium	MG/KG	96500 J	84000 J	66500 J	65000 J	94800	65100	16500	72700
Chromium	MG/KG	11.4	11	12.5	9.1	14.2 J	10.7	12.5	13.4
Cobalt	MG/KG	7 J	8 J	7.6 J	6.1 J	10.5	6.8 J	5 J	9.8
Copper	MG/KG	16.7	15.2	17.7	13.4	22.1	19	11	24.3
Cyanide	MG/KG	0.57 U	0.57 U	0.56 UJ	0.55 UJ	0.61 U	0.55 U	0.6 U	0.57 U
Iron	MG/KG	15500	15300	16400	12400	17600 J	15400 J	14200 J	18100 J
Lead	MG/KG	6.7 J	6 J	4.9 J	3.8 J	5.2 J	8 J	9.6 J	12.1 J
Magnesium	MG/KG	21000 J	21200 J	14500	19700	20200	16800	3590	14200
Manganese	MG/KG	385	359	350	341	493	312 J	143 J	377 J
Mercury	MG/KG	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	0.05 U
Nickel	MG/KG	19.3 J	21.4 J	23.2	15.6	23.3 UJ	20.9	21.4	29.3
Potassium	MG/KG	1200	1110	1180	979	1830	1080	404 J	893
Selenium	MG/KG	0.77 U	0.63 U	0.93 UJ	0.82 UJ	0.41 U	0.8 UJ	0.77 UJ	1.5 J
Silver	MG/KG	0.23 J	0.16 U	0.24 U	0.21 U	0.21 U	0.21 U	0.2 U	0.19 U
Sodium	MG/KG	113 J	113 J	73 J	93.4 J	79.7 J	43.8 U	42.5 U	64.9 J
Thallium	MG/KG	1.2 J	0.92 J	1.3 U	1.2 U	0.98 J	1.3 J	0.88 U	1.3 J
Vanadium	MG/KG	11.8	10.9	12.4	10.1	15.7	11.7	9.3	12.8
Zinc	MG/KG	33.5 J	38.9 J	53.2	29.6	51.1 J	41 J	37.7 J	85.4 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-7	MW12-7	TP12-23A	TP12-23B	TP12-23C	TP12-3A	TP12-3A	TP12-3B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123181	123182	123139	123140	123141	123085	123082	123083
DEPTH TO TOP OF SAMPLE		4	8	1	2	3	0.8	0.8	5.5
DEPTH TO BOTTOM OF SAMPLE		6	10	1	2	3	0.8	0.8	5.5
SAMPLE DATE		10/28/1998	10/28/1998	10/17/1998	10/17/1998	10/17/1998	10/7/1998	10/7/1998	10/7/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,1,2-Trichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,1-Dichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,1-Dichloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,2-Dichloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,2-Dichloroethene (total)	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
1,2-Dichloropropane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Acetone	UG/KG	6 J	5 J	11 U	18	12 U	11 U	61	35 U
Benzene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Bromodichloromethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Bromoform	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Carbon disulfide	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Carbon tetrachloride	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Chlorobenzene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Chlorodibromomethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Chloroethane	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Chloroform	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Cis-1,3-Dichloropropene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Ethyl benzene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methyl bromide	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methyl butyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methyl chloride	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methyl ethyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methyl isobutyl ketone	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Methylene chloride	UG/KG	12 U	11 U	11 U	11 U	12 U	2 J	180	2 J
Styrene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Tetrachloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	2 J
Toluene	UG/KG	12 U	11 U	11 U	11 U	12 U	6 J	11 U	3 J
Total Xylenes	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	14
Trans-1,3-Dichloropropene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Trichloroethene	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Vinyl chloride	UG/KG	12 U	11 U	11 U	11 U	12 U	11 U	11 U	13 U
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	UG/KG	76 U	72 U	77 UJ	76 U	770 UR	72 U	72 U	170 U
1,2-Dichlorobenzene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
1,3-Dichlorobenzene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
1,4-Dichlorobenzene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2,2'-oxybis(1-Chloropropane)	UG/KG								
2,4,5-Trichlorophenol	UG/KG	180 U	170 U	190 U	180 U	1900 UR	170 U	170 U	400 U
2,4,6-Trichlorophenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2,4-Dichlorophenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-7	MW12-7	TP12-23A	TP12-23B	TP12-23C	TP12-3A	TP12-3A	TP12-3B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123181	123182	123139	123140	123141	123085	123082	123083
DEPTH TO TOP OF SAMPLE		4	8	1	2	3	0.8	0.8	5.5
DEPTH TO BOTTOM OF SAMPLE		6	10	1	2	3	0.8	0.8	5.5
SAMPLE DATE		10/28/1998	10/28/1998	10/17/1998	10/17/1998	10/17/1998	10/7/1998	10/7/1998	10/7/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dimethylphenol	UG/KG	76 U	72 U	77 UJ	76 UJ	770 UR	72 U	72 U	170 U
2,4-Dinitrophenol	UG/KG	180 U	170 U	190 UJ	180 UJ	1900 UR	170 U	170 U	400 U
2,4-Dinitrotoluene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2,6-Dinitrotoluene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2-Chloronaphthalene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2-Chlorophenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2-Methylnaphthalene	UG/KG	76 U	72 U	77 U	4.4 J	770 UR	72 U	72 U	22 J
2-Methylphenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
2-Nitroaniline	UG/KG	180 U	170 U	190 U	180 UJ	1900 UR	170 U	170 U	400 U
2-Nitrophenol	UG/KG	76 U	72 U	77 U	76 UJ	770 UR	72 U	72 U	170 U
3,3'-Dichlorobenzidine	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 UJ
3-Nitroaniline	UG/KG	180 U	170 U	190 U	180 U	1900 UR	170 U	170 U	400 UJ
4,6-Dinitro-2-methylphenol	UG/KG	180 U	170 U	190 U	180 U	1900 UR	170 U	170 U	400 U
4-Bromophenyl phenyl ether	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
4-Chloro-3-methylphenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
4-Chloroaniline	UG/KG	76 UJ	72 UJ	77 U	76 U	770 UR	72 UJ	72 UJ	170 U
4-Chlorophenyl phenyl ether	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
4-Methylphenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
4-Nitroaniline	UG/KG	180 U	170 U	190 U	180 UJ	1900 UR	170 U	170 U	400 UJ
4-Nitrophenol	UG/KG	180 U	170 U	190 UJ	180 U	1900 UR	170 U	170 U	400 U
Acenaphthene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Acenaphthylene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Anthracene	UG/KG	76 U	72 U	77 U	5.4 J	770 UR	72 U	72 U	170 U
Benzo(a)anthracene	UG/KG	76 U	72 U	7.2 J	16 J	770 UR	72 U	5.3 J	170 U
Benzo(a)pyrene	UG/KG	76 U	72 U	8.3 J	13 J	39 J	72 U	4.8 J	170 U
Benzo(b)fluoranthene	UG/KG	76 U	72 U	13 J	14 J	770 UR	72 U	5 J	170 U
Benzo(ghi)perylene	UG/KG	76 U	72 U	77 U	11 J	39 J	72 U	72 U	170 U
Benzo(k)fluoranthene	UG/KG	76 U	72 U	77 U	12 J	770 UR	72 U	5.1 J	170 U
Bis(2-Chloroethoxy)methane	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Bis(2-Chloroethyl)ether	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Bis(2-Chloroisopropyl)ether	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Bis(2-Ethylhexyl)phthalate	UG/KG	76 U	72 U	77 U	5 J	770 UJ	72 U	72 U	170 U
Butylbenzylphthalate	UG/KG	76 U	72 U	77 U	76 U	770 UR	4.1 J	72 U	170 U
Carbazole	UG/KG	76 U	72 U	77 UJ	7.4 J	770 UR	72 UJ	72 UJ	170 UJ
Chrysene	UG/KG	76 U	72 U	12 J	17 J	770 UR	72 U	6.6 J	170 U
Di-n-butylphthalate	UG/KG	76 U	72 U	280 UJ	440 UJ	770 UR	72 U	72 U	170 U
Di-n-octylphthalate	UG/KG	14 J	6.9 J	77 U	76 U	770 UR	72 U	72 U	170 U
Dibenz(a,h)anthracene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Dibenzofuran	UG/KG	76 U	72 U	77 U	4.1 J	770 UR	72 U	72 U	170 U
Diethyl phthalate	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Dimethylphthalate	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Fluoranthene	UG/KG	76 U	72 U	77 U	36 J	88 J	72 U	5.1 J	170 U
Fluorene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-7	MW12-7	TP12-23A	TP12-23B	TP12-23C	TP12-3A	TP12-3A	TP12-3B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123181	123182	123139	123140	123141	123085	123082	123083
DEPTH TO TOP OF SAMPLE		4	8	1	2	3	0.8	0.8	5.5
DEPTH TO BOTTOM OF SAMPLE		6	10	1	2	3	0.8	0.8	5.5
SAMPLE DATE		10/28/1998	10/28/1998	10/17/1998	10/17/1998	10/17/1998	10/7/1998	10/7/1998	10/7/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Hexachlorobutadiene	UG/KG	76 U	72 U	77 UJ	76 U	770 UR	72 UJ	72 UJ	170 U
Hexachlorocyclopentadiene	UG/KG	76 U	72 U	77 UJ	76 U	770 UR	72 U	72 U	170 U
Hexachloroethane	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Indeno(1,2,3-cd)pyrene	UG/KG	76 U	72 U	77 U	8.7 J	770 UR	72 U	72 U	170 U
Isophorone	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
N-Nitrosodiphenylamine	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	9500
N-Nitrosodipropylamine	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Naphthalene	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	13 J
Nitrobenzene	UG/KG	76 U	72 U	77 UJ	76 U	770 UR	72 U	72 U	170 U
Pentachlorophenol	UG/KG	180 U	170 U	190 UJ	180 U	1900 UR	170 UJ	170 UJ	400 UJ
Phenanthrene	UG/KG	76 U	72 U	77 U	30 J	770 UR	72 U	6.6 J	170 U
Phenol	UG/KG	76 U	72 U	77 U	76 U	770 UR	72 U	72 U	170 U
Pyrene	UG/KG	76 U	72 U	77 U	32 J	52 J	72 U	10 J	170 U
Pesticides/PCBs									
4,4'-DDD	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
4,4'-DDE	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
4,4'-DDT	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Aldrin	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Alpha-BHC	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Alpha-Chlordane	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Aroclor-1016	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	42 U
Aroclor-1221	UG/KG	77 U	72 U	78 U	77 U	78 U	73 U	73 U	85 U
Aroclor-1232	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	42 U
Aroclor-1242	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	42 U
Aroclor-1248	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	42 U
Aroclor-1254	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	28 J
Aroclor-1260	UG/KG	38 U	36 U	38 U	38 U	38 U	36 U	36 U	42 U
Beta-BHC	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Delta-BHC	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Dieldrin	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Endosulfan I	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Endosulfan II	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Endosulfan sulfate	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Endrin	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Endrin aldehyde	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Endrin ketone	UG/KG	3.8 U	3.6 U	3.8 U	3.8 U	3.8 U	3.6 U	3.6 U	4.2 U
Gamma-BHC/Lindane	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Gamma-Chlordane	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Heptachlor	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.1 J	1 J	2.2 U
Heptachlor epoxide	UG/KG	2 U	1.8 U	2 U	2 U	2 U	1.8 U	1.8 U	2.2 U
Methoxychlor	UG/KG	20 U	18 U	20 U	20 U	20 U	18 U	18 U	22 U
Toxaphene	UG/KG	200 U	180 U	200 U	200 U	200 U	180 U	180 U	220 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		MW12-7	MW12-7	TP12-23A	TP12-23B	TP12-23C	TP12-3A	TP12-3A	TP12-3B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123181	123182	123139	123140	123141	123085	123082	123083
DEPTH TO TOP OF SAMPLE		4	8	1	2	3	0.8	0.8	5.5
DEPTH TO BOTTOM OF SAMPLE		6	10	1	2	3	0.8	0.8	5.5
SAMPLE DATE		10/28/1998	10/28/1998	10/17/1998	10/17/1998	10/17/1998	10/7/1998	10/7/1998	10/7/1998
QC CODE		SA	SA	SA	SA	SA	DU	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals									
Aluminum	MG/KG	7400	7700	12500	11000	11000	9100	8520	9140
Antimony	MG/KG	1.2 UR	0.89 UR	1.3 UR	1 UR	1.3 UR	1.3 UR	1.1 UR	1.3 UR
Arsenic	MG/KG	3	3.3	4.5	6.7	3.9	3.9	4	11.1
Barium	MG/KG	62.7	68.2	88.2	77.3	73	73.6	71.9	71.7
Beryllium	MG/KG	0.39 J	0.38 J	0.43 J	0.33 J	0.43 J	0.33 J	0.35 J	0.4 J
Cadmium	MG/KG	0.35 U	0.26 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	6
Calcium	MG/KG	72400	62500	34700	90700	32100	46900 J	44300 J	51900 J
Chromium	MG/KG	12.4 J	13.3 J	17.5	16.4	29.7	13.6	12	29.4
Cobalt	MG/KG	8.2 J	8.4	10.6	7.9 J	11.5	7.7 J	7.4 J	8.3 J
Copper	MG/KG	19.4	18.5	20.9	16.2	74.5	17.5	18	26.4
Cyanide	MG/KG	0.58 U	0.54 U	0.61 U	0.59 U	2.2	0.57 U	0.56 U	0.7 U
Iron	MG/KG	16500	17200	23800	18000	51000	17400 J	15500 J	18800 J
Lead	MG/KG	5 J	4.7 J	14.8	9.3	90.9 J	10.4	9.3	15.8
Magnesium	MG/KG	15300	13800	8710	25100	9450	6930	8790	12200
Manganese	MG/KG	378	387	629	497	331	431	422	379
Mercury	MG/KG	0.05 U	0.05 U	0.06 U	0.05 U	0.15 J	0.14 J	0.06 J	0.08 J
Nickel	MG/KG	21.7 UJ	21.3 UJ	25.2	20.7	36.9	22.5	20.7	27.5
Potassium	MG/KG	1160	1290	1560	1330	1940	897 J	770 J	875 J
Selenium	MG/KG	0.45 U	0.34 U	0.95 UJ	0.78 UJ	0.99 UJ	0.94 U	0.86 U	0.97 U
Silver	MG/KG	0.23 U	0.18 U	0.25 U	0.2 U	0.27 J	0.34 J	0.26 J	1.8 J
Sodium	MG/KG	75.1 J	103 J	52.1 U	42.5 U	1420	67.5 J	61.5 J	881 J
Thallium	MG/KG	1.2 J	1.3 J	1.1 U	1.1 J	1.1 U	1.1 U	0.97 U	1.4 U
Vanadium	MG/KG	13.6	13.6	21.3	17.7	17.6	15.9	15.2	17.3
Zinc	MG/KG	49.6 J	50.5 J	63	69.6	6080	46.3 J	44.2 J	208 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-3C	TP12-4A	TP12-4B	TP12-4C	TP12-5A	TP12-5A	TP12-5B	TP12-5C
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123084	123086	123087	123088	123092	123089	123090	123091
DEPTH TO TOP OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
DEPTH TO BOTTOM OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
SAMPLE DATE		10/7/1998	10/12/1998	10/12/1998	10/12/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998
QC CODE		SA	SA	SA	SA	DU	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,1,2-Trichloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,1-Dichloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,1-Dichloroethene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloropropane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Acetone	UG/KG	17 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Benzene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Bromodichloromethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Bromoform	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Carbon disulfide	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Carbon tetrachloride	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Chlorobenzene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Chlorodibromomethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Chloroethane	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Chloroform	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Cis-1,3-Dichloropropene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Ethyl benzene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methyl bromide	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methyl butyl ketone	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methyl chloride	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methyl ethyl ketone	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methyl isobutyl ketone	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Methylene chloride	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Styrene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Tetrachloroethene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Toluene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Total Xylenes	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Trans-1,3-Dichloropropene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Trichloroethene	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Vinyl chloride	UG/KG	12 U	12 U	11 U	11 U	11 U	12 U	12 U	11 U
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	UG/KG	74 U	74 U	75 U	75 U	77 UJ	75 UJ	78 U	74 U
1,2-Dichlorobenzene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
1,3-Dichlorobenzene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
1,4-Dichlorobenzene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2,2'-oxybis(1-Chloropropane)	UG/KG								
2,4,5-Trichlorophenol	UG/KG	180 U	180 U	180 U	180 U	190 UJ	180 U	190 U	180 U
2,4,6-Trichlorophenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2,4-Dichlorophenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-3C	TP12-4A	TP12-4B	TP12-4C	TP12-5A	TP12-5A	TP12-5B	TP12-5C
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123084	123086	123087	123088	123092	123089	123090	123091
DEPTH TO TOP OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
DEPTH TO BOTTOM OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
SAMPLE DATE		10/7/1998	10/12/1998	10/12/1998	10/12/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998
QC CODE		SA	SA	SA	SA	DU	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dimethylphenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2,4-Dinitrophenol	UG/KG	180 U	180 UJ	180 UJ	180 UJ	190 UJ	180 UJ	190 UJ	180 UJ
2,4-Dinitrotoluene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2,6-Dinitrotoluene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2-Chloronaphthalene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2-Chlorophenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2-Methylnaphthalene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2-Methylphenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
2-Nitroaniline	UG/KG	180 U	180 U	180 U	180 U	190 U	180 U	190 U	180 U
2-Nitrophenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
3,3'-Dichlorobenzidine	UG/KG	74 U	74 UJ	75 UJ	75 UJ	77 U	75 U	78 UJ	74 UJ
3-Nitroaniline	UG/KG	180 U	180 U	180 U	180 U	190 UJ	180 U	190 U	180 U
4,6-Dinitro-2-methylphenol	UG/KG	180 U	180 U	180 U	180 U	190 U	180 U	190 U	180 U
4-Bromophenyl phenyl ether	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
4-Chloro-3-methylphenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
4-Chloroaniline	UG/KG	74 UJ	74 U	75 U	75 U	77 U	75 U	78 U	74 U
4-Chlorophenyl phenyl ether	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
4-Methylphenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
4-Nitroaniline	UG/KG	180 U	180 UJ	180 UJ	180 UJ	190 UJ	180 U	190 UJ	180 UJ
4-Nitrophenol	UG/KG	180 U	180 UJ	180 UJ	180 UJ	190 U	180 UJ	190 UJ	180 UJ
Acenaphthene	UG/KG	74 U	74 U	75 U	75 U	7.6 J	75 U	78 U	74 U
Acenaphthylene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Anthracene	UG/KG	74 U	74 U	75 U	75 U	9.8 J	75 U	78 UJ	74 U
Benzo(a)anthracene	UG/KG	74 U	74 U	75 U	3.9 J	32 J	20 J	7.7 J	74 U
Benzo(a)pyrene	UG/KG	74 U	10 J	75 UJ	75 UJ	34 J	26 J	8 J	74 UJ
Benzo(b)fluoranthene	UG/KG	74 U	74 U	75 U	5.9 J	33 J	23 J	11 J	74 U
Benzo(ghi)perylene	UG/KG	74 U	74 U	75 U	75 U	26 J	16 J	13 J	74 U
Benzo(k)fluoranthene	UG/KG	74 U	74 U	75 U	5.6 J	33 J	26 J	10 J	74 U
Bis(2-Chloroethoxy)methane	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Bis(2-Chloroethyl)ether	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Bis(2-Chloroisopropyl)ether	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Bis(2-Ethylhexyl)phthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Butylbenzylphthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 UJ	74 U
Carbazole	UG/KG	74 UJ	74 U	75 U	75 U	14 J	75 UJ	78 UJ	74 U
Chrysene	UG/KG	74 U	74 U	75 U	6.8 J	45 J	28 J	11 J	74 U
Di-n-butylphthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	5.8 J	74 U
Di-n-octylphthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Dibenz(a,h)anthracene	UG/KG	74 U	74 U	75 U	75 U	9 J	6.8 J	78 U	74 U
Dibenzofuran	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Diethyl phthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Dimethylphthalate	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Fluoranthene	UG/KG	74 U	74 U	75 U	75 U	62 J	40 J	17 J	74 U
Fluorene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-3C	TP12-4A	TP12-4B	TP12-4C	TP12-5A	TP12-5A	TP12-5B	TP12-5C
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123084	123086	123087	123088	123092	123089	123090	123091
DEPTH TO TOP OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
DEPTH TO BOTTOM OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
SAMPLE DATE		10/7/1998	10/12/1998	10/12/1998	10/12/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998
QC CODE		SA	SA	SA	SA	DU	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Hexachlorobutadiene	UG/KG	74 UJ	74 U	75 U	75 U	77 UJ	75 UJ	78 U	74 U
Hexachlorocyclopentadiene	UG/KG	74 U	74 U	75 U	75 U	77 UJ	75 UJ	78 U	74 U
Hexachloroethane	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Indeno(1,2,3-cd)pyrene	UG/KG	74 U	74 U	75 U	75 U	25 J	18 J	8.1 J	74 U
Isophorone	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
N-Nitrosodiphenylamine	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
N-Nitrosodipropylamine	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Naphthalene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Nitrobenzene	UG/KG	74 U	74 U	75 U	75 U	77 U	75 UJ	78 U	74 U
Pentachlorophenol	UG/KG	180 UJ	180 UJ	180 UJ	180 UJ	190 UJ	180 UJ	190 UJ	180 UJ
Phenanthrene	UG/KG	74 U	74 U	75 U	75 U	51 J	36 J	12 J	74 U
Phenol	UG/KG	74 U	74 U	75 U	75 U	77 U	75 U	78 U	74 U
Pyrene	UG/KG	74 U	74 U	75 U	75 U	66 J	35 J	11 J	74 U
Pesticides/PCBs									
4,4'-DDD	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	2.9 J	25 J	3.9 U	3.7 UJ
4,4'-DDE	UG/KG	3.7 U	3.7 U	2.7 J	3.8 U	3.8 UJ	5.7 J	3.9 U	3.7 UJ
4,4'-DDT	UG/KG	3.7 U	3.7 U	4.9	3.8 U	3.3 J	2.4 J	3.9 U	3.7 UJ
Aldrin	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Alpha-BHC	UG/KG	1.9 U	1.9 U	5.8	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Alpha-Chlordane	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Aroclor-1016	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Aroclor-1221	UG/KG	75 U	75 U	76 U	76 U	78 U	76 U	79 U	75 UJ
Aroclor-1232	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Aroclor-1242	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Aroclor-1248	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Aroclor-1254	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Aroclor-1260	UG/KG	37 U	37 U	38 U	38 U	38 U	38 U	39 U	37 UJ
Beta-BHC	UG/KG	1.9 U	1.9 U	1.7 J	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Delta-BHC	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Dieldrin	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Endosulfan I	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Endosulfan II	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Endosulfan sulfate	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Endrin	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Endrin aldehyde	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Endrin ketone	UG/KG	3.7 U	3.7 U	3.8 U	3.8 U	3.8 U	3.8 U	3.9 U	3.7 UJ
Gamma-BHC/Lindane	UG/KG	1.9 U	1.9 U	1.9 U	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Gamma-Chlordane	UG/KG	1.9 U	1.9 U	1 J	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Heptachlor	UG/KG	1.9 U	1.9 U	8.4	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Heptachlor epoxide	UG/KG	1.9 U	1.9 U	2 J	1.9 U	2 U	1.9 U	2 U	1.9 UJ
Methoxychlor	UG/KG	19 U	19 U	19 U	19 U	20 U	19 U	20 U	19 UJ
Toxaphene	UG/KG	190 U	190 U	190 U	190 U	200 U	190 U	200 U	190 UJ

