UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

SEP 29 2004

James R. Davidson, Director
U.S. Army Installation Support Management Activity
National Capital Region Field Office
5001 Eisenhower Avenue
Alexandria, VA 22333-0001

Re: Record of Decision for the Fire Training Areas at the Seneca Army Depot Activity Superfund Site, Romulus, New York

Dear Mr. Davidson:

This is to inform you that after considering public comment on the Proposed Plan, Seneca Army Depot Activity's responsiveness summary to those comments, reviewing the draft Record of Decision and other supporting documents, the U.S. Environmental Protection Agency (EPA) concurs with the Record of Decision for the Fire Training Areas (SEAD-25 and 26) at the Seneca Army Depot Activity Superfund.Site, Romulus, New York. Enclosed are two copies of the Record of Decision, which I have co-signed on behalf of EPA.

This Record of Decision addresses only the Fire Training Sites SEADs-25 and 26. Other Areas of Concern (AOC) are being addressed under separate decision documents.

If you have any questions regarding the subject of this letter, please contact me at (212) 637-4390 or have your staff call Julio Vazquez at (212) 637-4323.

Sincerely,

William McCabe

for George Pavlou
Director
Emergency and Remedial Response Division

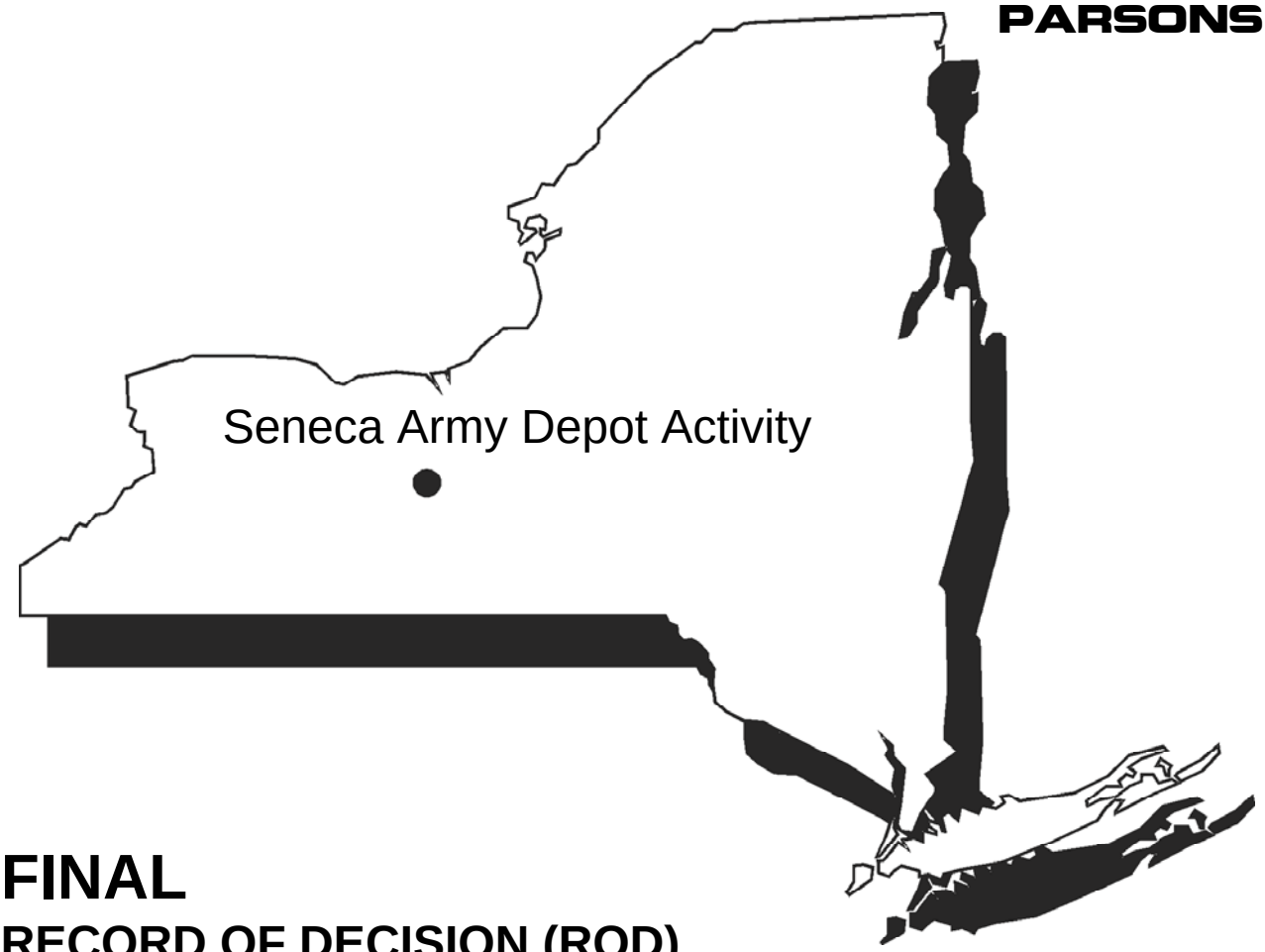
Enclosures

cc: Dale A. Desnoyers, Director
Division of Environmental Remediation
NYSDEC
A. Joseph White, NYSDEC

US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY

PARSONS



FINAL

RECORD OF DECISION (ROD)
THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD 25) AND THE FIRE TRAINING PIT AND AREA (SEAD 26)

SENECA ARMY DEPOT ACTIVITY

EPA Site ID# NY0213820830
NY Site ID# 8-50-006
CONTRACT NO. DACA87-95-D-0031
DELIVERY ORDER NO. 0029

September 2004

FINAL
RECORD OF DECISION
FOR

THE FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25) and the FIRE TRAINING PIT AND AREA (SEAD-26)

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared for:

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

and

UNITED STATES ARMY CORPS OF ENGINEERS
4820 UNIVERSITY SQUARE
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EPA Site ID# NY0213820830
NY Site ID# 8-50-006
Contract Number: DACA87-95-D-0031
Delivery Order 0029

September 2004

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
AWQS	Ambient Water Quality Criteria
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Responsibility, Compensation and Liability Act
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CY	Cubic yards
DoD	Department of Defense
DQO	Data Quality Objective
EPC	Exposure Point Concentration
EQ	Ecological quotient
ES	Engineering Science, Inc.
ESI	Expanded Site Investigation
FFA	Federal Facilities Agreement
FS	Feasibility Study
GA	NYSDEC ground water classification for a source that is suitable for drinking water
HEAST	USEPA Health Effects Summary Table
HI	Hazard Index
IAG	Interagency Agreement
IC	Institutional Controls
IRM	Interim Remedial Measure
LRA	Seneca Army Depot Local Redevelopment Authority
LUC	Land Use Controls
LUC/IC	Land Use Controls/Institutional Controls
LUCIP	Land Use Control Implementation Plan
LUCAP	Land Use Control Assurance Plan
MCL	Maximum Contaminant Level
mg	milligrams
mg/L	milligrams per liter
mg/Kg	milligrams per kilogram
mL	milliliters
NA	Not Available
NCP	National Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operations and Maintenance