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-3C	TP12-4A	TP12-4B	TP12-4C	TP12-5A	TP12-5A	TP12-5B	TP12-5C
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123084	123086	123087	123088	123092	123089	123090	123091
DEPTH TO TOP OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
DEPTH TO BOTTOM OF SAMPLE		4	0.5	6	8	0.5	0.5	2	8
SAMPLE DATE		10/7/1998	10/12/1998	10/12/1998	10/12/1998	10/13/1998	10/13/1998	10/13/1998	10/13/1998
QC CODE		SA	SA	SA	SA	DU	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals									
Aluminum	MG/KG	6550	9170	7650	7360	11100	11300	10300	7130
Antimony	MG/KG	1.3 UR	1 UR	1.2 UR	1.1 UR	1.4 UR	0.9 UR	1.3 UR	1.2 UR
Arsenic	MG/KG	4.3	3.4	2.7	3.7	3	3.2	4.4	3.3
Barium	MG/KG	53.3	69.3	56.4	66.7	77.2	79.7	74.3	77.5
Beryllium	MG/KG	0.23 J	0.41 J	0.34 J	0.28 J	0.49 J	0.45 J	0.47 J	0.26 J
Cadmium	MG/KG	0.07 U	0.05 U	0.06 U	0.05 U	0.07 U	0.04 U	0.06 U	0.06 U
Calcium	MG/KG	78500 J	67200 J	14200 J	78600 J	30800 J	22300 J	49800 J	91300 J
Chromium	MG/KG	13.5	15.4	10.8	12.4	25.4	23.6	15.4	12
Cobalt	MG/KG	8 J	9.5	6.4 J	8.5 J	9.2 J	9.4	8.6 J	10.5
Copper	MG/KG	18.8	21	11.3	18.3	23.5	23.2	21.2	20
Cyanide	MG/KG	0.57 U	0.58 U	0.6 U	0.56 U	0.59 U	0.57 U	0.59 U	0.56 U
Iron	MG/KG	18500 J	20200 J	15300 J	17200 J	20000 J	20300 J	19600 J	16100 J
Lead	MG/KG	8.3	9	9.3	7	36.2	32.7	13.8	8.1
Magnesium	MG/KG	8290	8840	3960	15300	7700	6830	9720	15500
Manganese	MG/KG	354	398	158	382	289	363	403	423
Mercury	MG/KG	0.05 U	0.05 U	0.05 U	0.05 U	0.06 J	0.05 U	0.1 J	0.1 J
Nickel	MG/KG	24	29	15.6	24.8	28.3	26.8	24	25.5
Potassium	MG/KG	898 J	787 J	755 J	1110	1090 J	1090	1220	1290
Selenium	MG/KG	1 U	0.76 U	0.93 U	0.8 U	1.1 U	0.68 U	0.96 U	0.89 U
Silver	MG/KG	0.39 J	0.2 U	0.24 U	0.21 U	0.28 U	0.18 U	0.25 U	0.23 U
Sodium	MG/KG	109 J	105 J	70.4 J	127 J	79.7 J	88.7 J	80.4 J	148 J
Thallium	MG/KG	1.1 U	0.86 U	1 U	0.91 U	1.2 U	0.77 U	1.1 U	1 U
Vanadium	MG/KG	12.1	15.8	14	12.7	18.4	19.2	19	12.8
Zinc	MG/KG	44.8 J	49.7 J	36.7 J	51.7 J	104 J	88.4 J	62.3 J	53.1 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-6A	TP12-6B	TP12-6C	TP12-7AA	TP12-7BA	TP12-7BB	TP12-8A	TP12-8B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123158	123159	123160	123128	123127	123129	123130	123132
DEPTH TO TOP OF SAMPLE		2.5	3	3.5	1	1	2	1	3
DEPTH TO BOTTOM OF SAMPLE		2.5	3	3.5	1	1	2	1	3
SAMPLE DATE		10/17/1998	10/17/1998	10/17/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,1,2,2-Tetrachloroethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,1,2-Trichloroethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,1-Dichloroethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,1-Dichloroethene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloroethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloroethene (total)	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
1,2-Dichloropropane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Acetone	UG/KG	13 U	16 UJ	13 UJ	11 UJ	13 UJ	12 UJ	12 UJ	11 UJ
Benzene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Bromodichloromethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Bromoform	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Carbon disulfide	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Carbon tetrachloride	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Chlorobenzene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Chlorodibromomethane	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Chloroethane	UG/KG	13 U	16 UJ	13 UJ	11 UJ	11 UJ	12 UJ	12 UJ	11 UJ
Chloroform	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Cis-1,3-Dichloropropene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Ethyl benzene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Methyl bromide	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Methyl butyl ketone	UG/KG	13 U	16 UJ	13 UJ	11 U	11 U	12 U	12 U	11 U
Methyl chloride	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Methyl ethyl ketone	UG/KG	13 U	16 UJ	13 UJ	11 UJ	11 UJ	12 UJ	12 UJ	11 UJ
Methyl isobutyl ketone	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Methylene chloride	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Styrene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Tetrachloroethene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Toluene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Total Xylenes	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Trans-1,3-Dichloropropene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Trichloroethene	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Vinyl chloride	UG/KG	13 U	16 U	13 U	11 U	11 U	12 U	12 U	11 U
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
1,2-Dichlorobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
1,3-Dichlorobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
1,4-Dichlorobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2,2'-oxybis(1-Chloropropane)	UG/KG								
2,4,5-Trichlorophenol	UG/KG	200 U	200 U	190 U	180 U	180 U	180 U	190 U	300 U
2,4,6-Trichlorophenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2,4-Dichlorophenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-6A	TP12-6B	TP12-6C	TP12-7AA	TP12-7BA	TP12-7BB	TP12-8A	TP12-8B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123158	123159	123160	123128	123127	123129	123130	123132
DEPTH TO TOP OF SAMPLE		2.5	3	3.5	1	1	2	1	3
DEPTH TO BOTTOM OF SAMPLE		2.5	3	3.5	1	1	2	1	3
SAMPLE DATE		10/17/1998	10/17/1998	10/17/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
2,4-Dimethylphenol	UG/KG	85 UJ	84 UJ	78 UJ	76 UJ	73 UJ	76 U	78 U	120 U
2,4-Dinitrophenol	UG/KG	200 UJ	200 UJ	190 UJ	180 UJ	180 UJ	180 UJ	190 UJ	300 UJ
2,4-Dinitrotoluene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2,6-Dinitrotoluene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2-Chloronaphthalene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2-Chlorophenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2-Methylnaphthalene	UG/KG	85 U	84 U	78 U	7.8 J	73 U	6.8 J	78 U	120 U
2-Methylphenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
2-Nitroaniline	UG/KG	200 U	200 U	190 U	180 U	180 U	180 U	190 U	300 U
2-Nitrophenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
3,3'-Dichlorobenzidine	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
3-Nitroaniline	UG/KG	200 U	200 U	190 U	180 U	180 U	180 U	190 U	300 U
4,6-Dinitro-2-methylphenol	UG/KG	200 U	200 U	190 U	180 UJ	180 UJ	180 U	190 U	300 U
4-Bromophenyl phenyl ether	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
4-Chloro-3-methylphenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
4-Chloroaniline	UG/KG	85 U	84 U	78 U	76 UJ	73 UJ	76 UJ	78 UJ	120 UJ
4-Chlorophenyl phenyl ether	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
4-Methylphenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
4-Nitroaniline	UG/KG	200 UJ	200 UJ	190 UJ	180 UJ	180 UJ	180 UJ	190 UJ	300 UJ
4-Nitrophenol	UG/KG	200 UJ	200 UJ	190 UJ	180 UJ	180 UJ	180 U	190 U	300 U
Acenaphthene	UG/KG	85 U	84 U	78 U	7.6 J	5 J	76 U	78 U	120 U
Acenaphthylene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Anthracene	UG/KG	85 U	84 U	78 U	8.3 J	5.4 J	17 J	57 J	120 U
Benzo(a)anthracene	UG/KG	85 U	15 J	7.4 J	38 J	19 J	7.7 J	200	26 J
Benzo(a)pyrene	UG/KG	85 U	15 J	7.8 J	43 J	20 J	8.6 J	100	24 J
Benzo(b)fluoranthene	UG/KG	5.1 J	16 J	11 J	49 J	18 J	13 J	200	33 J
Benzo(ghi)perylene	UG/KG	4.9 J	13 J	9.7 J	28 J	14 J	76 UJ	35 J	120 UJ
Benzo(k)fluoranthene	UG/KG	85 U	16 J	8.6 J	42 J	24 J	76 U	170	29 J
Bis(2-Chloroethoxy)methane	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Bis(2-Chloroethyl)ether	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Bis(2-Chloroisopropyl)ether	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Bis(2-Ethylhexyl)phthalate	UG/KG	12 J	13 J	16 J	76 UJ	73 UJ	76 U	78 U	120 U
Butylbenzylphthalate	UG/KG	15 J	27 J	30 J	76 UJ	73 UJ	76 U	78 U	120 U
Carbazole	UG/KG	85 U	84 U	78 U	12 J	6.7 J	76 UJ	78 UJ	120 UJ
Chrysene	UG/KG	5.2 J	19 J	11 J	55 J	26 J	16 J	310	36 J
Di-n-butylphthalate	UG/KG	640 UJ	850 UJ	680 UJ	76 UJ	73 UJ	76 U	78 U	120 U
Di-n-octylphthalate	UG/KG	85 U	84 U	78 U	8 J	73 UJ	76 UJ	78 UJ	120 UJ
Dibenz(a,h)anthracene	UG/KG	85 U	84 U	78 U	11 J	7 J	76 UJ	26 J	120 UJ
Dibenzofuran	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Diethyl phthalate	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Dimethylphthalate	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Fluoranthene	UG/KG	7.7 J	31 J	17 J	85	48 J	22 J	220	51 J
Fluorene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-6A	TP12-6B	TP12-6C	TP12-7AA	TP12-7BA	TP12-7BB	TP12-8A	TP12-8B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123158	123159	123160	123128	123127	123129	123130	123132
DEPTH TO TOP OF SAMPLE		2.5	3	3.5	1	1	2	1	3
DEPTH TO BOTTOM OF SAMPLE		2.5	3	3.5	1	1	2	1	3
SAMPLE DATE		10/17/1998	10/17/1998	10/17/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Hexachlorobutadiene	UG/KG	85 U	84 U	78 U	76 UJ	73 UJ	76 UJ	78 UJ	120 UJ
Hexachlorocyclopentadiene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Hexachloroethane	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Indeno(1,2,3-cd)pyrene	UG/KG	85 U	9.4 J	7.6 J	26 J	13 J	76 UJ	44 J	120 UJ
Isophorone	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
N-Nitrosodiphenylamine	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
N-Nitrosodipropylamine	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Naphthalene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Nitrobenzene	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Pentachlorophenol	UG/KG	200 U	200 U	190 U	180 UJ	180 UJ	180 U	190 U	300 U
Phenanthrene	UG/KG	5 J	13 J	8.3 J	67 J	39 J	16 J	20 J	16 J
Phenol	UG/KG	85 U	84 U	78 U	76 U	73 U	76 U	78 U	120 U
Pyrene	UG/KG	8.2 J	30 J	16 J	85	40 J	15 J	310	53 J
Pesticides/PCBs									
4,4'-DDD	UG/KG	4.2 U	4.2 U	3.9 U	2.2 J	3.7 U	3.8 U	3.9 U	6.1 U
4,4'-DDE	UG/KG	4.2 U	4.2 U	3.9 U	2.5 J	3.7 U	3.3 J	3.9 U	6.1 U
4,4'-DDT	UG/KG	4.2 U	3.4 J	3.9 U	2.6 J	3.7 U	2.9 J	3.9 U	6.1 U
Aldrin	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Alpha-BHC	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Alpha-Chlordane	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Aroclor-1016	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Aroclor-1221	UG/KG	86 U	85 U	80 U	77 U	74 U	77 U	80 U	120 U
Aroclor-1232	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Aroclor-1242	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Aroclor-1248	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Aroclor-1254	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Aroclor-1260	UG/KG	42 U	42 U	39 U	38 U	37 U	38 U	39 U	61 U
Beta-BHC	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Delta-BHC	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Dieldrin	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Endosulfan I	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Endosulfan II	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Endosulfan sulfate	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Endrin	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Endrin aldehyde	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Endrin ketone	UG/KG	4.2 U	4.2 U	3.9 U	3.8 U	3.7 U	3.8 U	3.9 U	6.1 U
Gamma-BHC/Lindane	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Gamma-Chlordane	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Heptachlor	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Heptachlor epoxide	UG/KG	2.2 U	2.2 U	2 U	2 U	1.9 U	2 U	2 U	3.1 U
Methoxychlor	UG/KG	22 U	22 U	20 U	20 U	19 U	20 U	20 U	31 U
Toxaphene	UG/KG	220 U	220 U	200 U	200 U	190 U	200 U	200 U	310 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-6A	TP12-6B	TP12-6C	TP12-7AA	TP12-7BA	TP12-7BB	TP12-8A	TP12-8B
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123158	123159	123160	123128	123127	123129	123130	123132
DEPTH TO TOP OF SAMPLE		2.5	3	3.5	1	1	2	1	3
DEPTH TO BOTTOM OF SAMPLE		2.5	3	3.5	1	1	2	1	3
SAMPLE DATE		10/17/1998	10/17/1998	10/17/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998	10/15/1998
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1	RI PHASE 1 STEP 1
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals									
Aluminum	MG/KG	11300	7180	7690	9980 J	8110 J	11000 J	10300 J	14000 J
Antimony	MG/KG	1.3 UR	1 UR	1.4 UR	1.1 UR	1.3 UR	1.2 UR	1.3 UR	2 UR
Arsenic	MG/KG	4.3	4.1	3.8	5.8 J	3.6 J	4.3	3.2	5.8
Barium	MG/KG	82.2	63.2	62.2	69.9	51.8	49.9 J	106 J	113 J
Beryllium	MG/KG	0.47 J	0.31 J	0.35 J	0.32 J	0.31 J	0.46 J	0.44 J	0.6 J
Cadmium	MG/KG	0.07 U	0.05 U	0.07 U	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U
Calcium	MG/KG	24600	114000	138000	51400 J	39000 J	27400	6830	139000
Chromium	MG/KG	16.5	11.2	13.1	24.6	13.8	20.9	14	24.1
Cobalt	MG/KG	10.2 J	8.5 J	7.8 J	10.8	11.6	11.7	9 J	16.3 J
Copper	MG/KG	20.3	18.5	19.3	26	20.9	33.9	14.7	32.5
Cyanide	MG/KG	0.67 U	0.64 U	0.62 U	0.63 U	0.56 U	0.65 U	0.67 U	1 U
Iron	MG/KG	22700	14600	17400	25500 J	23100 J	11300 J	20800 J	33500 J
Lead	MG/KG	15.4 J	15.1 J	14.8 J	39.8 J	17.2 J	34.6 J	12.8 J	21.8 J
Magnesium	MG/KG	6520	9930	13500	18400 J	7820 J	9900 J	4390 J	14300 J
Manganese	MG/KG	545	314	359	656	378	167	597	786
Mercury	MG/KG	0.06 U	0.06 U	0.09 J	0.06 J	0.05 U	0.05 U	0.06 J	0.09 U
Nickel	MG/KG	24.1	21.2	22.6	28.1 J	34.9 J	39 J	18.7 J	45.5 J
Potassium	MG/KG	978 J	920	977 J	961	985 J	1210	881 J	1340 J
Selenium	MG/KG	1 UJ	0.78 UJ	1.1 UJ	0.85 U	0.95 U	0.93 J	0.98 J	1.5 J
Silver	MG/KG	0.27 U	0.2 U	0.28 U	0.22 U	0.25 U	0.24 U	0.26 U	0.39 U
Sodium	MG/KG	55.7 U	42.9 U	82.5 J	48.4 J	267 J	140 J	53.6 U	205 J
Thallium	MG/KG	1.1 U	0.89 U	1.2 U	1.7 J	1.1 J	1.1 J	1.1 U	1.7 U
Vanadium	MG/KG	19.7	17.5	14.6	19.3	14.9	19.9	17.5	23.7
Zinc	MG/KG	59	61.5	94.5	172 J	656 J	411 J	49.2 J	108 J