ACRONYMS AND ABBREVIATIONS
(Continued)

PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PID	Planned Industrial Development
ppb	parts per billion
ppm	parts per million
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SEAD	Former acronym for the Seneca Army Depot used to designate SWMU numbers
SEDA	Seneca Army Depot Activity
SF	Slope Factor
SPDES	State Pollutant Discharge Elimination System
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TBC	To be Considered
TCLP	Toxicity Characteristic Leaching Procedure
UCL	Upper Confidence Limit
μg/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 DECLARATION OF THE RECORD OF DECISION

Site Name and Location

The Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26)
Seneca Army Depot Activity
CERCLIS ID# NY0213820830
Romulus, Seneca County, New York

Statement of Basis and Purpose

This decision document presents the U.S. Army's and EPA's selected remedy for soil and groundwater at SEAD-25 and SEAD-26, located at the Seneca Army Depot Activity (SEDA) near Romulus, New York. The decision was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, 42 U.S.C. §9601 et seq. and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. The Base Realignment and Closure (BRAC) Environmental Coordinator; the Director of the National Capital Region Field Office, and the U.S. Environmental Protection Agency (USEPA) Region II have been delegated the authority to approve this Record of Decision (ROD); New York State Department of Environmental Conservation (NYSDEC) has concurred with the selected remedial action.

This ROD is based on the Administrative Record that has been developed in accordance with Section 113(k) of CERCLA. The Administrative Record is available for public review at the Seneca Army Depot Activity, Building 123, Romulus, NY. The Administrative Record Index identifies each of the items considered during the selection of the remedial action. This index is included in **Appendix A**.

The State of New York, through the NYSDEC and the New York State Department of Health (NYSDOH), has concurred with the Selected Remedy. The NYSDEC Declaration of Concurrence is provided in **Appendix B** of this ROD.

Site Assessment

The response action selected in this ROD is necessary to protect the public welfare and the environment from actual or threatened releases of hazardous substances into the environment or from actual or threatened releases of pollutants or contaminants from this site that may present an imminent and substantial endangerment to public health or welfare.

Description of the Selected Remedy

SEAD-25

The Selected Remedy for SEAD-25 addresses soil, sediment, and groundwater. The Selected Remedy will result in the removal of soils and sediments impacted by volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Such compounds are believed to be present due to past fire training activities. The presence of VOCs in the soil is considered to be the source of groundwater impacts that will be mitigated through the removal of the soil. The Selected Remedy also includes groundwater monitoring for contaminants of concern (COCs) to demonstrate that additional impacts to groundwater are mitigated. The use of groundwater will be restricted until such time that the levels of groundwater contaminants are below groundwater cleanup standards. The cleanup goals for all media of concern are presented in **Table 1-1A**.

The remedial action will allow the site to be used for its future intended industrial use. Once groundwater cleanup standards are achieved, the site may eventually be released for unrestricted use. The elements that compose this remedy include:

- Excavate soil at the source in an area approximately 60 feet by 100 feet to a depth of 6 feet [approximately 1,350 cubic yards (CY)];
- Excavate a volume of sediment approximately 780 feet long, 3 feet wide and 2 feet deep (175 CY) from the northwest ditch;
- Dispose of excavated soils in an appropriate off-site facility;
- Dewater the soil excavation pit;
- Treat groundwater that is recovered during excavation and during dewatering of excavation pit with an on-site air stripper;
- Replace excavated soil with clean backfill, and establish a ground cover to avoid soil erosion;
- Conduct groundwater monitoring of the plume for COCs until NYSDEC Class GA standards are achieved (approximately 10 years);
- Establish and maintain land use controls to prevent access to or use of the groundwater until cleanup standards are met;
- Complete a review of the selected remedy every five-years (at minimum), in accordance with Section 121(c) of the CERCLA;
- Prepare a contingency plan that may include additional monitoring and air sparging of the plume, as necessary; and
- Once groundwater cleanup standards are achieved, the groundwater use restriction maybe eliminated.

A summary of the SEAD-25 and SEAD-26 Land Use Controls is provided below.

SEAD-26

The Army has modified the Selected Remedy for SEAD-26 since the Proposed Plan in order to eliminate the need for any permanent land use restrictions. The Selected Remedy for SEAD-26 addresses the groundwater and the soils at the site. Groundwater has been impacted by VOCs due to past fire training activities at the site. Groundwater use controls will be implemented to prevent access to and use of the groundwater. With the approval of USEPA, once legally applicable groundwater cleanup standards are achieved, the groundwater use restrictions may be eliminated and the site may be released for unrestricted use. Removal of soils that contain elevated levels of polycyclic aromatic hydrocarbons (PAHs) will restore the land for unrestricted use, thereby reducing the long-term costs associated with maintaining and enforcing land use controls. The cleanup goals for all media of concern are presented in **Table 1-1B**. The Selected Remedy consists of the following elements:

- Excavate surface soils with total carcinogenic PAH concentrations above 10 ppm, for an estimated total of 1050 CY;
- Dispose of excavated soils in an appropriate off-site facility;
- Conduct groundwater monitoring for COCs until the groundwater cleanup standards are met (approximately 20 years) in order to ensure that the VOCs present do not migrate off-site;
- Establish and maintain groundwater use controls to restrict groundwater access to and use of groundwater until cleanup standards are achieved;
- Complete a review of the selected remedy every five-years (at minimum), in accordance with Section 121(c) of the CERCLA;
- Prepare a contingency plan that may include additional monitoring and air sparging of the plume, as necessary, which would protect against VOC contamination migrating off-site; and
- Remove groundwater use restrictions once groundwater cleanup standards are achieved.

The cleanup goal for the PAHs is a value of 10 ppm for total carcinogenic PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene] at each sample location. According to available data, the total carcinogenic PAH levels in ditch soils and subsurface soils are below 10 ppm. It should be noted that a review of the available site data suggests that the highest concentrations of the greatest contributors to carcinogenic risk (benzo(a)pyrene and dibenz(a,h)anthracene) that would remain on-site following a removal action with 10 ppm as a cleanup goal would be 1.2 ppm and 0.41ppm, respectively.

A summary of the SEAD-25 and SEAD-26 Land Use Controls is provided below.

SEAD 25 AND 26 Land Use Control Performance Objectives

The LUC performance objectives for SEAD 25 and 26 are to:

- Prevent access or use of the groundwater until cleanup levels are met; and

- Maintain the integrity of any current or future remedial or monitoring system.

The land use controls would be implemented over the area bounded by the site boundary at SEAD-25 **(Figure 6-2)** and SEAD-26 (**Figure 11-1**). The LUCs will continue until the groundwater beneath has been reduced to levels that allow for unlimited exposure and unrestricted use. With the approval of USEPA, once groundwater cleanup standards are achieved, the groundwater use restrictions may be eliminated and the site may be released for unrestricted use.

LUC Remedial Design

In order to implement the Army's remedy, which includes the imposition of land use controls, a LUC Remedial Design for SEAD-25 and 26 will be prepared which satisfies the applicable requirements of Paragraphs (a) and (c), Environmental Conservation Law (ECL) Article 27, Section 1318: Institutional and Engineering Controls. In addition, the Army will prepare an environmental easement for SEADs 25 and 26, consistent with Section 27-1318(b) and Article 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at the time of the property's transfer from federal ownership. A schedule for completion of the draft SEAD 25 and 26 LUC Remedial Design Plan (LUC RD) will be completed within 21 days of the ROD signature, consistent with Section 14.4 of the Federal Facilities Agreement (FFA).

The Army shall implement, inspect, report, and enforce the LUCs described in this ROD in accordance with the approved LUC RD. Although the Army may later transfer these responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity.

Finally, it should be noted that a deed notice will be included to notify future users that site-related contaminants are present in the adjacent roadside ditch (along Administration Avenue) at SEAD-25. These site-related contaminants do not contribute to an unacceptable human health risk at the site. The Army will have no additional LUC implementation responsibilities with respect to the roadside ditch contaminants.

State Concurrence

NYSDOH forwarded a letter of concurrence regarding the selection of a remedial action to NYSDEC, and NYSDEC, in turn, forwarded to USEPA a letter of concurrence regarding the selection of a remedial action in the future. This letter of concurrence has been placed in **Appendix B**.

Declaration

CERCLA and the NCP require each Preferred Remedy to be protective of human health and the environment, cost effective, comply with other statutory laws; and use permanent solutions, alternative treatment technologies, and resource recovery options to the maximum extent possible.

CERCLA and the NCP also state a preference for treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The Selected Remedy is consistent with CERCLA and the NCP and is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative technologies to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment).

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure for an intermediate period, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the New York State Department of Environmental Conservation.

Concur and recommend for immediate implementation:

Stephen M Absolom 7/27/04

STEPHEN M. ABSOLOM Date
BRAC Environmental Coordinator

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The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the New York State Department of Environmental Conservation.

Concur and recommend for immediate implementation:

James R. Davidson
Director
National Capital Region Field Office
U.S. Army Installation Support Management Activity

19 Aug 2004
Date

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The foregoing represents the selection of a remedial action by the U.S. Department of the Army and the U.S. Environmental Protection Agency, with the concurrence of the New York State Department of Environmental Conservation.

Concur and recommend for immediate implementation:

William N. Cabe

Mr. George Pavlou
Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region II

9-29-04
Date

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2.0 SITE NAME, LOCATION AND DESCRIPTION

SEDA is a 10,587-acre former military facility located in Seneca County near Romulus, New York, which has been owned by the United States Government and operated by the Department of the Army since 1941. A location map for SEDA is provided as **Figure 2-1**. As shown in **Figure 2-1**, SEDA is located between Seneca Lake and Cayuga Lake. **Figure 2-1** also shows that SEDA is bordered by New York State Highway 96 on the east, New York State Highway 96A on the west, and sparsely populated farmland on the north and south.

The Fire Training and Demonstration Pad (SEAD-25) is located in the east-central portion of SEDA. The site is bounded to the east by Administration Avenue beyond which is undeveloped land covered by deciduous trees; to the south by Ordnance Drive beyond which is an open grassy field and a stand of coniferous trees; to the west by grassland, brush and conifers; and to the north by grassland and a baseball field. A site map of the area is included as **Figure 2-2.**

The Fire Training Pit and Area (SEAD-26) are located in the southeastern portion of SEDA. The site is bounded to the east and west by SEDA railroad tracks; on the south by grassland and low brush; and on the north by 7 th Street. Vehicular access is currently provided to the site via a locking gate on 7th Street.

3.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

3.1 LAND USE AND RESPONSE HISTORY

Prior to construction of SEDA in 1941, much of the land was used for farming. Since construction, SEDA has been owned by the United States Government and operated by the Department of the Army. SEDA's primary mission was the receipt, storage, maintenance, and supply of military items.

The Fire Training and Demonstration Pad (SEAD-25) was in use from the late 1960s to the late 1980s. The pad was used for fire control training. During the 1980s, the pad was used twice for fire fighting demonstrations, once in 1982 or 1983 and in 1987. The Fire Training Pit and Area (SEAD-26) was in use from 1977 to 1994. The pit is approximately 75 feet in diameter and approximately 3 feet deep. A bentonite liner was installed in the pit in 1982 or 1983. The pit was used one to four times a year for fire fighting training during which time various flammable materials were floated on water, ignited, and extinguished. Prior to 1977, the fire training area surrounding the pit may have also been used for fire demonstrations.

SEAD-25 and 26 are described in three reports previous to the Remedial Investigation (RI). The first report is the Work Plan for CERCLA Expanded Site Inspection (ESI) of Ten Solid Waste Management Units (SWMUs) written by Parsons Main, Inc. in January 1993. This report detailed the site work and sampling to be performed under the ESI. The second report is a SWMU Classification Report (Parsons ES, 1994), which was undertaken to describe and evaluate the Solid Waste Management Units at SEDA. The third is an Expanded Site Inspection Report (Parsons ES, 1995), which describes a more detailed investigation of SEAD-25 and SEAD-26. The fieldwork for the ESI was conducted according to the Work Plan for CERCLA ESI of Ten Solid Waste Management Units (Parsons ES, 1994). Based on the results of the ESI, a RI Workplan was prepared and the RI field program was conducted. An RI and FS were completed for SEAD-25/26 in May 1998 and October 1998, respectively.

In 1995, SEDA was designated for closure under the Department of Defense's (DoD's) Base Realignment and Closure (BRAC) process. To address employment and economic impacts associated with the SEDA's closure, the Seneca County Board of Supervisors established the Seneca Army Depot Local Redevelopment Authority (LRA) in October 1995. The primary responsibility assigned to the LRA was to prepare a plan for redevelopment of the SEDA property. Following a comprehensive planning process, a *Reuse Plan and Implementation Strategy for Seneca Army Depot* was completed and adopted by the LRA on October 8, 1996. The Seneca County Board of Supervisors subsequently approved this *Reuse Plan* on October 22, 1996. **Figure 3-1** depicts the intended future land uses for SEDA, as proposed by the LRA. As indicated on **Figure 3-1**, the proposed future land use for the SEAD-25/26 is for Planned Industrial Development (PID).

3.2 ENFORCEMENT HISTORY

SEDA was proposed for the National Priorities List (NPL) in July 1989. In August 1990, SEDA was finalized and listed in Group 14 on the Federal Section of the NPL. The USEPA, NYSDEC, and the Army entered into an agreement, called the Federal Facility Agreement (FFA), also known as the Interagency Agreement (IAG). This agreement determined that future investigations were to be based on CERCLA guidelines and RCRA was considered to be an Applicable or Relevant and Appropriate Requirement (ARAR) pursuant to Section 121 of CERCLA. In October 1995, SEDA was designated as a facility to be closed under the provisions of the BRAC process. As required for sites on the NPL, an RI/FS was completed for SEAD-25/26. The Final RI was completed and submitted in May 1998, and the FS was completed and submitted in October 1998.