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-8C	TP12A-3	TP12A-3	TP12A-4	TP12A-4	TP12A-5	TP12A-6	TP12A-6	TP12A-7	TP12A-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123131	TP12A-3-1	TP12A-3-2	TP12A-4-1	TP12A-4-2	TP12A-5-1	TP12A-6-1	TP12A-6-2	TP12A-7-1	TP12A-8-1
DEPTH TO TOP OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
DEPTH TO BOTTOM OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
SAMPLE DATE		10/15/1998	6/22/1994	6/22/1994	6/21/1994	6/21/1994	6/23/1994	6/23/1994	6/23/1994	6/23/1994	6/24/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds											
1,1,1-Trichloroethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,1,2,2-Tetrachloroethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,1,2-Trichloroethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,1-Dichloroethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,1-Dichloroethene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,2-Dichloroethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,2-Dichloroethene (total)	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
1,2-Dichloropropane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Acetone	UG/KG	12 UJ	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Benzene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Bromodichloromethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Bromoform	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Carbon disulfide	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Carbon tetrachloride	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Chlorobenzene	UG/KG	12 U	13 U	11 U	5 J	1 J	11 U	11 U	11 U	15 UJ	11 U
Chlorodibromomethane	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Chloroethane	UG/KG	12 UJ	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Chloroform	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Cis-1,3-Dichloropropene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Ethyl benzene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methyl bromide	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methyl butyl ketone	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methyl chloride	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methyl ethyl ketone	UG/KG	12 UJ	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methyl isobutyl ketone	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Methylene chloride	UG/KG	12 U	1 J	1 J	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Styrene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Tetrachloroethene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Toluene	UG/KG	12 U	13 U	11 U	2 J	12 U	11 U	11 U	11 U	15 UJ	11 U
Total Xylenes	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Trans-1,3-Dichloropropene	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Trichloroethene	UG/KG	12 U	13 U	11 U	2 J	12 U	11 U	11 U	11 U	15 UJ	11 U
Vinyl chloride	UG/KG	12 U	13 U	11 U	12 U	12 U	11 U	11 U	11 U	15 UJ	11 U
Semivolatile Organic Compounds											
1,2,4-Trichlorobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
1,2-Dichlorobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
1,3-Dichlorobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
1,4-Dichlorobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2,2'-oxybis(1-Chloropropane)	UG/KG		430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2,4,5-Trichlorophenol	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
2,4,6-Trichlorophenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2,4-Dichlorophenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

Parameter	Units	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-8C	TP12A-3	TP12A-3	TP12A-4	TP12A-4	TP12A-5	TP12A-6	TP12A-6	TP12A-7	TP12A-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123131	TP12A-3-1	TP12A-3-2	TP12A-4-1	TP12A-4-2	TP12A-5-1	TP12A-6-1	TP12A-6-2	TP12A-7-1	TP12A-8-1
DEPTH TO TOP OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
DEPTH TO BOTTOM OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
SAMPLE DATE		10/15/1998	6/22/1994	6/22/1994	6/21/1994	6/21/1994	6/23/1994	6/23/1994	6/23/1994	6/23/1994	6/24/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
2,4-Dimethylphenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2,4-Dinitrophenol	UG/KG	180 UJ	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
2,4-Dinitrotoluene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2,6-Dinitrotoluene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2-Chloronaphthalene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2-Chlorophenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2-Methylnaphthalene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2-Methylphenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
2-Nitroaniline	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
2-Nitrophenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
3,3'-Dichlorobenzidine	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
3-Nitroaniline	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
4,6-Dinitro-2-methylphenol	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
4-Bromophenyl phenyl ether	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
4-Chloro-3-methylphenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
4-Chloroaniline	UG/KG	74 UJ	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
4-Chlorophenyl phenyl ether	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
4-Methylphenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
4-Nitroaniline	UG/KG	180 UJ	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
4-Nitrophenol	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
Acenaphthene	UG/KG	13 J	430 U	370 U	390 U	400 U	370 U	44 J	370 U	540 U	370 U
Acenaphthylene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Anthracene	UG/KG	20 J	430 U	370 U	390 U	400 U	370 U	63 J	370 U	43 J	370 U
Benzo(a)anthracene	UG/KG	68 J	430 U	370 U	390 U	400 U	370 U	99 J	370 U	150 J	370 U
Benzo(a)pyrene	UG/KG	67 J	430 U	370 U	390 U	400 U	370 U	92 J	370 U	180 J	370 U
Benzo(b)fluoranthene	UG/KG	82 J	430 U	370 U	390 U	400 U	370 U	95 J	370 U	320 J	370 U
Benzo(ghi)perylene	UG/KG	43 J	430 U	370 U	390 U	400 U	370 U	29 J	370 U	98 J	370 U
Benzo(k)fluoranthene	UG/KG	84 J	430 U	370 U	390 U	400 U	370 U	76 J	370 U	540 UJ	370 U
Bis(2-Chloroethoxy)methane	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Bis(2-Chloroethyl)ether	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Bis(2-Chloroisopropyl)ether	UG/KG	74 U									
Bis(2-Ethylhexyl)phthalate	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Butylbenzylphthalate	UG/KG	11 J	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Carbazole	UG/KG	18 J	430 U	370 U	390 U	400 U	370 U	40 J	370 U	540 U	370 U
Chrysene	UG/KG	88	430 U	370 U	390 U	400 U	370 U	130 J	370 U	210 J	370 U
Di-n-butylphthalate	UG/KG	74 U	430 U	370 U	390 U	400 U	28 J	47 J	32 J	50 J	52 J
Di-n-octylphthalate	UG/KG	74 UJ	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Dibenz(a,h)anthracene	UG/KG	19 J	430 U	370 U	390 U	400 U	370 U	43 J	370 U	99 J	370 U
Dibenzofuran	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Diethyl phthalate	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Dimethylphthalate	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Fluoranthene	UG/KG	140	430 U	370 U	390 U	400 U	370 U	300 J	370 U	320 J	370 U
Fluorene	UG/KG	12 J	430 U	370 U	390 U	400 U	370 U	35 J	370 U	540 U	370 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-8C	TP12A-3	TP12A-3	TP12A-4	TP12A-4	TP12A-5	TP12A-6	TP12A-6	TP12A-7	TP12A-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123131	TP12A-3-1	TP12A-3-2	TP12A-4-1	TP12A-4-2	TP12A-5-1	TP12A-6-1	TP12A-6-2	TP12A-7-1	TP12A-8-1
DEPTH TO TOP OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
DEPTH TO BOTTOM OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
SAMPLE DATE		10/15/1998	6/22/1994	6/22/1994	6/21/1994	6/21/1994	6/23/1994	6/23/1994	6/23/1994	6/23/1994	6/24/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Hexachlorobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Hexachlorobutadiene	UG/KG	74 UJ	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Hexachlorocyclopentadiene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Hexachloroethane	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Indeno(1,2,3-cd)pyrene	UG/KG	42 J	430 U	370 U	390 U	400 U	370 U	69 J	370 U	140 J	370 U
Isophorone	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
N-Nitrosodiphenylamine	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
N-Nitrosodipropylamine	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Naphthalene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Nitrobenzene	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Pentachlorophenol	UG/KG	180 U	1100 U	900 U	940 U	960 U	900 U	920 U	900 U	1300 U	890 U
Phenanthrene	UG/KG	100	430 U	370 U	390 U	400 U	370 U	280 J	370 U	120 J	370 U
Phenol	UG/KG	74 U	430 U	370 U	390 U	400 U	370 U	380 U	370 U	540 U	370 U
Pyrene	UG/KG	140	430 U	370 U	390 U	400 U	370 U	230 J	370 U	230 J	370 U
Pesticides/PCBs											
4,4'-DDD	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	5.1	3.7 U	5.4 U	3.7 U
4,4'-DDE	UG/KG	2.1 J	4.3 U	3.7 U	3.9 U	4 U	3.7 U	6.4	3.7 U	2.3 J	3.7 U
4,4'-DDT	UG/KG	4.4	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8	3.7 U	5.4 U	3.7 U
Aldrin	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Alpha-BHC	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Alpha-Chlordane	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.6 J	1.9 U
Aroclor-1016	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Aroclor-1221	UG/KG	75 U	88 U	75 U	79 U	81 U	75 U	77 U	75 U	110 U	74 U
Aroclor-1232	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Aroclor-1242	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Aroclor-1248	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Aroclor-1254	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Aroclor-1260	UG/KG	37 U	43 U	37 U	39 U	40 U	37 U	38 U	37 U	54 U	37 U
Beta-BHC	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Delta-BHC	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Dieldrin	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Endosulfan I	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Endosulfan II	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Endosulfan sulfate	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Endrin	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Endrin aldehyde	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Endrin ketone	UG/KG	3.7 U	4.3 U	3.7 U	3.9 U	4 U	3.7 U	3.8 U	3.7 U	5.4 U	3.7 U
Gamma-BHC/Lindane	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Gamma-Chlordane	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.3 J	1.9 U
Heptachlor	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Heptachlor epoxide	UG/KG	1.9 U	2.2 U	1.9 U	2 U	2 U	1.9 U	2 U	1.9 U	2.8 U	1.9 U
Methoxychlor	UG/KG	19 U	22 U	19 U	20 U	20 U	19 U	20 U	19 U	28 U	19 U
Toxaphene	UG/KG	190 U	220 U	190 U	200 U	200 U	190 U	200 U	190 U	280 U	190 U

Table B-4
Disposal Pit C Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		TP12-8C	TP12A-3	TP12A-3	TP12A-4	TP12A-4	TP12A-5	TP12A-6	TP12A-6	TP12A-7	TP12A-8
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123131	TP12A-3-1	TP12A-3-2	TP12A-4-1	TP12A-4-2	TP12A-5-1	TP12A-6-1	TP12A-6-2	TP12A-7-1	TP12A-8-1
DEPTH TO TOP OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
DEPTH TO BOTTOM OF SAMPLE		2	2.5	6	4	4	3	1	7	4	7
SAMPLE DATE		10/15/1998	6/22/1994	6/22/1994	6/21/1994	6/21/1994	6/23/1994	6/23/1994	6/23/1994	6/23/1994	6/24/1994
QC CODE		SA	SA	SA	SA	SA	SA	SA	SA	SA	SA
STUDY ID		RI PHASE 1 STEP 1	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI	ESI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Metals											
Aluminum	MG/KG	4140 J	13200	9720	9600	13400	9750	14000	8460	18600	6610
Antimony	MG/KG	1.2 UR	0.25 UJ	0.27 UJ	0.25 UJ	0.18 UJ	0.26 UJ	0.25 J	0.28 J	0.39 J	0.26 UJ
Arsenic	MG/KG	2.6	5	3.7	4.2	4.9	3.8	5.2	2.9	7.7	3.1
Barium	MG/KG	38.9 J	89	73.6	72	102	94.5	78.7	76.2	135	67.4
Beryllium	MG/KG	0.21 J	0.71 J	0.49 J	0.48 J	0.63 J	0.45 J	0.61 J	0.4 J	0.83 J	0.31 J
Cadmium	MG/KG	0.06 U	3.6	0.68 J	0.57 J	0.82	0.4 J	0.7 J	0.35 J	1 J	0.5 J
Calcium	MG/KG	224000	5600	85400	82800	39100	78800 J	22000 J	62000 J	25400 J	86700 J
Chromium	MG/KG	6.7	18.1	14.8	14.1	18.5	15.1	20.7	14	25	10.6
Cobalt	MG/KG	4.9 J	10.2	8.3 J	8.6 J	9.6	8.2 J	10.1	6.8 J	15.7	7.1 J
Copper	MG/KG	14	18.6	18	21.2	24.2	19.5	21.2	16.4	38.4	17.7
Cyanide	MG/KG	0.57 U	0.58 U	0.45 U	0.46 U	0.5 U	0.52 U	0.48 U	0.48 U	0.8 U	0.49 U
Iron	MG/KG	13000 J	24100	19400	18700	23300	18900	26100	17100	34500	14400
Lead	MG/KG	18.1 J	25.7	10	8.9	16.8	15.5 J	22.7 J	431 J	49 J	12.3 J
Magnesium	MG/KG	11900 J	4530	12700	15700	9930	19100	6840	11600	10600	36100
Manganese	MG/KG	515	490	429	395	419	394	524	358	857	326
Mercury	MG/KG	0.06 U	0.06 J	0.02 J	0.03 J	0.03 J	0.04 J	0.08 J	0.03 J	0.11	0.02 J
Nickel	MG/KG	12.3 J	27.2	25	24.8	30.9	24	28.4	22	39.4	18.9
Potassium	MG/KG	731 J	1290 J	1700 J	1990 J	2880 J	2350 J	1430 J	1700 J	3670 J	1480 J
Selenium	MG/KG	0.9 J	1.9	0.65 J	0.95 J	1.6	0.54 U	1.2	0.48 U	1.2 J	0.54 U
Silver	MG/KG	0.24 U	0.1 U	0.1 U	0.1 U	0.07 U	0.1 U	0.08 U	0.09 U	0.13 U	0.1 U
Sodium	MG/KG	114 J	30.3 J	129 J	124 J	107 J	115 J	51.5 J	95 J	26.5 U	112 J
Thallium	MG/KG	1 U	0.56 J	0.7 J	0.41 J	0.56 J	0.38 U	0.48 J	0.34 U	0.98 J	0.38 U
Vanadium	MG/KG	11.1	22.5	15.4	16.2	21.5	17.5	22.7	14.1	36.4	11
Zinc	MG/KG	90.2 J	112	53.8	79.3	281	51.1	78.8	53.8	155	42.6

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate
R = the analytical result was rejected during data validation.

Table B-5
Building 813-814 Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SP813-3	SP813-3	SP813-4	SP813-5	SP813-9	SP813-10	SP813-11	SP813-12
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123695	123696	123697	123698	123659	123660	123661	123662
DEPTH TO TOP OF SAMPLE		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DEPTH TO BOTTOM OF SAMPLE		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SAMPLE DATE		12/9/2004	12/9/2004	12/9/2004	12/9/2004	7/22/2005	7/22/2005	7/22/2005	7/22/2005
QC CODE		SA	DU	SA	SA	SA	SA	SA	SA
STUDY ID		SRI	SRI	SRI	SRI	SRI	SRI	SRI	SRI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,1,2,2-Tetrachloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,1,2-Trichloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,1-Dichloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,1-Dichloroethene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,2-Dichloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
1,2-Dichloropropane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Acetone	UG/KG	18 U	19 U	19 U	17 U	340 U	1700 U	1900 U	2300 U
Benzene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Bromodichloromethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Bromoform	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Carbon Disulfide	UG/KG	8.8 U	9.5 U	9.6 U	8.4 U	1000 U	830 U	960 U	1200 U
Carbon Tetrachloride	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Chlorobenzene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Chlorodibromomethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Chloroethane	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Chloroform	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
cis-1,2-Dichloroethene	UG/KG	2.4 J	2.6 J	1.7 J	4.2 U	520 U	420 U	480 U	580 U
cis-1,3-Dichloropropene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Ethyl Benzene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	33 J	80 J	480 U	580 U
Meta/Para Xylene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Methyl bromide	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Methyl butyl ketone	UG/KG	8.8 UJ	9.5 UJ	9.6 UJ	8.4 UJ	1000 U	830 U	960 U	1200 U
Methyl chloride	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Methyl ethyl ketone	UG/KG	8.8 UJ	9.5 UJ	9.6 UJ	8.4 UJ	1000 UJ	830 UJ	960 UJ	1200 UJ
Methyl isobutyl ketone	UG/KG	8.8 UJ	9.5 UJ	9.6 UJ	8.4 UJ	1000 UJ	830 UJ	960 UJ	1200 UJ
Methylene Chloride	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Ortho Xylene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	31 J	480 U	580 U
Styrene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Tetrachloroethene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Toluene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
trans-1,2-Dichloroethene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Trans-1,3-Dichloropropene	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U
Trichloroethene	UG/KG	3100	190	110	9.3	160 J	110 J	410 J	510 J
Vinyl Chloride	UG/KG	4.4 U	4.8 U	4.8 U	4.2 U	520 U	420 U	480 U	580 U

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the
associated reporting limit is approximate

Table B-5
Building 813-814 Surface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

FACILITY		SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12	SEAD-12
LOCATION ID		SP813-13	SP813-14	SP813-17	SP813-18	SP813-18	SP813-19	SP813-20	SP813-21
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123663	123664	123667	123668	123709	123669	123707	123708
DEPTH TO TOP OF SAMPLE		N/A	N/A	N/A	0	0	0	0	0
DEPTH TO BOTTOM OF SAMPLE		N/A	N/A	N/A	0.2	0.2	0.2	0.2	0.2
SAMPLE DATE		7/22/2005	7/22/2005	11/28/2005	2/14/2006	2/14/2006	2/14/2006	2/14/2006	2/14/2006
QC CODE		SA	SA	SA	SA	DU	SA	SA	SA
STUDY ID		SRI	SRI	SRI	SRI	SRI	SRI	SRI	SRI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,1,2,2-Tetrachloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,1,2-Trichloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,1-Dichloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,1-Dichloroethene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,2-Dichloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
1,2-Dichloropropane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Acetone	UG/KG	2100 U	1900 U	18 U	19 U	18 U	18 U	18 U	19 U
Benzene	UG/KG	520 U	470 U	4.6 U	0.32 J	0.33 J	4.6 U	4.6 U	4.8 U
Bromodichloromethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Bromoform	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Carbon Disulfide	UG/KG	1000 U	930 U	0.48 J	9.6 U	9 U	9.2 U	9.1 U	9.6 U
Carbon Tetrachloride	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Chlorobenzene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Chlorodibromomethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Chloroethane	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Chloroform	UG/KG	520 U	470 U	4.6 U	0.47 J	4.5 U	4.6 U	4.6 U	4.8 U
cis-1,2-Dichloroethene	UG/KG	520 U	470 U	4.6 U	1 J	4.5 U	4.6 U	0.61 J	1.3 J
cis-1,3-Dichloropropene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Ethyl Benzene	UG/KG	54 J	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Meta/Para Xylene	UG/KG	150 J	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Methyl bromide	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Methyl butyl ketone	UG/KG	1000 U	930 U	9.2 U	9.6 U	9 U	9.2 U	9.1 U	9.6 U
Methyl chloride	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Methyl ethyl ketone	UG/KG	1000 UJ	930 UJ	9.2 U	9.6 U	9 U	9.2 U	9.1 U	9.6 U
Methyl isobutyl ketone	UG/KG	1000 UJ	930 UJ	9.2 U	9.6 U	9 U	9.2 U	9.1 U	9.6 U
Methylene Chloride	UG/KG	520 U	470 U	0.38 J	0.32 J	4.5 U	4.6 U	4.6 U	4.8 U
Ortho Xylene	UG/KG	42 J	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Styrene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Tetrachloroethene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	0.32 J
Toluene	UG/KG	210 J	470 U	4.6 U	0.45 J	0.57 J	4.6 U	4.6 U	4.8 U
trans-1,2-Dichloroethene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Trans-1,3-Dichloropropene	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U
Trichloroethene	UG/KG	240 J	130 J	3.4 J	1200	58	6.3	120	160
Vinyl Chloride	UG/KG	520 U	470 U	4.6 U	4.8 U	4.5 U	4.6 U	4.6 U	4.8 U

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the
associated reporting limit is approximate

Table B-6
Building 813-814 Subsurface Soil Data
SEAD-12 Feasibility Study
Seneca Army Depot Activity

LOCATION ID		TP813-4F	TP813-5F	TP813-6F	TP813-10F	TP813-11F	TP813-12F	TP813-13F	TP813-13F (D)
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE ID		123688	123689	123691	123701	123702	123703	123704	123705
DEPTH TO TOP OF SAMPLE		4	3	3	4	3	2	3	3
DEPTH TO BOTTOM OF SAMPLE		5	4	4	5	4	3	4	4
SAMPLE DATE		11/10/2004	11/10/2004	11/10/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004	12/21/2004
QC CODE		SA	SA	SA	SA	SA	SA	SA	DU
STUDY ID		SRI	SRI	SRI	SRI	SRI	SRI	SRI	SRI
Parameter	**Units**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**	**Value (Q)**
Volatile Organic Compounds									
1,1,1-Trichloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,1,2,2-Tetrachloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,1,2-Trichloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,1-Dichloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,1-Dichloroethene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,2-Dichloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
1,2-Dichloropropane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Acetone	UG/KG	2000 U	2000 U	1600 U	16 U	4.3 J	32	17 U	18 U
Benzene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Bromodichloromethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Bromoform	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Carbon Disulfide	UG/KG	1000 U	980 U	780 U	8.1 U	3.2 U	9.9 U	8.6 U	9.1 U
Carbon Tetrachloride	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Chlorobenzene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Chlorodibromomethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Chloroethane	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Chloroform	UG/KG	510 U	490 U	390 U	4 U	1.6 U	1.4 J	4.3 U	4.5 U
cis-1,2-Dichloroethene	UG/KG	510 U	490 U	390 U	4 U	1.5 J	4.9 J	4.3 U	4.5 U
cis-1,3-Dichloropropene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Ethyl Benzene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Meta/Para Xylene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Methyl bromide	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Methyl butyl ketone	UG/KG	1000 U	980 U	780 U	8.1 UJ	3.2 UJ	9.9 UJ	8.6 UJ	9.1 UJ
Methyl chloride	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Methyl ethyl ketone	UG/KG	1000 U	980 U	780 U	8.1 UJ	3.2 UJ	4.5 J	8.6 UJ	9.1 UJ
Methyl isobutyl ketone	UG/KG	1000 U	980 U	780 U	8.1 UJ	3.2 UJ	9.9 UJ	8.6 UJ	9.1 UJ
Methylene Chloride	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Ortho Xylene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Styrene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Tetrachloroethene	UG/KG	510 U	490 U	390 U	3.2 J	1.6 U	4.9 U	4.3 U	4.5 U
Toluene	UG/KG	510 U	490 U	100 J	4 U	1.6 U	4.9 U	4.3 U	4.5 U
trans-1,2-Dichloroethene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
trans-1,3-Dichloropropene	UG/KG	510 U	490 U	390 U	4 U	1.6 U	4.9 U	4.3 U	4.5 U
Trichoroethene	UG/KG	540 U	160 J	590	4800 J	11	1000 J	1.3 J	4.5 U
Vinyl Chloride	UG/KG	510 U	490 U	390 U	4 U	1.5 J	4.9 U	4.3 U	4.5 U
Other Analyses									
Percent Solids	%	85.5	84.3	84.4	81	80.7	77.3	89.1	87.9
Total Organic Carbon	MG/KG		4120	5420					