4.0 COMMUNITY PARTICIPATION

The U.S. Army relies on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI/FS report, the Proposed Plan and supporting documentation had been made available to the public for a public comment period, which began on October 13, 2002 and concluded on November 12, 2002. Copies of the RI/FS report, the Proposed Plan, the Record of Decision, and supporting documentation are available at the following repository:

Seneca Army Depot Activity
Building 123, P.O. Box 9
Romulus, NY 14541
(607) 869-1309
Hours are Mon-Fri 8:30 am to 4:30 pm

A public meeting was held during the public comment period at the Seneca County Office Building on October 22, 2002 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial option, and to receive public comments. Comments received at the public meeting, as well as written comments, are documented in the Responsiveness Summary Section of the Record of Decision (ROD), **Appendix C**.

In addition, coordination with Native American stakeholders will be consistent with the programmatic agreements between the State Historic Preservation Office, recognized Native American Tribes, and the Advisory Council for Historic Preservation.

The primary responsibility assigned to the Local Redevelopment Authority (LRA) was the preparation of a plan for the redevelopment of the Depot. During the BRAC process, monthly presentations have been given to the LRA. In addition, the SEDA Restoration Advisory Board (RAB) was established to facilitate the exchange of information between SEDA and the community. RAB members include the representatives from the Army, USEPA, state regulatory agencies, and the community. After a comprehensive planning process, a Reuse Plan and Implementation Strategy for Seneca Army Depot was completed and adopted by the LRA on October 8, 1996. The Reuse Plan was subsequently approved by the Seneca County Board of Supervisors on October 22, 1996.

During the BRAC process there have been, and continue to be, presentations to the RAB (occurring at approximately a bi-monthly basis) regarding the progress of SEAD-25 and SEAD-26 and other investigations related to the closure of SEDA.

5.0 SCOPE AND ROLE

The preferred alternative for SEAD-25 was selected since it eliminates source soils from further impacting groundwater at the site, eliminates sediments that contribute to human health risk, and effectively treats the most highly impacted groundwater at the site. This alternative does not require any treatability or pilot studies as other alternatives do, and does not require any long-term operating system, while maintaining its effectiveness. In addition, the Army believes that in selecting this alternative, property transfer at this site may be expedited since the time to implement this remedy is relatively short. The removal of soils and sediments from the site so that the source of contamination no longer exists ranked as one of the highest remedies for effectiveness and implementability among the other alternatives considered in the FS. While it is not the most cost-effective solution, it will provide an effective and efficient solution requiring the least amount of operation and maintenance, and it restores the land for unrestricted use, thereby reducing the long-term costs associated with maintaining and enforcing land use controls.

The preferred alternative for SEAD-26 was selected because the groundwater is impacted by relatively low concentrations of VOCs in only one well on-site, and it would be suitable to monitor the groundwater and restrict its access until groundwater cleanup standards are achieved. Removal of soils that contain elevated levels of PAHs would restore the land for unrestricted use, which in the long-term will be more cost-effective than maintaining and enforcing land use controls. In comparison to other remedies considered in the FS, this alternative ranks high for protection of the environment, ARAR compliance, and short and long-term effectiveness. This alternative also ranked highest for implementability (administrative and technical feasibility) and cost, although it will take longer than other remedies to achieve cleanup goals. The selected remedies are discussed in greater detail in **Section 11.0**.

6.0 SITE CHARACTERISTICS

This section provides an overview of the site impacts and also identifies the actual and potential routes of exposure posed by the conditions at the site. A complete description of the site characteristics is included in Section 4.0 of the RI report.

Based on the results of the ESI, a RI Workplan was prepared and the RI field program was conducted. At SEAD-25, the RI field program consisted of soil gas and groundwater headspace surveys, soil sampling (surface and in boreholes), groundwater investigation in both overburden and bedrock, surface water/sediment and spring investigations, and an ecological investigation. The RI at SEAD-26 was similar to that at SEAD-25, with the exception of the soil gas and headspace surveys, and the investigation of groundwater in bedrock, which were not part of the field program at SEAD-26. The remedial investigations were designed to meet site-specific data quality objectives (DQOs).

6.1 SEAD-25

The primary contaminants of concern (COCs) at the Fire Training and Demonstration Pad (SEAD-25) are volatile organic compounds (VOCs), specifically benzene, toluene, ethylbenzene, and xylene (BTEX) compounds in both soil and groundwater, as well as lesser amounts of chlorinated ethene compounds in groundwater. In soils, these impacts were limited to the south-central and western portions of the pad, and several of these compounds were present in concentrations that exceeded their respective NYSDEC Technical and Administrative Guidance Memorandum (TAGM) guidelines, which have been adopted as cleanup standards for this site. The VOC contaminants are believed to have been released to the environment during fire training activities at the Pad. In addition, varying concentrations of SVOCs were also detected in the soil and sediment, mainly in the drainage ditches on the periphery of the site. Less significant impacts from other contaminants were also detected at the site.

6.1.1 Impacts to Soil

The primary impact to soils at the Fire Training and Demonstration Pad was from VOCs (mainly BTEX compounds); however there were other impacts from metals and SVOCs. **Table 6-1A** and **6-1B** present the soil sampling results at SEAD-25. The impact from BTEX compounds occurred in the western half of the Pad and the vertical impacts extended from the land surface to a depth of 4 to 6 feet below the surface, which approximately corresponds to the top of competent shale bedrock. The contaminants that exceeded their respective NYSDEC TAGM cleanup guidelines were benzene, toluene, ethylbenzene, xylenes, benzo(a)anthracene, chrysene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene. Note that benzo(a)anthracene was found slightly above the TAGM (224 μg/Kg) in one sample during the ESI, and had an estimated concentration of 230 μg/Kg. However, this value was inadvertently omitted from Table 2-1C in the FS.

6.1.2 Impacts to Groundwater

The primary impact to the groundwater is from two overlapping VOC plumes that both originate at the southwestern portion of the Fire Training and Demonstration Pad, neither of which are expected to extend beyond Ordnance Drive. BTEX was not detected in the bedrock wells at SEAD-25. The primary plume is composed of hydrocarbon compounds that are typically associated with gasoline (BTEX), and it is approximately 200 feet long. The groundwater flow direction is shown in **Figure 6-1**. Results of groundwater contour mapping indicate that groundwater flow is radial below the pad, with a strong horizontal gradient to the south and west. The radial groundwater flow that has developed below the pad at SEAD-25 is believed to be a local phenomenon that is present because of the influence of the anthropomorphic bedrock topographic mound located below the pad. The mapping also indicated that the groundwater flow in the deeper portion of the aquifer located in the competent shale zone is to the west and southwest.