U = compound was not detected
J = the reported value is an estimated concentration
UJ = the compound was not detected; the associated reporting limit is approximate

APPENDIX C

RESPONSE TO COMMENTS

- Response (dated 12/18/2007) to NYSDEC Comments Dated 9/12/2007
- Response (dated 12/18/2007) to USEPA Comments Dated 6/13/2007
- Response (dated 5/21/2003) to USEPA Comments Dated 8/15/2002
- Table C-1 Summary Statistics of Comparison between EM-5 and Background and Resident/Worker Criteria for Radionuclides in Soil
- Table C-2 Summary Statistics of Comparison between EM-6 and Background and Resident/Worker Criteria for Radionuclides in Soil

Army's Response to Comments from the New York State Department of Environmental Conservation

Subject: Draft Final Feasibility Study Report at the
Radiological Waste Burial Sites (SEAD-12)
Seneca Army Depot
Romulus, New York

Comments Dated: September 12, 2007

Date of Comment Response: December 18, 2007

GENERAL COMMENTS:

Comment 1: Since the future land use designated for SEAD-12 is institutional training, what is the rationale for only comparing analytical data in the FS Report summary tables to Unrestricted Use SCOs? Again, the report should also include comparisons to the Commercial Use SCOs, which are consistent with the future intended use of the SEAD.

Response 1: Acknowledged. Table 2-2 has been revised to include NYSDEC Commercial Use SCOs.

SPECIFIC COMMENTS:

Comment 1: Section 2.4-Based on our discussions with Seneca County Industrial Development Agency regarding the training area, we disagree that the change in intended use from conservation recreational to Institutional training will result in a change in the current nature of the habitat (unless the "institutional training" use would be significantly different than the "training" use). The nature of the intended future use should be spelled out in greater details. However, since virtually all of the Disposal Pit C surface soils meet the unrestricted use Soil Cleanup Goals (SCOs), we don't disagree with the conclusion that "no further action is warranted at Disposal Pit C to mitigate potential risks to ecological receptors".

Response 1: Acknowledged. Section 2.4 has been revised to reflect that since virtually all of the Disposal Pit C surface soils meet the unrestricted use SCOs, no further action is warranted at Disposal Pit C to mitigate potential risks to ecological receptors. As the detailed plan for intended future use may still be changing in the future, the intended future use of the property is not discussed in greater details in this report.

Comment 2: Section 2.5.1: Potential Chemical-Specific ARARs and TBCs, page 2-5 – The text states that NYSDEC Soil Cleanup Objectives (SCO) for unrestricted use are considered as "To Be Considered" (TBC) regulatory items (e.g., advisories, criteria, or guidance) for the SEAD-12 FS. Following the promulgation of Part 375 SCOs (December 2006), which were developed to be protective of public health, it is recommended that the Commercial Use SCOs be met during the completion of all subsequent remedial actions at SEAD-12. These SCOs are consistent with the intended future use of the site (i.e., institutional training).

Response 2: Acknowledged. NYSDEC in December 2006 enacted into state law cleanup objectives for five categories of future land use (i.e., unrestricted, residential, restricted-residential, commercial, and industrial) at waste sites located within its bounds. As SEAD-12 is located in the institutional training area, the NYSDEC SCOs for commercial use scenario are considered to be "relevant and appropriate" criteria for SEAD-12. NYSDEC Commercial Use SCOs will be included in the report as "relevant and appropriate" criteria. Table 2-2 has been revised to add Commercial Use SCOs. SCOs for unrestricted use are still retained for comparison purposes in this report.

It should be noted that although the NYSDEC Commercial Use SCOs are identified as "relevant and appropriate" criteria for SEAD-12 and will be included in the report for site characterization purposes, these criteria are not adopted as cleanup goals (CUGs) for the site. The CERCLA cleanup process is a risk-based process. Based on the RI, no significant risks to human health or the environment are expected at SEAD-12; the purpose of the remedial action at Disposal Pit A/B and Disposal Pit C is solely to prevent access to military debris. Therefore, it is the Army's position that the cleanup goal for soil is to remove military-related debris at Disposal Pit A/B and Disposal Pit C. No chemical-specific cleanup goals are warranted for the remedial action except that TCE SCOs may be used for Alternative 4 when building demolition and soil excavation are warranted.

Comment 3: Section 2.5.1.1: Soil, page 2-5 – The text indicates "average concentrations for all analytes are below the cleanup objectives for restricted industrial or commercial use scenarios." Similar to comment #2, what is the basis for comparing data to industrial use scenarios? In addition, achievement of the Commercial Use SCOs should be determined by comparing individual concentrations of analytical samples to the SCOs, not average. It is inappropriate to conclude that soil conditions at SEAD-12, based on the average concentrations for all analytes, are generally consistent with the unrestricted use requirements presented in NYCRR Subpart 375-6 without also discussing individual samples.

Response 3: Acknowledged. NYSDEC Commercial Use SCOs have been included in the report as relevant and appropriate criteria and reference to industrial use SCOs has been removed from the report. Table 2-2 has been revised to add Commercial Use SCOs and the maximum detected concentrations detected for Disposal Pit A/B, Disposal Pit C, and Buildings 813/814. As shown in **Table 2-1B**, the detected concentrations in Disposal Pit A/B, Disposal Pit C, and Buildings 813/814 are all below the Commercial Use SCOs with the exception of three Aroclor-1254 exceedances (out of 28 samples) and three cadmium exceedances (out of 28 samples) in Disposal Pit A/B subsurface soil. Aroclor-1254 was detected at low frequency in Disposal Pit A/B soil (i.e., 6 out of 28 subsurface soil samples) and the average concentration in subsurface soil is below the NYSDEC Commercial Use SCO (294 μg/kg vs. 1,000 μg/kg). Cadmium was detected in 10 out of 28 subsurface soil samples and the average concentration in subsurface soil is below the NYSDEC Commercial Use SCO (6.6 mg/kg vs. 9.3 mg/kg). Further, the Aroclor-1254 and cadmium concentrations in Disposal Pit A/B soil do no pose significant risks to human health or the environment based on the RI baseline risk assessment. Although several maximum detected concentrations are above the unrestricted use SCOs, the average concentrations in general are consistent with the unrestricted use SCOs. Further, based on the baseline risk assessment performed during the RI, contaminants in soil at Disposal Pit A/B or Disposal Pit C do not pose significant risks to human health or the environment. Therefore, it is concluded that soil conditions at SEAD-12 are in general consistent with the unrestricted use requirements presented in 6 NYCRR Subpart 375-6. The above discussions have been included in **Section 2.5.1.1**.

Comment 4: Section 2.6 – "….to NYSDEC TAGM 4003…." this TAGM has been reissued as DSHM-RAD-05-01.

Response 4: Acknowledged. The report has been revised to reflect this change.

Comment 5: Section 2.6.2-3rd Bullet – "…restricted industrial/commercial use…" is suggested to change to "..commercial use…" to be consistent with PART 375.

Response 5: Acknowledged. The report has been revised to reflect this change.

Comment 6: Section 3.3.3-2nd Bullet – "What is common fill", please explain is it clean soil or what is it?

Response 6: Acknowledged. Clean imported soil will be used as common fill and this definition has been included in Section 3.3.3.

Comment 7: Appendix B: NYSDEC comments dated August 22, 2002 responded by the Army on March 30, 2007 have no response on the basis of investigation SRI (Supplemental Remedial Investigation) report. It needs to show the results of SRI in the Summary Table form for comparison of contaminants concentration and cleanup objectives, in this section and in Section 4.6 also.

Response 7: Acknowledged. Surface soil and subsurface soil data representative of the surface and subsurface soil conditions of soil in the Buildings 813/814 area have been included in Appendix B of the FS report. The summary statistics of these soil data collected during the SRI have been added to **Table 2-1A/B** and **Table 2-2**. The SRI soil results are discussed in detail in Section 1.2.6.4 and exceedances of NYSDEC SCOs have been included in the discussion in Section 2.5.1.1.

Army's Response to Comments from the United States Environmental Protection Agency

Subject: Draft Final Feasibility Study Report at the
Radiological Waste Burial Sites (SEAD-12)
Seneca Army Depot
Romulus, New York

Comments Dated: June 13, 2007

Date of Comment Response: December 18, 2007

GENERAL COMMENTS

Comment 1: The cover letter included with the document states that the Draft Final Feasibility Study (FS) Report incorporates the results of the Supplemental Remedial Investigation (SRI) conducted in 2004 and 2005. While conclusions from the SRI have been presented, very little supporting information from the SRI has been included in this FS. For example, Figures 1-5 and 1-6 show sample locations for all Expanded Site Inspection (ESI) and RI samples collected from SEAD-12, but these figures do not appear to show the soil samples or groundwater samples collected from temporary wells in the vicinity of Buildings 813/814 during the SRI. Furthermore, surface and subsurface soil chemical exceedances of NYSDEC TAGMs are summarized in Tables 1-1 and 1-2, but results from the SRI do not appear to be included on these tables. Please revise the FS to include the results from the SRI in applicable figures, tables, and discussions of the contamination (such as in Section 2.5.1.1).

Response 1: **Tables 1-1** and **1-2** have been revised to include the SRI data collected for Buildings 813/814. **Figures 1-5** and **1-6** have been revised to indicate the location of the SRI sampling. In addition, **Figures 1-7** and **1-8** were added to the document to present the SRI sample locations. The text has been revised to incorporate the revised/new tables and figures.

Comment 2: Protection of human health and the environment is required where risks exceed established EPA target ranges. However, Page 2-3 of this Feasibility Study (FS) notes that "no significant risks [are] expected for human or ecological receptors at SEAD-12." It is not clear how this conclusion was drawn since a baseline risk assessment was apparently not conducted for the Buildings 813/814 area. Section 1.5 (Risk Assessment) provides a summary of the three areas for which risk assessments were conducted, but the Buildings 813/814 area has not been included in this summary. The FS further notes that trichloroethylene (TCE) was detected in groundwater in this area at a concentration of 2,400 ug/l, above the NYSDEC Ambient Water Quality Standards (AWQS) for Class GA groundwater (5 ug/l). Although a source removal was conducted, soil contamination remains at the site above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) soil action level of 700 ug/kg, and it does not appear that post-excavation groundwater samples were collected to confirm the success of the source removal. While Page 2-3 indicates that the building is currently uninhabitable, exposure to other potential receptors (trespassers, construction workers, future building inhabitants, etc.) should be addressed, and risk associated with these potential exposures quantified. Please revise the FS to include the results of a risk assessment for the Buildings 813/814 area, or provide additional justification for not assessing risk in this area of the site. Results of a risk assessment for the Buildings 813/814 area should guide selection of remedial action objectives for this area.

Response 2: The Army agrees that clarification regarding the status of a risk analysis at Buildings 813/814 is warranted in this document. It is the Army's position that a risk analysis with respect to vapor intrusion will take place once a future user, if identified, plans to occupy the building through the use of a deed notice/environmental easement, since the only potential risk would be to a building occupant. It will be the responsibility of the organization making the determination to occupy the building to perform such an analysis prior to use. The rationale for this is presented below:

- Currently the residual contaminants in SEAD-12 soil near Buildings 813/814 do not exceed NYSDEC Restricted Use Soil Cleanup Objectives. Elevated TCE concentrations were observed in soils near Buildings 813/814 during the SRI and the associated soils were excavated and disposed off-site. The TCE concentrations remaining underneath the Buildings (maximum 4.8 ppm) are below all the NYSDEC Restricted Use Soil Cleanup Objectives for protection of public health (10 ppm, 21 ppm, and 200 ppm for residential, restricted-residential, and commercial, respectively). Although concentrations exceed NYSDEC Unrestricted Use Soil Cleanup Objective for TCE (0.47 ppm), these soils are located beneath the building foundation and are not accessible.
- Currently, groundwater at SEAD-12 is not impacted by TCE. Although TCE concentrations above the NYSDEC GA Standard were observed at MW12-37, the SRI indicated the TCE contamination at MW12-37 was isolated. As discussed in our response to EPA's comments dated June 9, 2006 on the SRI, soil adjacent to MW12-37, which was considered source of the TCE contamination detected in MW12-37, was excavated during the SRI. As a result, MW12-37 as well as the surrounding soils and groundwater, no longer exists. Thirteen temporary wells shown in Figure 1-8, were installed as part of the SRI and temporary wells located as close as 20 to 30 feet of MW12-37 had no TCE detected during the SRI. Therefore, groundwater is not a media of concern at this site.
- Due to the presence of TCE in soils beneath the building, vapor intrusion into the buildings is a potential pathway that cannot be eliminated using existing data alone. Therefore, a restriction on building use is warranted. However, there is no current or planned use of the buildings. Currently, the buildings are secured without occupants and there are no utilities available in the buildings. Therefore, the vapor intrusion exposure pathway is not complete under the current conditions as no potential receptors are identified.
- The Army's proposal for delaying the vapor intrusion investigations until the buildings have a change in use and are planned to be occupied is consistent with the NY State and Army guidance. In NYSDOH's 2005 draft document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" indicates in Section 3.2.7 (Current and Future Land Uses) that *"Both current and future land uses are considered when evaluating the investigation data and determining appropriate actions for*

further investigation or measures to address exposures . .However, provisions may be put in place to defer sampling until occupancy of the building is expected;". In addition, the guidance states that *"if actions should be taken to mitigate exposures related to soil vapor intrusion should the site be developed, the appropriate mitigation method will depend upon the proposed land use - a parking lot, recreational field, single-family home, commercial building, high-rise building with underground parking, occupied or unoccupied building, etc."* Army guidance (dated 11/6/06) states that with respect to future construction at BRAC sites, modeling is typically not conducted and instead a notice of potential vapor intrusion risks are memorialized in transfer documents.

To conclude, **Sections 1.5** and **2.4** of the FS will be modified to include discussion of the potential for indoor air risk within Buildings 813/814 prompting the need for a land use control in the form of a deed notice/environmental easement. In addition, the justification for postponement of a quantitative risk assessment regarding this potential pathway that would be conducted by the organization making the determination to occupy the building, will be included using the rationale above.

Comment 3: The FS reports that the depth of the groundwater at SEAD-12 has ranged from approximately 2 feet below ground surface (bgs) to approximately 11 feet bgs. The estimated depth to groundwater in the vicinity of the proposed areas of excavation (Disposal Pits A/B and C) is not specified, but the estimated depth of excavation at both areas is approximately 5 feet (Page 2-12). The FS should indicate whether dewatering will be anticipated at either of the proposed excavation areas. If dewatering is anticipated, the description of the alternative should elaborate on the proposed plan for handling extracted groundwater (i.e., sampling, disposal, etc.).

Response 3: At Disposal Pit A/B, the water table was encountered at 6 feet or was deeper than the base of excavation (greater than 6 feet) at most test pits and was encountered at 4 feet in an ESI test pit. The water table was not encountered in any of the test pits excavated in Area 1 of Disposal Pit C, which were excavated to a depth of 6 feet below ground surface or greater. At Area 2 of Disposal Pit C, the water table was encountered at depths ranging from 3 feet in the ESI test pit to 6.5 feet; in two other test pits the water table was not encountered at depths greater than 6 feet.

Based on the Army's construction experience at the Ash Landfill and SEAD-25, no water was encountered during the excavation at either of these sites. Dewatering at SEAD-12 is not anticipated due to the tight formation and scheduling of construction work during the drier part of the year. The above statement has been included in **Section 4.3.1.**

SPECIFIC COMMENTS

Comment 1: Tables 1-1 and 1-2: Exceedance Summaries of Surface Soils and Subsurface Soils. These tables present those compounds detected in soil in excess of the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) soil action levels. However, the unit of measure for the soil data has not been provided on either table. Please revise the tables to include the unit of measure for the soil data.

Response 1: Tables 1-1 and **1-2** have been modified to show the units of measure for the data.

Comment 2: Section 1.4: Fate and Transport, Page 1-12. This section lacks a discussion of the volatility of trichloroethene (TCE) and cis-1,2-dichloroethene and the potential for these compounds to impact indoor air. As the potential for vapor intrusion is a concern at this site, all applicable fate and transport characteristics of the contaminants should be discussed in this section. It should also be noted that chlorinated volatile organic compounds (VOCs) have the potential to attenuate. A discussion of potential mechanisms and byproducts of their attenuation should be included in this section. Please revise the FS to provide further discussion of the fate and transport characteristics of those chlorinated VOCs detected in site media.

Response 2: A discussion on the fate and transport of VOCs detected at the site and their potential for impacting indoor air has been added to **Section 1.4** as **subsection 1.4.1**.

Comment 3: Section 2.5.1.1: Soil, Page 2-5. This section discusses exceedances of the soil cleanup objectives for unrestricted future use at Disposal Pit A/B and Disposal Pit C, but it does not address exceedances of the soil cleanup objectives at the Building 813/814 area. This section also indicates that "average concentrations for all analytes are below the cleanup objectives for restricted industrial or commercial use scenarios." However, none of the tables provided in this FS compare the results to the soil cleanup objectives for restricted industrial or commercial use. Please revise the FS to include the results of sampling at the Building 813/814 area in this comparison of detected concentrations to soil cleanup objectives. Additionally, please include the soil cleanup objectives for restricted industrial or commercial use on an appropriate table.

Response 3: Table 2-1 has been revised and separated into two tables; **Table 2-1A** for Unrestricted Use Soil Cleanup Objective exceedances and **Table 2-1B** for Restricted Commercial Use Soil Cleanup Objective exceedances. The tables were also revised to include results from Buildings 813/814.

Comment 4: Table 2-2: Disposal Pit A/B and C Arithmetic Average and Appropriate UCL Values for Constituents that Exceed NYSDEC Unrestricted Use Criteria. This table includes average values for surface and subsurface soil, but the source for this data has not been provided. Additionally, it is not clear why "Appropriate UCL Values" is included in the title as it does not appear that any UCLs have been provided in the table. Please revise the table to provide a source for the data from which arithmetic means were calculated. Also, remove reference to UCLs from the title unless UCL values are presented, and clearly labeled as such.

Response 4: Buildings 813/814 surface and subsurface exceedances have been added to **Table 2-2**. In additional, appropriate UCL values for Disposal Pit A/B, Disposal Pit C, and Buildings 813/814 have been included in the table. The title of **Table 2-2** has been revised to read "Disposal Pit A/B, Disposal Pit C, and Buildings 813/814 Summary Statistics and Comparison with NYSDEC Soil Cleanup Objectives". The source data for **Table 2-2** are presented in the RI report (Tables 4-E, 4-F, 4-G, and 4-H) and the SRI report (Appendix E). These data have been included in Appendix B of this report.

Comment 5: Section 1.2.2: Future Land Uses, Page 1-3. The last sentence of this section indicates that "a remedial alternative for an unrestricted use scenario is included in this FS." The remedial alternative to which this statement refers is unclear since, with the exception of the no action alternative, the other two potential alternatives (excavation and capping) require an easement for the Building 813/814 area. Please revise the FS to include a remedial alternative for unrestricted site use.

Response 5: Alternative 4 for unrestricted use has been added to the FS. This alternative includes excavation of the disposal pits, a vapor intrusion study at Buildings 813/814, demolition of Buildings 813/814, and disposal of the affected soils in this area. The vapor intrusion study would assess indoor and outdoor air quality and include sub-slab soil gas sampling. This study would determine the need for action associated with Buildings 813/814. A probable action that would eliminate the need for site restrictions (i.e., building demolition, soil excavation and disposal) has been included in the alternative.

Comment 6: Section 2.7: Remediation Volume Estimates, Page 2-12. It is noted that the southernmost portion of Disposal Pit A/B does not require remediation since contaminants and debris were absent from this area, and no EM anomalies were detected. While it is agreed that anomalies were not detected in this area, it does not appear that test pits were conducted or environmental samples were collected in this area (according to the sampling locations shown on Figures 1-5 and 2-2). Additionally, it is noted that this portion of Disposal Pit A/B is supposed to be shaded in gray on Figure 2-2. This does not appear to be the case. Please revise the FS to remove reference to the absence of debris and contaminants from the southern portion of Disposal Pit A/B if investigations were not conducted in this area. Additionally, please revise Figure 2-2 to show the southern portion of the Disposal Pit A/B in gray shading.

Response 6: As noted by EPA, the text referenced requires clarification. The sentence referenced on page 2-12 has been revised as follows: "The southern most portion of the original Disposal Pit A/B potential release area boundary (which is outside the area to be excavated as shown in Figure 2-2) does not require remediation. This is based on the results of the EM survey which indicated this area was undisturbed and that Disposal Pits A/B did not extend this far to the south". The RI investigation samples were located based on EM results. Since no EM anomalies were found in this area, no RI samples were collected in this area.

Comment 7: Section 2.3: General Remedial Action Objectives, Page 2-2. A general remedial action objective (RAO) for SEAD-12 is to prevent public or other persons from direct contact with military debris or exposure to indoor air that may present a health risk. Although the risk assessment did not identify a significant level of risk attributable to soil contamination, the FS does note that debris *and* soil will be screened for radiological contamination due to the nature of work conducted at SEAD-12. It is suggested that the general RAO be expanded to include the prevention of direct contact with soil that may present a health risk due to radiological contamination.

Response 7: Agreed. The comment has been addressed as suggested on page 2-2.

Comment 8: Section 2.7: Remediation Volume Estimates, Page 2-12. The estimated volume of affected soil and debris is 4,677 cubic yards for Disposal Pit A/B, and the volume of debris itself is estimated at 1,216 yards. The FS does not clearly indicate how the estimate of the debris was calculated. If assumptions based on the materials found in test pits were used, please clearly state those assumptions. This comment also applies to the estimates associated with Disposal Pit C.

Response 8: A thorough review of the test pit logs found in **Appendix B** of the RI (August 2002) was completed in estimating the volume of affected soil and debris within the disposal pits. For each test pit, a table was made noting the dimensions of the test pit and the approximate dimensions of the debris found in that test pit. To calculate the volume of debris for an area (e.g. Disposal Pits A/B), the volume of debris found in all the test pits for this area was summed and the total volume (soil and debris) of all the test pits for this area was summed. Based on this information, the percentage of debris was calculated (% debris = debris volume / total test pit volume). This percentage was then multiplied by the total volume of the area.

The spreadsheets summarizing the dimensions of the test pits and debris and the percent debris calculations have been added to the cost backup information in **Appendix A**. A reference to this backup has been included in **Section 2.7** and in **Table 2-4**.

It should be noted that the estimated volume of affected soil and debris has been revised in the Final FS.

Comment 9: Section 3.2: Assembly of Alternatives, Page 3-1. It is noted that Table 3-1 summarizes the technologies that were retained for further evaluation; however, it appears that Table 3-1 does not include environmental easements as a possible alternative. As this institutional control is proposed, it should be included in Table 3-1. Please revise Table 3-1 to include this information.

Response 9: Table 3-1 has been revised. An environmental easement has been added to the description of Alternative 2. As mentioned in Response 5, Alternative 4 has been added as an unrestricted use alternative, which includes the excavation of the disposal pits outlined in Alternative 2, a vapor intrusion study, demolition of Buildings 813/814, and soil excavation and disposal.

Comment 10: Section 3.5.1.1: Short-Term Human Health and Environmental Protectiveness, Page 3-4. In this evaluation, none of the alternatives appear to consider potential risk to indoor air exposure at Building 813/814 with respect to short-term human health and environmental protectiveness. Further review of the alternatives screening appears to show that the potential risk to indoor air was also not considered in the evaluations of the reduction of toxicity, reduction of mobility, reduction of volume, and permanence. Please revise the FS to address how the alternatives will address each of the screening criteria with respect to potential indoor air contamination. If additional evaluation determines a change in the numerical ranking of the alternatives, the alternatives retained for the detailed analysis may need to be reconsidered.

Response 10: Section 3 has been updated to include the consideration of the potential for indoor air contamination at Buildings 813/814.

Comment 11: Section 4.0: Detailed Analysis of Remedial Action Alternatives, Page 4-1. It does not appear that a summary table of the nine screening criteria with respect to each alternative has been provided. EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (RI/FS Guidance) dated October 1998, specifies that "the analysis of individual alternatives with respect to the specified criteria should be presented in the FS report as a narrative discussion accompanied by a summary table" (Page 6-13). Appendix F of the RI/FS Guidance provides an example of a summary table. Please revise the FS to include a table that summarizes the nine criteria with respect to each alternative.

Response 11: Table 4-2 (Individual Evaluation of Final Alternatives) has been added to the document for comparison of the remedy alternatives presented. The reference to **Table 4-2** has been included in **Section 4.5.**

Comment 12: Section 4.3.3: Reduction of Toxicity, Mobility, or Volume, Page 4-5. It is noted that Alternative 2 (excavation/disposal/easement) will reduce toxicity "to some degree." This appears to contradict the previous evaluation of this criterion presented in Section 3.5.1.3 (Reduction of Toxicity) in which it is stated that none of the alternatives would reduce the toxicity that may be associated with military debris. It does not appear that the excavated material will be treated prior to disposal in landfills. Revise the FS to address this discrepancy.

Response 12: Agreed. The referenced statement has been removed from the section.

Comment 13: Appendix A: Detailed Cost Estimate for Remedial Action Alternative 2. The cost estimates for Alternative 2 include information that has not been adequately addressed within the FS narrative. For example, Table A-1 includes an estimate to sample seven monitoring wells and a frac tank. Confirmatory soil sampling has been proposed (in addition to the soil pile sampling discussed in the text of the FS). Also included in the estimate is the cost of air stripping. If these activities are anticipated as part of Alternative 2, they should be discussed in the description of the alternative presented in the text of the FS. Please revise the FS to provide a thorough description of Alternative 2, including those activities (such as sampling and air stripping) which have been included in the cost estimate.

Response 13: The cost estimate, **Table A-1**, and the text have been updated and revised so they are consistent. Details have been added to the text of **Section 4.3** to clarify the components. Some components, such as air stripping of excavation water, have been deleted since they are no longer part of the remedy.

Army's Response to Comments from the United States Environmental Protection Agency

Subject: Draft FS Report for SEAD-12
Seneca Army Depot
Romulus, New York

Comments Dated: August 15, 2002

Date of Comment Response: May 21, 2003

GENERAL COMMENTS:

Comment 1: The Feasibility Study (FS) states that the high levels of Pb-210 at EM-5 are naturally occurring, and presents a different statistical test (i.e., ANOVA) to demonstrate this position. However, EM-5 failed the non-parametric statistical test performed (i.e., WRS), and according to MARSSIM additional site-specific information should be provided to fully evaluate all the possible reasons for failure, their causes, and their remedies. Another alternative recommended by MARSSIM is to increase the scanning area and provide the reasons for why the survey unit was mis-classified. The parametric ANOVA test does not provide enough justification to disqualify EM-5 as an Area of Concern (AOC).

Response 1: In responding to this comment, the Army would first like to clarify one thing in EPA's comment. The Analysis of Variance (ANOVA) test was used to demonstrate that potentially elevated levels of Radium-226, not Lead-210, in soils at EM-5 are within background levels and are not associated with military activities at the site. During the remedial investigation, comparison of Ra-226 data from EM-5 (as well as EM-6) and the worker DCGL using the Wilcoxon Rank Sum (WRS) test indicated that the site levels of Ra-226 were above the DCGL levels. Upon further investigation of the Ra-226 results at EM-5, an error was found in the WRS analyses for these two areas. The site data from EM-5 and EM-6 for Ra-226 are actually within background plus worker DCGL values and are not elevated according to this analysis. Therefore, the ANOVA analysis is no longer necessary and reference to this test will be removed from the text of the FS.

Although the ANOVA test results were used as justification for eliminating EM-5 as an area of concern (AOC) with respect to Ra-226, an additional rationale was provided in Section 1.3 of the FS with respect to elevated levels Pb-210 observed at EM-5. They are as follows:

- A source of naturally-occurring uranium (native shale) is present.
- The region has a history of elevated radon (and consequently elevated amounts of radon progeny, including Pb-210).
- It is reasonable to assume that radon gas emanations from the subsurface may become trapped in localized areas within the soil matrix. This trapped gas may then decay and result in localized elevated areas of radon progeny (including Pb-210, Pb-214, and Bi-214). With a half-life of 22.3 years, Pb-210 is more likely to accumulate within the soil matrix than the shorter-lived progeny.

- There is no known source of military items containing radioactive materials in EM-5.

In addition, the likelihood of uranium progeny such as Ra-226 and Pb-210 being present in significant amounts as a result of military items (if they were present) is quite small. Both enriched and depleted uranium initially are stripped of impurities (i.e., progeny) as a result of the enrichment/depletion process. Although in-growth does start immediately after enrichment/depletion, the long half-lives of U-238 and U-235 would limit the buildup of significant amounts of progeny in the last 50 years. The same is true for processed radium used in military items.

It is not believed that EM-5 was misclassified and additional scanning is not necessary. Rather than reclassifying this area, the Army will re-sample the surface soil samples originally collected from this area and analyze them for Pb-210 using longer count times to reduce the detection limit. In responding to NYSDEC comments regarding the same issue, the State was concerned that perhaps analytical error may be the cause of some of the elevated readings found at EM-5. This is outlined in the Supplemental Remedial Investigation (RI) Workplan.