The plume is shown in **Figure 6-2**. The other plume contains lower concentrations of chlorinated ethenes and it is approximately 130 feet long. A summary of the groundwater sampling results is shown in **Table 6-1C**. The following compounds in these plumes exceeded NYSDEC AWQS for Class GA water: benzene, toluene, ethylbenzene, xylene, trichloroethene, 1,2-dichloroethene (total), 1,1,1-Trichloroethane, and 1,1-dichloroethane. Other compounds detected in groundwater above the AWQS were chloroform, 2,4-dimethylphenol, 2-methylphenol, 3,3'-dichlorobenzidine, 4-methylphenol, naphthalene, phenol, and thallium.

6.1.3 Impacts to Surface Water

In surface water, the inorganic compounds (or metals) aluminum, iron, copper, silver, zinc, and lead were found at concentrations above the NYS Class C Ambient Water Quality Standard (AWQS); however, none of these are considered to be ARAR-based COCs for reasons discussed below. Aluminum and iron are present in concentrations that are consistent with background. Copper slightly exceeded the Class C standard in two samples, and zinc and silver were each detected once above the Class C Standard. Lastly, while lead exceeded the AWQS of 1.8 μg/L in four samples (maximum 7 μg/L), these elevated concentrations are believed to be attributed to high turbidity in the samples. In addition, the surface water in the ditches is intermittent and the ditches are not classified surface water bodies. Therefore, the NYSDEC Class C Standard is not applicable to the surface water in the ditches.

6.1.4 Impacts to Sediment

Impacts to sediment in the drainage ditches were mainly from SVOCs, pesticides, and heavy metals. The most significant impacts from SVOCs and metals were in the drainage ditch northwest of the Pad, whereas in the other ditch the most significant impact from SVOCs was found in an upgradient location. The following SVOC and metal contaminants were found to exceed the NYS sediment criteria: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, antimony, arsenic, cadmium, chromium, copper, iron, lead,

manganese, mercury, nickel, silver, and zinc. Pesticides that exceeded the criteria are 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, heptachlor, and heptachlorepoxide.

6.2 SEAD-26

At the Fire Training Pit and Area (SEAD-26), the primary contaminants detected are SVOCs and metals in the soil and sediments. In addition, low levels of volatiles have been detected in the groundwater above NYSDEC GA Standards. However, the contaminants that exceeded NYSDEC GA Standards in the groundwater are no longer found in the soil of SEAD-26 due to attenuation of the contaminants in the soil.

6.2.1 Impacts to Soil

The soil analysis results for SEAD-26 are presented in **Table 6-2A** and **6-2B**. The primary impacts to soil at SEAD-26 were from SVOCs. These included PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and dibenz(a,h)anthracene) and significant impacts from other compounds (2,4-dinitrophenol, 2-nitrophenol, 2-nitroaniline, and nitrobenzene), all of which were above the NYSDEC TAGM guideline and some of which were found to contribute to unacceptable risk at the site. Heavy metals that were elevated and considered in the risk assessment were arsenic, lead, thallium, and zinc.

6.2.2 Impacts to Groundwater

Results from groundwater analysis are presented in **Table 6-2C**. Groundwater impacts were primarily from VOCs, however, concentrations that exceeded the NYSDEC AWQS for Class GA waters were found in one well that was located on the southern side of the burning pit. The concentrations of benzene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropylbenzene, n-propylbenzene, and p-isopropyltoluene in groundwater exceeded NYSDEC AWQS for Class GA waters. (Please note that the RI did not identify the standards for the later five volatile compounds noted above and, therefore, no exceedences were noted for them in the RI; standards for these compounds were later included in the FS, Table 2-2a). In addition, naphthalene was detected at a concentration of 15 μg/L in the well on the southern side of the burning pit, which is above the NYSDEC guidance value of 10 μg/L. Based on the groundwater data, no significant plume of volatiles and semivolatiles exists on the site.

6.2.3 Impacts to Surface Water

Impacts to surface water were mainly from heavy metals. Most of the exceedences of the NYS Class C AWQS were for aluminum, iron, and zinc, which are base metal components of the surrounding bedrock (background). Other metals that exceeded the standard (by 1 to 2 times) were lead, nickel, and cyanide and these exceedences occurred at two locations. (Please note that the text of the RI mistakenly notes that arsenic and chromium, instead of nickel and cyanide, exceed the

standard). The compound heptachlor (0.03 μg/L) was also found to exceed the AWQS (0.001 μg/L) at one location.

6.2.4 Impacts to Sediment

In sediment, impacts were mainly from SVOCs (i.e., PAHs), pesticides, and heavy metals. The organic compounds that exceeded the NYS sediment criteria were benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno[1,2,3-cd]pyrene, acenaphthene, phenol, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan I and II, and heptachlor epoxide, and Aroclor-1260. (Please note that in Table 2-2e of the FS, Aroclor-1260, having a maximum detection of 650 μg/Kg, should have been included in the column showing the number of hits above the criteria.) The metals that exceeded the sediment criteria were arsenic, nickel, copper, mercury, manganese, zinc, lead, and iron.

7.0 SUMMARY OF SITE RISKS

Based on the results of the RI, a baseline risk assessment (BRA) was conducted to estimate the risks associated with current and future site conditions. The BRA estimated the human health and ecological risk that could result from the site if no remedial action were taken.

7.1 HUMAN HEALTH RISK ASSESSMENT

The reasonable maximum human exposure was evaluated. The human health risk assessment methodology is shown in **Figure 7-1**. A four-step process was used for assessing site-related human health risks for a reasonable maximum exposure scenario:

- *Hazard Identification*--identified the COC based on several factors such as toxicity, frequency of occurrence, and concentration.
- *Exposure Assessment*--estimated the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed.
- *Toxicity Assessment*--determined the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response).
- *Risk Characterization*--summarized and combined the outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks (for example, one-in-a-million excess cancer risk).

The primary contaminants of potential concern (COPCs) at the Fire Training and Demonstration Pad (SEAD-25) are VOCs (primarily aromatic and some chlorinated compounds), SVOCs (mainly PAHs), and to a lesser degree heavy metals, such as arsenic and thallium. At the Fire Training Pit and Area (SEAD-26) the COPCs are mainly SVOCs. VOCs, heavy metals, pesticides and polychlorinated biphenyls (PCBs) were also detected. Several compounds including xylene and toluene and some PAH compounds are known to cause cancer in laboratory animals and are suspected to be human carcinogens.

The BRA addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the site under current and future land use scenarios. **Figure 7-2** shows the exposure pathways considered for the media of concern. For the baseline risk assessment, the reasonable maximum exposure was evaluated.