Comment 2: The FS provides remediation alternatives and supporting information for elevated levels of trichloroethene (TCE) in groundwater near Building 813. The horizontal and vertical extent of this plume, however, has not been adequately determined. One well is located within the plume and one well is presumably located downgradient. While the source area is presumed to be in the vicinity of Building 813, the exact location (e.g., a leach field or septic tank) is not known. Therefore, it is premature to propose remediation technologies until the plume has been completely characterized and the source area has been better defined. This supplemental investigation is proposed in the FS to be done under Section 4.0 Treatability Study. However, EPA found no information in this Section regarding such investigation. EPA is performing further evaluation on the proposed Treatability Study, and a comment letter will be forwarded to you under a separate cover.

Response 2: There will be a supplemental remedial investigation (RI) performed to acquire information to further characterize specific areas within SEAD-12. Please refer to the Supplemental RI Workplan submitted simultaneously with these comments for complete details on the information to be collected in the vicinity of Building 813 and 814 that will assist in the determination of the horizontal and vertical extent of the TCE groundwater plume. Additional activities proposed and detailed in the workplan pertaining to defining the TCE plume near Buildings 813 and 814 include:

- Installation and groundwater sampling of 15 temporary monitoring wells;
- Installation of 7 permanent overburden monitoring wells;
- Groundwater sampling of the 7 new permanent wells and the 4 existing wells;
- Land surveying of new temporary and permanent monitoring wells, and
- Surface water sampling.

Comment 3: The summary of the human health risk assessment provided in section 2.5.1 indicates that cancer risks are above the EPA target range of 10^{-4} to 10^{-6} for Disposal Pit A/B, Disposal Pit C, and the former dry waste disposal pit for the future resident. The excess cancer risk was due to dermal contact with surface water and groundwater. Several concerns should be addressed:

- The clean-up goals provided in Table 2-5 indicate that the source removal is driven by the need to remove military debris, and not to reduce risk. The discussion of these alternatives should be based on reducing the cancer risk via contact with groundwater and surface water to acceptable levels. In addition, text on page 2-8 indicates that metals in subsurbace soil are two to five times above the TAGM values. Remedial alternatives should be adequate to reduce the concentrations of metals in subsurface soil to meet TAGMs and remove soils that may be impacting groundwater. The clean-up goals should be revised.

- The alternatives for Disposal Pit A/B and C include no action, excavation, and capping. It is not clear how the selected alternative(s) will reduce risks associated with surface water and groundwater. A discussion should be added to the text.

In addition, it is not clear why the Former Dry Waste Disposal Pit was not part of this FS. The human health risk assessment indicates an unacceptable risk to the future resident. Justification for not including this area in the FS should be provided.

Response 3: Although cancer risks calculated for a future resident were above the EPA target range of 1 x 10^{-4} and 1 x 10^{-6} for Disposal Pit A/B, Disposal Pit C, and the former dry waste disposal pit, alternatives considered in the FS did not address reduction of this risk for the following reason. The excess cancer risk for the future resident was due to dermal contact with surface water and groundwater, which are believed to be grossly overestimated. Surface water and groundwater were evaluated on a site wide basis and any risk from these media were added to site specific risks for each area of concern (i.e. risk generated from soil at Disposal Pit A/B, Disposal Pit C, and the former dry waste disposal pit). The cancer risk for dermal contact to groundwater is 4 x 10^{-4} and the cancer risk for dermal contact to surface water is 2 x 10^{-4}. Specifically, the contaminant that drives this risk level is benzo(a)pyrene. Below is an excerpt from Section 6.5.2.1 of the Revised Final Remedial Investigation Report (August 2002) that explains why the calculated risk from exposure to benzo(a)pyrene was considered highly uncertain and overestimated.

"The reader is cautioned that the cancer risk values attributed to benzo(a)pyrene due to dermal contact with water are highly uncertain and may grossly overestimate actual risks. In groundwater this compound was detected in two wells during the same sampling event and was not confirmed during the second round of groundwater sampling (i.e. results were non detect for this compound). In both cases, the reported concentration was a very low estimated value, lower than the quantitation limit for the samples. In surface water this compound was detected in one sample during the ESI study phase; the compound was not detected during the RI study phase. Therefore, it is highly unlikely that the compound is pervasive in either groundwater or surface water across SEAD-12, and it is possible that the detections were analytical artifacts associated with the laboratory's effort to identify and semi-quantify compounds at very low concentrations. Also, in "Dermal Exposure Assessment: Principals and Applications", EPA warns that its exposure assessment method for dermal contact with water during showering may yield seemingly unreasonable (i.e., counterintuitive) results. For instance, the absorbed dose due to dermal contact may exceed the dose received by direct ingestion of the same water. This was the case for benzo(a)pyrene in groundwater at SEAD-12. It should also be noted that the single detected benzo(a)pyrene concentrations were below the applicable New York drinking water standard."

Based on the reasons provided above, reduction of the excess cancer risk due to exposure to benzo(a)pyrene in the groundwater and surface water was not considered in developing remedial alternatives at SEAD-12. In eliminating the risk from benzo(a)pyrene, risk levels for a future resident are within acceptable ranges. Additional text will be added to Section 2.5.1 of the FS to explain why this risk is believed to be overestimated and reduction of the excess cancer risk was not considered in development of alternatives.

With respect to establishing cleanup goals for metals at the site, although there are some exceedances of metals above the TAGM, human health risk is not exhibited, and, therefore, cleanup goals for these metals will not be established. However, please note that the remedial actions proposed would address the majority of areas where these exceedances occur by removing military debris.

Comment 4: Potential adverse short-term effects on the environment that may be caused by the remediation effort (e.g., interceptor trench increasing the vertical extent of contamination) were not adequately discussed. In addition, any uncertainties concerning the alternatives were not discussed. Following EPA 1988 Guidance for Conducting RI and FS, the uncertainties of alternatives as well as and their effects on remedy performance should be discussed in the text.

Response 4: Short-term effects on the environment that may be caused by the remediation effort, as well as uncertainties concerning the alternatives, will be added to the text once additional data are gathered in the Building 813/814 area and the alternatives may be more fully developed.

Comment 5: Recent EPA guidance, EPA 2000, recommends using a discount rate of 7% rather than the 5% used in the document. Additional analysis at the higher discount rate is needed to evaluate uncertainty in future economic conditions.

Response 5: According to EPA Guidance *A Guide to Developing and Documenting cost Estimates During the Feasibility* Study (EPA 2000), "the 7% discount rate should generally be used in calculating net present value costs for all non-federal facility sites." The guidance recommends that for federal facility sites "it is generally appropriate to apply the real discount rates found in Appendix C of OMB [Office of Management and Budget] Circular A-94", *Guidelines and Discount Rates for Benefit-Cost Analyses of Federal Programs*. The current real interest rate for a 30-year period is 3.2% (OMB 2003). The Army has complied with EPA's request and recalculated the present worth costs based on the 2000 EPA guidance using the 3.2% discount rate. Table 5-2 and related text have been revised accordingly. Please note that use of a different rate has no effect on the cost ranking of the analyses.

Comment 6: The FS does not include a general schedule for the remediation activities. The schedule should include estimated start and completion times.

Response 6: Section 5.6 has been added to the FS, which includes a general schedule for the remediation activities, including an estimated start date and an estimated date of completion.

Comment 7: It is unclear why Building 804 was singled out on the submittal letter. Different titles are found on the outside cover, cover sheet and submittal letter.

Response 7: In future correspondence, the title "Radioactive Waste Burial Sites – SEAD-12" will be used.

Specific Comments:

Comment 1: Section 1.3, page 1-7. This section provides a discussion of radiation present at EM-5. No further action is proposed for this area. This determination was based on an extra statistical evaluation of radiation in samples compared to background radiation levels. This procedure is not supported by MARSSIM (Section 8.5.3). SEDA must show that the samples with elevated levels of Pb-210 also have elevated levels of stable lead.

Response 1: Please refer to the response to General Comment #1 for a discussion of the statistics involved in the evaluation of EM-5 and for a justification of the use of the ANOVA test for statistical analysis following the guidance of MARSSIM.

It may not be appropriate to make a comparison between stable lead concentrations and radioactive lead concentrations because of the small contribution of radioactive lead to the overall lead profile. Based on a specific activity for Pb-210 of 7.65E13 pCi/g (per *The Health Physics and Radiological Health Handbook, 3rd Edition*), the highest Pb-210 concentration at EM-5 (76.9 pCi/g from sample TP12-15C) would be equivalent to about 1E-6 mg/kg of Pb-210, which is a negligible fraction of the 63.9 mg/kg lead concentration determined chemically at that location. Therefore, it is unlikely that a correlation between chemical lead concentrations and radioactive lead concentrations could be established.

Comment 2: Section 1.5.2, page 1-12. This section provides soil sample designations for areas with elevated zinc content in Disposal Area C and indicates that a limited removal action may be warranted. The areas of elevated zinc should be depicted on a figure to determine whether the excavation alternative for this area will remove this soil.

Response 2: Such a figure already exists in Section 2.8, "Remediation Volume Estimates", that depicts the zinc concentrations at Disposal Pit C. Figure 2-4 posts the sampling locations, the concentrations that exceeded criteria levels, and an outline of the proposed area of excavation at Disposal Pit C.

Comment 3: Section 2.7.3, page 2-13. This section states that excavated soil and debris will be "scanned" for radiological contamination, with the goal of ensuring that the DCGLs remain below the level presented in Table 2-5. Table 2-5 presents specific radionuclides, implying that the debris/soil will be sampled. According to Table 2-6, some of the debris removed from the test pits in Disposal Pit C had gamma radiation levels of eight times above background. Soil/debris should be screened using an appropriate real-time radiation detecting device that identifies individual nuclides. The text should be revised.

Response 3: Radiological screening activities will consist of scanning and segregating potentially elevated materials. Preliminary screening flag values will be based on background measurements and a gross activity DCGL (calculated per Section 4.3.4 of MARSSIM using the isotopic DCGLs listed in Table 2-5). Using a conservative flag value as the basis for separating unaffected soil from potentially contaminated soil or debris ensures on a real-time basis that elevated material is being segregated. If necessary, materials having potentially elevated levels of radiation will be further characterized on-site using gamma spectroscopy or at an off-site analytical laboratory.

The text in Section 2.7.3 will be clarified, and will read:

"…Throughout the remedial process, excavated soil and debris will be scanned for radiological contamination, with the goal of ensuring that residual radioactivity levels are below the DCGLs (plus background) presented in Table 2.5. Radiological screening activities will consist of scanning and segregating potentially elevated materials; the screening will be done in situ in layers that are no deeper then the screening instrument can efficiently detect. Preliminary screening flag values will be based on background measurements and a gross activity DCGL. If necessary, materials having potentially elevated levels of radiation will be further screened on-site using gamma spectroscopy or at an off-site analytical laboratory. Pursuant to the preceding ARARs analysis, further consideration of any additional chemical-specific, location-specific, or action-specific radiological ARARs does not appear to be warranted."

It is indicated in Table 2-6 that there were "cone-shaped objects" found in test pit TP12-3 (North) that had gamma radiation screening measurements at eight times background levels. The table also indicates in the column titled "Removal Action?" that these objects were removed. Section 4.3.4.2 from the SEAD-12 Remedial Investigation Report (Parsons, August 2002) provides a more detailed explanation of the objects found in the test pits at Disposal Pit C. With these objects removed from Disposal Pit C, there are no known remaining locations within the excavation area that are expected to exceed screening levels.

Comment 4: Section 2.8.2, page 2-13. This section states that the southernmost portion of Disposal Pit A/B does not require remediation because contaminants and debris were absent from the area, and no electromagnetic (EM) anomalies were detected. The area to which this statement refers is not clear. The area should be further clarified by providing additional text or locating it on a figure.

Response 4: The text has been modified to clarify that the southern most portion of Disposal Pit A/B refers to the "potential release area" that is shaded in gray in Figure 2-2 to indicate the boundary of the area, but is not within the boxed area that indicates the "area to be excavated" for Disposal Pit A/B.

Comment 5: Table 2-9. This table provides the technology screening for groundwater remediation. The table indicates that air stripping would be retained for further study. While air sparging is a form of in-situ air stripping, ex-situ air stripping was not discussed in the FS. Justification should be provided in the text.

In addition, soil vapor extraction (SV) was not evaluated in the table. SVE is a proven technology that has demonstrated effectiveness at removing TCE from the vadose zone. Justification for not evaluating SVE should be provided in the text.

Response 5: Ex-situ air stripping will be added as a final treatment option in place under groundwater alternative GW-4. This alternative will now include the option to either use liquid-phase activated carbon or ex-situ air stripping to treat groundwater once it is collected.

Soil Vapor Extraction (SVE) is not evaluated in Table 2-9 because the table relates to technology screening for groundwater remediation. However, SVE is discussed as an alternative in Table 2-8 that relates to technology screening for soil/debris remediation. This technology was eliminated from further consideration since no TCE has been detected at this point within the vadose zone. In addition, both NYSDEC and EPA challenged the implementation of bioventing at SEAD-25 and 26 at SEDA due to the tight formation. The Army would anticipate similar resistance to implementation of soil vapor extraction at SEAD-12 due similar geological nature. SVE will not be considered in the assembly of alternatives.

Comment 6: Section 3.5 and Tables 3-2 and 3-3. This portion of the text describes the screening criteria for the remedial alternatives while the tables provide the actual screening. There are several discrepancies between the tables and the text. A discussion of the columns entitled permanence and availability were not included in the text. These discrepancies should be addressed.

Response 6: Both the tables (Tables 3-2 and 3-3) along with the corresponding text in Section 3.5 have been revised. The column in Tables 3-2 and 3-3 entitled “availability” has been changed to “availability of services and materials”. An explanation of what is considered under this factor has been added to the text in Section 3.5.3. Text in Section 3.5.2 has been added, clarifying the factors considered in the category of permanence.

Comment 7: Section 3.6.2.6, page 3-10. This section states that air sparging and interceptor trenches were ranked highest for permanence. Table 3-3, however, indicates that excavation provided the highest level of permanence. This discrepancy should be addressed.

Response 7: Table 3-3 had been revised to indicate that air sparging (GW-3) and interceptor trenches (GW-4) were both ranked the highest for permanence.

Comment 8: Section 4.3.1, page 4-4. This section outlines the data requirements to define the extent of the TCE plume near Building 813. At present, one well is within the plume and one well presumably downgradient. Six new wells of unspecified depth are proposed to define the plume. Several issues should be addressed:

- The source of the contamination has not been located. The EM survey that appears to cover this area (Figure 2-1) should be evaluated to determine whether a possible source structure is present (e.g., a leach field or septic tank) is present. The anomaly EM-19 appears to be near the expected source area. Text should be revised to address this anomaly.
- Horizontal and vertical extent of contamination is required. Efforts should be made to determine whether the bedrock (shale) aquifer has been impacted. Information provided in this report indicates that the shale is fractured. The depth of the six wells to be installed was not provided. The text should be revised to include a detailed evaluation of the structural characteristics of the bedrock in this area. In addition, the text should indicate that the vertical extent of contamination will be defined. If contamination is present in the bedrock aquifer, several of the remedial alternatives proposed would not be applicable.
- If only six wells are to be used to delineate the plume horizontally and vertically, it is suggested that a soil gas or direct-push membrane interface probe (MIP) investigation be undertaken to properly locate the wells at the fringes of the plume. MIP can provide information on lithology as well as vertical segregation of TCE within the till aquifer. Consideration should be provided to conducting one of these investigations.