The BRA evaluated the health effects that may result from exposure for the following three-receptor groups:

1. Current site worker,
2. Future on-site construction workers, and

3. Future on-site residents.

The following exposure pathways were considered:

1. Inhalation of volatile organic compounds in ambient air (current site worker, future residential, future on-site construction worker);
2. Inhalation of dust in ambient air (current site worker, future residential, future on-site construction worker);
3. Ingestion of on-site soils (current site worker, future residential, future on-site construction worker);
4. Dermal contact to on-site soils (current site worker, future residential, future on-site construction worker);
5. Ingestion of groundwater (daily) (future residential);
6. Dermal contact to groundwater while showering (future residential);
7. Inhalation of groundwater while showering (future residential);
8. Dermal contact to surface water while wading (future residential);
9. Dermal contact to sediment (future residential); and,
10. Ingestion of on-site sediment (future residential);

Under current USEPA guidelines, the likelihood of carcinogenic and non-carcinogenic effects due to exposure to site-related contaminants are considered separately. Non-carcinogenic risks were assessed by calculation of a Hazard Index (HI), which is an expression of the chronic daily intake of a contaminant divided by its safe or Reference Dose (RfD). An HI that exceeds 1.0 indicates the potential for non-carcinogenic effects to occur. Carcinogenic risks were evaluated using a cancer Slope Factor (SF), which is a measure of the cancer-causing potential of a chemical. Slope Factors are multiplied by daily intake estimates to generate an upper-bound estimate of excess lifetime cancer risk. For known or suspected carcinogens, USEPA has established an acceptable cancer risk range of 10^{-4} to 10^{-6} (one-in-ten thousand to one-in-one million).

SEAD-25

A summary of the COCs for potential human health receptors based on the BRA are presented in **Table 7-1** for SEAD-25. **Table 7-2** summarizes the results for total carcinogenic and non-carcinogenic risks, and **Table 7-3** provides a summary of the primary contributors to unacceptable risk levels. The results of the BRA at SEAD-25 indicate that for the future on-site construction worker, the HI was above the USEPA target of 1.0, while the cancer risk for this receptor was within the target risk range. For the future on-site resident, both measures of risk (non-carcinogenic and carcinogenic risk) are above the USEPA target risk range/value noted above.

The current site worker did not exhibit excess risk of cancer above the USEPA target range or a potential for adverse non-carcinogenic health threats.

The risk analysis of the future on-site construction worker receptor scenario indicated that the cancer risk is 4 x 10^{-6} and the HI is 4. The cancer risk is within the USEPA target risk ranges, but the hazard index is above the USEPA target risk value of 1. These risks are mainly due to inhalation of VOCs in the ambient air. The primary COC that is contributing to this risk is benzene in the soils, as presented in **Table 7-3**. Inhalation of ambient air during construction is responsible for 75% of the cancer risk and 98% of the hazard index.

The risk analysis for a future on-site resident showed that the excess cancer risk under this exposure scenario is 1 x 10^{-3} with a HI of 10 and 5 for child and adult, respectively. Both measures of risk are above the USEPA target risk ranges. These risks are due primarily to potential exposure of receptors to on-site groundwater containing benzene as their sole drinking water source; groundwater ingestion is responsible for over 67% of the total cancer risk and over 80% of the HI. A smaller contributor to the cancer risk is ingestion of sediment, which contains PAHs, as presented in **Table 7-3**.

SEAD-26

The results of the BRA at SEAD-26 indicate that the cancer risks for all of the receptors evaluated were within the USEPA target risk range. **Table 7-4** provides the results for total carcinogenic and non-carcinogenic risks. With respect to non-carcinogenic risk, the child receptor under the future residential scenario had a HI that slightly exceeded the target value due to dermal contact with groundwater and ingestion of site soils. The current site worker did not exhibit excess risk of cancer above the USEPA target range or a potential for adverse non-carcinogenic health threats.

The future on-site construction worker had a cancer risk and hazard index of 2 x 10^{-6} and 0.4, respectively. The cancer risk is within the USEPA target risk ranges, and the hazard index is below the USEPA target risk value.

The risk analysis for future on-site residents showed that the cancer risk under this scenario is 7 x 10^{-5}, and the HI for a child is approximately 1.3 and the HI for an adult is 0.4. The cancer risk is within the USEPA target risk range, but at the higher end of the range. The hazard index is not above the USEPA target risk value for the adult receptor, however, the HI for the child receptor slightly exceeded 1. The risk driver for this scenario is ingestion of on-site soils: 86% of the total cancer risk and 70% of the child hazard index is due to ingestion of on-site soils. The primary COCs contributing to the soil ingestion cancer risk are carcinogenic PAHs and arsenic. The COCs contributing to the soil ingestion HI are bis(2-ethyhexyl)phthalate, arsenic, and thallium. There were also lower, but equal, contributions to the HI from dermal contact with groundwater and ingestion of ditch soils.

Additional Information on SEAD-25 and SEAD-26 Human Health Risk Assessment

The results of the BRA indicate that potential future on-site residents and future on-site construction workers are the receptors at SEAD-25 that exhibit excess risk of cancer above the USEPA target

range and/or a potential for non-carcinogenic effects. However, the likelihood of any future residential development and future groundwater use on-site is low. If there is no development on the site then the pathway cannot be completed and there is no associated risk. At SEAD-26, none of the USEPA risk criteria were exceeded, other than a slight excess risk for potential non-carcinogenic effects to a future resident child.

Currently, exposure of off-site populations to contaminants in groundwater at SEAD-25 is unlikely, due to the relative small magnitude of the impacts and direction of groundwater flow and the long distance from the plume to the nearest downgradient boundary (more than 2 miles). At SEAD-26, the current off-site populations are upgradient from the impacted site; therefore, impacts to their wells by the release at SEAD-26 are not likely.

The remedial action selected will be based upon the RI/FS that includes a detailed analysis of remedial alternatives. In addition, the preferred alternative will be protective of receptors that are appropriate for the intended future land use, which is light industrial use for SEAD-25 and office/planned industrial development for SEAD-26. For SEAD-25, residential land use was considered to compare the cost of remediating the site for this land use versus the cost to implement restricted use on the site, and because the area directly east of SEAD-25 is designated as residential. Another reason for the consideration of a residential use is to comply with Army guidance, which states that alternatives consistent with property use without restriction should be considered to compare life-cycle institutional control costs with more conservative cleanup alternatives (DAIM-BO, "Army Guidance for Using Institutional Controls in the CERCLA Process"). In addition, the residential scenario was evaluated due to the NYSDEC goal of restoring NYS inactive hazardous waste disposal sites to pre-disposal conditions, to the extent feasible and authorized by law.

7.2 ECOLOGICAL RISK ASSESSMENT

The reasonable maximum environmental exposure was also evaluated. A four-step process was used for assessing site-related ecological risks for a reasonable maximum exposure scenario:

- *Characterization of the Unit and the Ecological Communities it May Affect*—Includes ecological conditions observed at the unit, site habitat characterization, wildlife resources that are present in the area, and ecological resource values to wildlife and to humans.
- *Exposure Assessment*—Discusses COPCs, exposure point concentrations, and it presents exposure assessments. Chemical distribution of COPCs and their uptake through various pathways are also discussed in this section. And daily intakes of COPCs through environmental media are quantified as well.
- *Toxicity Assessment*—Assesses ecological effects that potentially may result from receptor exposure to COPCs. Evaluates potential toxicity of each COPC in each medium and defines toxicity benchmark values that will be used to calculate the ecological quotient (EQ.)

- *Risk Characterization*—Integrates the results of the preceding elements of the assessment. It estimates risk with respect to the assessment endpoints, based on the predicted exposure to and toxicity of each COPC.

Ecological risk was then presented in terms of an EQ, which is derived from the results of the exposure quantification and the toxicity assessment for each COPC. The EQs are based on relevant measurement endpoints and are indicative of the potential for each chemical to pose an ecological risk to receptors. Step 2 of the screening-level exposure estimate and risk calculation in "Ecological risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting ecological Risk Assessments" (USEPA 1997) suggests that EQs less than or equal to 1 present no probable risk. EQs between 1 and 10 present a small potential for environmental effects, EQs between 10 and 100 present a significant potential that effects could result from greater exposure, and EQs greater than 100 indicate the highest potential for expected effects.

The results of the ecological risk assessment presented in the RI report (Parsons ES, May 1998) concluded that there is negligible risk to the ecosystems of the SEAD-25 and SEAD-26 study areas. During the field evaluation, no overt acute toxic impacts were noted. The quantitative ecological risk evaluation determined that a possibility exists for the COPCs to present a small potential for environmental effects due to sediment at SEAD-25 and due to sediment, soil, and surface water at SEAD-26.

At SEAD-25, aquatic-amphibian (current scenario) receptors were most affected by the contaminants. In sediment, the EQs that were greater than 1 were mostly driven by 4,4'-DDD (EQ=1300); heptachlor (EQ=33), lead (EQ=12), and silver (EQ=10). Terrestrial (current conditions) receptors are also likely to be most affected by iron (EQ=39) in the sediment at SEAD-25. Note that the highest concentrations of 4,4'-DDD, fluoranthene, heptachlor, lead, silver, and iron were all found in the drainage ditch northwest of the site.

At SEAD-26, terrestrial receptors are mostly affected by COPCs in the soil. For current conditions, the risk drivers are bis(2-ethylhexyl)phthalate (EQ=86.3) and zinc (EQ=24.3). For future conditions, the risk drivers are di-n-butylphthalate (EQ=5.7) and zinc (EQ=21.6). The highest EQs for aquatic-amphibian populations under current conditions were from the contaminants heptachlor (EQ=23.0), aluminum (EQ=21.4), iron (EQ=28.1), and zinc (EQ=2.7, revised from 15.4) in surface water, and benzo(b)fluoranthene (EQ=20), chrysene (EQ=20), and phenol (EQ=22) in the sediment. Note that the EPCs for heptachlor and chrysene in the sediment are conservative since they were calculated using the 95th UCL of the mean, which exceeded the max hit.

Although there are EQs greater than 1, EQs alone are not an indication of risk. Furthermore, upon consideration of the weight of evidence presented in the Ecological Risk Summary Section of the RI, a risk management decision was made that the COPCs identified at SEAD-25 and SEAD-26 are considered to pose negligible risk to the ecosystem at these sites. In particular, sediment is not believed to be a significant media of interest at the sites. The primary reason is that, while a

significant portion of the risk was attributed to aquatic receptors, the ecological quotient is based on continuous exposure to the contaminants in the sediment in the ditches. However, the drainage ditches on the sites only contain water for a limited period of time after heavy rains or from snow melt. Thus, aquatic organisms are unlikely to be present in the drainage ditches when the conditions in the ditches are not aquatic. In addition at SEAD-25, the presence of PAHs in sediment may be due to sources other than past activities at the site, as evidenced by the increasing concentrations measured in “upstream” areas of the site.

8.0 REMEDIAL ACTION OBJECTIVES

Remedial action objectives have been developed that consist of media-specific objectives for the protection of human health and the environment. These objectives are based on available information and standards such as ARARs and risk-based levels established in the risk assessment. The cleanup goals for soil and groundwater at SEAD-25 and for groundwater at SEAD-26 are presented in **Table 1-1A** and **Table 1-1B**, respectively. The following sections describe how these remedial objectives were determined.

Remedial action objectives are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on guidance documents and risk levels established in the risk assessment and comply with ARARs to the greatest extent possible. A list of ARARs is provided in **Appendix D**. The remedial action objectives for the SEAD-25 and SEAD-26 operable unit are as follows:

- Prevent public or other persons from direct contact with contaminated soils, sediments, solid waste and surface water that may present a health risk.
- Eliminate or minimize the migration of hazardous contaminants from soil to groundwater.
- Prevent ingestion of groundwater containing contaminants in excess of federal and state drinking water standards or criteria, or which pose a threat to public health.
- Prevent off-site migration of contaminants above levels protective of public health and the environment, and
- Restore groundwater, soil, surface water, and sediments to levels that are protective of public health and the environment.

9.0 DESCRIPTION OF ALTERNATIVES

CERCLA and the NCP require that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws; and use permanent solutions, alternative treatment technologies, and resource recovery options to the maximum extent possible. In addition, there is a statutory preference for treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

Ten remedial alternatives were identified for SEAD-25. These alternatives are:

- RA25-1: The No-Action Alternative,
- RA25-2: Institutional Controls, Natural Attenuation of Plume,
- RA25-3: Bioventing of Soil, Air Sparging of Plume,
- RA25-3A: Bioventing of Soil, Natural Attenuation of Plume,
- RA25-4: Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume,
- RA25-5: Soil Removal, Off-site Disposal, and Air Stripping of Plume,
- RA25-6: Soil Removal, Off-site Disposal, and Air Sparging of Plume,
- RA25-3R: Bioventing/Air Sparging/Sediment Removal - Residential Alternative,
- RA25-3AR: Bioventing/Natural Attenuation/Sediment Removal - Residential Alternative, and
- RA25-4R: Source Removal, Off-site Disposal, Sediment Removal, and Long-Term Monitoring of Plume – Residential Alternative.

Alternatives RA25-1 through RA25-6 include institutional controls to prevent residential land use.

Alternatives RA25-3R, RA25-3AR, and RA25-4R include institutional controls to prevent the access or use of groundwater until groundwater cleanup standards are met. With approval of USEPA, after groundwater standards are achieved, the sites may be released for unrestricted use.

Four remedial alternatives were identified for SEAD-26. These alternatives are:

- RA26-1: The No-Action Alternative,
- RA26-2: Soil Removal, Off-site Disposal, and Monitoring of Plume,
- RA26-3: Air Sparging of Plume, and
- RA26-4: Air Stripping of Plume.

Alternative RA26-2 includes a land use control to prevent the access to or use of groundwater until USEPA concurs that the groundwater cleanup standards are achieved.

Since the completion of the FS, some of the alternatives have been revised slightly and, therefore, the descriptions and costs of the alternatives may differ slightly from the previous documents. Cost backup that documents the changes is provided in Appendix A of the Proposed Plan. In addition, the O&M costs have been revised since the Proposed Plan to adjust the costs for groundwater monitoring for all alternatives. The frequency of long-term monitoring, which is a component of O&M in many alternatives for SEAD-25 and SEAD-26, will be detailed in the RD plan. The options for both SEAD-25 and SEAD-26 are described below.