Figure 2-6 provides an extrapolation of the TCE plume. The drainage ditch and surface water sample 12-31 are mentioned in the text. These features are not provided on the figure. These features, including the flow direction of water in the drainage ditch, should be provided on the figure.

Response 8: Information pertaining to the extent and characterization of the TCE plume by Building 813 will be addressed when the additional information collected during the supplemental remedial investigation is analyzed. This will include correlation of the source areas and the EM anomalies and details of the horizontal and vertical extents of the contamination. Please refer to the supplemental workplan for details of the additional activities to be performed.

In response to concerns noted above, the source of the TCE contamination will be investigated as part of the supplemental RI investigation. According to Table 4-2 in the RI, the EM-19 anomaly is due to a backhoe. This anomaly will not be investigated further. However, potential outlets from Buildings 813/814 will be investigated further in order to locate a source. In order to determine the horizontal and vertical extent of contamination, 15 temporary wells will be used in conjunction with previously collected soil gas survey data to locate the extent of the contamination. No bedrock wells are proposed. Although a weathered shale layer is present, a competent shale layer exists below this. Extensive studies at the Ash Landfill have shown no communication between the upper and lower aquifers and therefore, no bedrock investigation will be conducted.

Figure 2-6 has been updated to include the drainage ditch sample, surface water sample SW12-31, and the direction of groundwater flow in the drainage ditch.

Comment 9: <u>Section 4.3.2, page 4-4</u>. This section provides data requirements for natural attenuation. According to EPA (1998) additional parameters are required:

1. Temperature;
2. Optional confirmation of biological activity;
3. Hydraulic gradient;
4. An estimate of hydraulic conductivity; and
5. An estimate of the heterogeneity of aquifer material.

These parameters should be added to the text.

Response 9: Agreed. Based on guidance set forth in the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (EPA, September 1998), text describing the evaluation of temperature, hydraulic gradient, hydraulic conductivity, and aquifer heterogeneity has been added to Section 4.3.2. In terms of biological activity, the Army believes that the updated list of parameters listed in Section 4.3.2 will provide adequate information to evaluate the presence or absence of biological activity and chlorinated compound degradation. To compliment the additional parameters recommended by EPA listed above, text has been added to clarify that the fraction of organic carbon in soils will also be measured as part of the monitored natural attenuation (MNA) evaluation. Fraction organic carbon, when used in combination with estimates for porosity and bulk mass density, can be used to evaluate the effects of sorption on chlorinated ethane fate and transport. Appropriate text has also been added to the Supplementary RI Workplan for SEAD-12 to indicate that sample collection and analysis for the aforementioned parameters will be performed as part of supplemental RI field activities.

Comment 10: Section 4.4.1, page 4-5. This section discussed the treatability study and data needs for air sparging. Additional data needs include:

1. Vadose zone gas permeability;
2. Aquifer permeability and heterogeneities; and
3. Evaluate the presence of low-permeability layers.

In addition, it is also useful to collect air saturation data in the saturated zone using a neutron probe. This information should be added to the study.

Response 10: Text has been modified in Section 4.4.1 to include the above listed parameters to the potential list of data needs. A detailed description of the additional data to be collected can be found in the Supplemental RI Workplan.

Comment 11: Section 4.4.4, page 4-8. This section describes the in-situ permeable reactive wall remedial alternative, including the bench-scale test. Additional data needs include buffering capacity and permeability of the aquifer material. Investigation of these parameters should be added to the text.

Response 11: Text has been added to Section 4.4.4 to indicate that the local groundwater velocity and buffering capacity will be estimated as part of the treatability study evaluation for in-situ chemical reaction with zero-valance iron. The Army has included a further recommendation that major cation species (potassium, manganese, magnesium, calcium, sodium) be added to the analyte list for the purpose of evaluating potential long-term effects of chemical precipitation on barrier performance. Appropriate text has also been added to the Supplementary RI Workplan for SEAD-12 to indicate that sample collection and analysis for the aforementioned parameters will be performed as part of supplemental RI field activities.

Comment 12: Section 5.2.2, page 5-3. This section discusses the excavation alternative for Disposal Pits A/B and C. The text does not take into account the potential for the presence of unexploded ordnance (UXO) or ordnance and explosives (OE) in the pits. Test pit information indicates that inert (fired) munitions were uncovered in the disposal pits. The likelihood of UXO or OE presence in the pits should be evaluated and discussed in the text.

Response 12: Nothing found in the test pits constitutes UXO or OE, and according to the Army, it is not believed that UXO or OE was ever used, buried, destroyed, or found at SEAD-12. Consequently, the work planned at SEAD-12 does not take into account UXO or OE because it is not believed to be a hazard.

Comment 13: Section 5.2.2.1, page 5-4. This section states that material excavated from the disposal pits will be segregated into two piles, one with radiation levels lower than background and one with radiation levels above background. The above background pile would be further separated into materials below action levels and those above action levels at a later time. This discussion appears to pertain to waste materials and not soil. It may be difficult to separate soil above action levels from that below action levels once the soil has been placed in one pile. The text should provide provisions for separating soil above action levels from that below action levels.

Response 13: The discussion in Section 5.2.2.1 applies to all materials removed during the excavation, including debris and soil. Initially, soil will be screened in situ and separated as discussed in the response to Specific Comment #3 above. Two piles of soil and debris will result from the screening: soil equal or below background and soil above background.

It is acknowledged that soil may be difficult to segregate if residual contamination is present in a distributed form. With the excavated soils, localized hotspots or “chunks” of elevated material (and adjacent soils) will be removed when possible. If hotspots are not present or if their locations cannot be determined within the above-background soils, confirmation sampling will be performed at the location of the highest scanning measurement, and the whole soil pile may be classified based on the concentrations present in that sample.

Excavated materials (soil and debris) will be considered solid waste subject to RCRA Subtitle D and New York State solid waste regulations. In New York, all sanitary landfills are authorized to accept industrial wastes, and, therefore, would be able to accept the materials excavated from SEAD-12. These landfills cannot accept hazardous waste or radiological waste, and therefore require extensive testing to assure that the waste is not a hazardous waste. The actual testing requirements vary for each landfill. Once the landfill is selected, these requirements will be specified.

Comment 14: Section 5.3.1.7, page 5-9. This section states that one 5-year review will be conducted for the natural attenuation alternative. This remedy is expected to require 30 to 40 years to complete. Therefore, at least six 5-year reviews should be budgeted; one for each 5 years of remediation. These costs should be added to the text and associated tables.

Response 14: The text in Section 5.3.1.7 discussing the O&M cost associated with the GW-2 natural attenuation alternative has been modified to clearly indicate that six 5-year reviews at $9,000 apiece and a discount rate of 3.2%, for a present worth value of $32,300, are included in the cost. The present value for six 5-year reviews were estimated by using a compounded interest rate of 0.171 (1.032^5-1) for 5, 10, 15, 20, 25, and 30 years. The modification has also been made in Table 5-2.

Comment 15: Section 5.3.3.1, page 5-13. This section provides an analysis of the interceptor trench/liquid-phase carbon alternative. The estimated time for remediation completion was not provided. This information should be provided in the text.

Response 15: As indicated in Section 5.3.3.7, the there is an estimated 5-year treatment time. Once the groundwater at the site meets the treatment criteria, the remedial action would be considered permanent. The estimated length of treatment time will be added to Section 5.3.3.1, Definition of Alternative GW-4, for clarification.

Comment 16: Section 5.5, page 5-23. This section states that natural attenuation is the recommended groundwater remedial alternative. The time-frame for remediation by natural attenuation is expected to be 30 to 40 years. The text indicates that the other technologies screened would take from 4 to 10 years for remediation of the groundwater plume. EPA (1997) states that "Monitored natural attenuation is appropriate as a remedial approach only when it can be demonstrated capable of achieving a site's remedial objectives within a time-frame that is reasonable compared to that offered by other methods…". Justification should be provided that the time-frame for remediation by natural attenuation is comparable to remediation times for other alternatives.

Because the time-frame is generally not comparable, natural attenuation is typically used in conjunction with other technologies, such as source removal or air sparging. Consideration should be given to combining natural attenuation with other alternatives.

Response 16: It is acknowledged that the estimated time frame monitored natural attenuation should be comparable to that of alternate methods. As indicated in Section 5.3.1.1, additional information will be collected during the supplemental investigation to further define the area of VOC impacts for improved characterization of the area. The primary objective of this site modeling would be to demonstrate whether natural degradation processes would reduce contaminants concentrations below the Class GA groundwater standards for TCE, and associated degradation products. The natural biodegradation process would also be evaluated during the pilot study phase; the effects of addition of nutrients and reducing agents on degradation rates and the capacity of the aquifer to degrade the VOCs will be assessed. The ability to more precisely define the time frame for the alternative will be improved upon the collection of the additional information because natural attenuation is extremely dependent on site conditions.

Table C-1
Summary Statistics of Comparison Between EM-5 and
Background and Resident/Worker Criteria for Radionuclides in Soil
SEAD-12 Feasibility Study
Seneca Army Depot Activity

	Valid N EM-5	Valid N Background	Rank Sum EM-5	Rank Sum Background	U	Z	Pass/Fail	Greater if Fail
Bi-214	30	37	1301.5	976.5	273.5	3.6	Fail	Site
Bi-214 Res	30	37	1268	1010	307	3.1	Fail	Site
Bi-214 Worker	30	37	1067	1211	508	0.6		
Cs-137	30	37	1222	1056	353	2.6	Fail	Site
Cs-137 Res	30	37	465	1813	0	-7.0	Fail	Background
Co-57	30	37	1019	1259	554	0.0		
Co-57 Res	30	37	465	1813	0	-7.4	Fail	Background
Co-60	30	37	974	1304	509	-0.6		
Co-60 Res	30	37	590	1688	125	-5.5	Fail	Background
Pb-210	30	37	1326	952	249	3.9	Fail	Site
Pb-210 Res	30	37	1313	965	262	3.7	Fail	Site
Pb-210 Worker	30	37	1167	1111	408	1.9	Fail	Site
Pb-211	30	37	1039	1239	536	0.2		
Pb-211 Res	30	37	998	1280	533	-0.3		
Pb-211 Worker	30	37	954	1324	489	-0.8		
Pb-214	30	37	1170	1108	405	1.9	Fail	Site
Pb-214 Res	30	37	1132	1146	443	1.4		
Pb-214 Worker	30	37	863	1415	398	-2.0	Fail	Background
Pu-239	30	37	707.5	1570.5	242.5	-4.2	Fail	Background
Pu-239 Res	30	37	465	1813	0	-7.1	Fail	Background
Ra-223	30	37	1274	1004	301	3.4	Fail	Site
Ra-223 Res	30	37	629	1649	164	-5.0	Fail	Background
Ra-226	30	37	1301.5	976.5	273.5	3.6	Fail	Site
Ra-226 Res	30	37	1268	1010	307	3.1	Fail	Site
Ra-226 Worker	30	37	1067	1211	508	0.6		
Ra-228	30	37	1196.5	1081.5	378.5	2.2	Fail	Site
Ra-228 Res	30	37	1056	1222	519	0.5		
Ra-228 Worker	30	37	921	1357	456	-1.2		
Th-230	30	37	933	1345	468	-1.1		
Th-230 Res	30	37	929	1349	464	-1.1		
Th-230 Worker	30	37	794	1484	329	-2.9	Fail	Background
Th-232	30	37	1106.5	1171.5	468.5	1.1		
Th-232 Res	30	37	949	1329	484	-0.9		
H-3	30	37	1386.5	891.5	188.5	5.0	Fail	Site
H-3 Res	30	37	644	1634	179	-5.0	Fail	Background
U-233/234	30	37	1300	978	275	3.6	Fail	Site
U-233 Res	30	37	465	1813	0	-7.0	Fail	Background
U-235	30	37	963.5	1314.5	498.5	-0.8		
U-235 Res	30	37	465	1813	0	-7.1	Fail	Background
U-238	30	37	1158.5	1119.5	416.5	1.8	Fail	Site
U-238 Res	30	37	465	1813	0	-7.0	Fail	Background

Table C-2
Summary Statistics of Comparison Between EM-6 and
Background and Resident/Worker Criteria for Radionuclides in Soil
SEAD-12 Feasibility Study
Seneca Army Depot Activity

	Valid N EM-6	Valid N Background	Rank Sum EM-6	Rank Sum Background	U	Z	Pass/Fail	Greater if Fail
Bi-214	27	37	1101.5	978.5	275.5	3.1	Fail	Site
Bi-214 Res	27	37	1073	1007	304	2.7	Fail	Site
Bi-214 Worker	27	37	857	1223	479	-0.3		
Cs-137	27	37	836.5	1243.5	458.5	-0.6		
Cs-137 Res	27	37	378	1702	0	-6.8	Fail	Background
Co-57	27	37	954.5	1125.5	422.5	1.3		
Co-57 Res	27	37	378	1702	0	-7.2	Fail	Background
Co-60	27	37	943	1137	434	0.9		
Co-60 Res	27	37	552	1528	174	-4.5	Fail	Background
Pb-210	27	37	889	1191	488	0.2		
Pb-210 Res	27	37	858	1222	480	-0.3		
Pb-210 Worker	27	37	618	1462	240	-3.5	Fail	Background
Pb-211	27	37	1036.5	1043.5	340.5	2.2	Fail	Site
Pb-211 Res	27	37	1006	1074	371	1.7	Fail	Site
Pb-211 Worker	27	37	981	1099	396	1.4		
Pb-214	27	37	999	1081	378	1.7	Fail	Site
Pb-214 Res	27	37	968	1112	409	1.2		
Pb-214 Worker	27	37	701	1379	323	-2.4	Fail	Background
Pu-239	27	37	496.5	1583.5	118.5	-5.4	Fail	Background
Pu-239 Res	27	37	378	1702	0	-7.0	Fail	Background
Pm-147	6	31	153	550	54	1.6		
PM147res	6	31	21	682	0	-3.9	Fail	Background
Ra-223	27	37	1109	971	268	3.3	Fail	Site
Ra-223 Res	27	37	484	1596	106	-5.4	Fail	Background
Ra-226	27	37	1101.5	978.5	275.5	3.1	Fail	Site
Ra-226 Res	27	37	1073	1007	304	2.7	Fail	Site
Ra-226 Worker	27	37	857	1223	479	-0.3		
Ra-228	27	37	1150.5	929.5	226.5	3.7	Fail	Site
Ra-228 Res	27	37	1035	1045	342	2.1	Fail	Site
Ra-228 Worker	27	37	917	1163	460	0.5		
Th-230	27	37	814	1266	436	-0.9		
Th-230 Res	27	37	811	1269	433	-0.9		
Th-230 Worker	27	37	610	1470	232	-3.6	Fail	Background
Th-232	27	37	1119	961	258	3.3	Fail	Site
Th-232 Res	27	37	986	1094	391	1.5		
H-3	27	37	938.5	1141.5	438.5	1.1		
H-3 Res	27	37	378	1702	0	-7.3	Fail	Background
U-233/234	27	37	1070.5	1009.5	306.5	2.7	Fail	Site
U-233 Res	27	37	378	1702	0	-6.8	Fail	Background
U-235	27	37	700.5	1379.5	322.5	-2.7	Fail	Background
U-235 Res	27	37	378	1702	0	-7.0	Fail	Background
U-238	27	37	953	1127	424	1.0		
U-238 Res	27	37	378	1702	0	-6.8	Fail	Background