All alternatives for SEAD-25 and SEAD-26 include interim land use controls as part of the remedy, including a groundwater use restriction, to prevent access or use of the groundwater until groundwater cleanup standards are achieved. The LUCs will be continued until the groundwater beneath has been reduced to levels that allow for unlimited exposure and unrestricted use. In order to implement the Army's remedy, which includes the imposition of land use controls, a LUC Remedial Design for SEAD-25 and 26 will be prepared which satisfies the applicable requirements of Paragraphs (a) and (c), Environmental Conservation Law (ECL) Article 27, Section 1318: Institutional and Engineering Controls. In addition, the Army will prepare an environmental easement for SEADs 25 and 26, consistent with Section 27-1318(b) and Article 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at the time of the property's transfer from federal ownership. A schedule for completion of the draft SEAD 25 and 26 LUC Remedial Design Plan (LUC RD) will be completed within 21 days of the ROD signature, consistent with Section 14.4 of the Federal Facilities Agreement (FFA).

The Army shall implement, inspect, report, and enforce the LUC objectives described in this ROD in accordance with the approved LUC Remedial Design. Although the Army may later transfer these responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity. With the approval of USEPA, once groundwater cleanup standards are achieved, the groundwater use restriction may be eliminated and the site may be released for unrestricted use. Remedial alternatives that would restore the land only for restricted use would require additional land use controls, in perpetuity, to restrict future site use for daycare or residential use. The five-year reviews, conducted in accordance with 121(c) of CERCLA, are intended to evaluate whether the response actions remain protective of public health and the environment, and they would consist of document review, ARAR review, interviews, inspection/technology review, technical assessment, and reporting.

Alternative RA25-1: No-Action Alternative:

The CERCLA program requires that the "No-Action" option be considered as a baseline for comparison of other options. There are no costs associated with the no-action option. The no-action option means that no remedial activities would be undertaken at the site. No monitoring or security measures would be undertaken. Any attenuation of the threats posed by the site to human health and

the environment would be the result of natural processes. Current security measures would be eliminated or modified so that the property may be transferred or leased as appropriate.

Alternative RA25-2: Institutional Controls, Natural Attenuation of Plume

Capital Cost: $38,100
O & M Cost: $781,700 - soil sampling and groundwater monitoring
Present Worth Cost: $819,800
Construction Time: No construction.

Alternative RA25-2 (Institutional Controls and Natural Attenuation) would rely upon natural mechanisms to biodegrade organic chemicals (BTEX) in the soil and groundwater, also referred to as bioremediation. Site characterization data presented in the RI (dissolved oxygen, nitrate, and Eh) provide evidence that degradation of the plume is occurring, and these data also provide support for the analytical modeling that showed that the plume will degrade to below NYSDEC GA standards in 150 years. Dechlorination would treat the relatively low concentrations of chlorinated ethenes in groundwater. RA25-2 is similar to the no-action alternative in that it would result in leaving areas with chemically impacted soils intact. Institutional Controls, which are an element of this alternative, would include a groundwater use restriction until ARARs were achieved and a land use control preventing residential land use. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan. Continued groundwater monitoring and soil sampling until cleanup standards are achieved would document the natural degradation of the plume and would provide a detection mechanism for off-site migration of contaminants, which would require that additional action be taken.

The cost of this alternative is relatively high since it includes groundwater and soil monitoring for approximately 150 years.

Alternative RA25-3: Bioventing of Soil and Air Sparging of Plume

Capital Cost: $373,500
O & M Cost: $422,600
Present Worth Cost: $796,100
Construction Time: construction and start-up of the bioventing/air sparging system should take 2 to 3 months.

Alternative RA25-3 involves the installation of a bioventing system and two air sparging trenches. An aboveground bioventing system would feed air through one injection point to the western portion of the Fire Training and Demonstration Pad. The bioventing system consists of one compressed air pump to feed oxygen into the soil to promote the natural degradation of organic chemicals in the source area. Aeration of the VOC source area is expected to cause the volatilization of organic chemicals in the groundwater near the source. However, the low airflow employed in bioventing

provides only enough oxygen to sustain microbial activity near the source. Thus, the two air sparging trenches would be used to remediate downgradient portions of the plume north of Ordnance Drive. One would be located just off the southwest corner of the pad, and the other farther downgradient. Each trench would be approximately 200 feet long. The air sparging system consists of two trenches installed in the saturated soil with horizontal piping for air injection. The injected air promotes volatilization of the organic contaminants in the groundwater, and aerobic biodegradation. Due to the low concentration of volatiles, a vapor recovery system is not required. Periodic groundwater monitoring would be used to assess the progress of the treatment.

The bioventing system would run until the NYSDEC soil criteria for groundwater protection from organic contaminants are met, approximately 5 years. Groundwater would be monitored until cleanup standards are achieved, and the air sparging treatment system would be run until the concentrations of organics in the groundwater are below the NYSDEC criteria for Class GA groundwater, approximately 10 years, based on groundwater modeling results.. Any soils removed for the downgradient trench installation would come from areas in which previous soil sampling has indicated little or no soil contamination. The soil from the upgradient trench would be disposed off-site in a RCRA approved landfill.

Land use controls, which are an element of this alternative, would include a groundwater use restriction until groundwater ARARs were achieved and a land use control preventing residential land use. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-3A: Bioventing of Soil and Natural Attenuation of Plume

Capital Cost: $236,400
O & M Cost: $526,500
Present Worth Cost: $762,900
Construction Time: construction and start-up of the bioventing system should take 2 to 3 months.

Alternative RA25-3A involves the installation of a bioventing system to remove volatiles from the source area and natural attenuation (biodegradation) with long-term groundwater monitoring to treat the impacted groundwater. An aboveground bioventing system would feed air through one injection point (vertical well) to the western portion of the fire training and demonstration pad. The bioventing system consists of one compressed air pump to feed oxygen into the soil to enhance the natural degradation of organic chemicals in the source area. Aeration of the VOC source area is expected to enhance the volatilization of organic chemicals in the groundwater near the source. However, the low airflow employed in bioventing provides only enough oxygen to sustain microbial activity near the source. Natural attenuation would be relied upon to enhance the degradation of BTEX and chlorinated ethenes in groundwater; field data indicate that natural degradation is occurring at the site. This alternative would use a groundwater monitoring program to assess the effectiveness of this approach over time.

The bioventing system will be run until the NYSDEC soil criteria for groundwater protection from organic contaminants are met, approximately 5 years. Groundwater monitoring of natural attenuation would be performed until the concentrations of organics in the groundwater are below the NYSDEC criteria for Class GA groundwater; this is expected to occur in approximately 15 years, based on modeling results.

Land use controls, which are an element of this alternative, would include a groundwater use restriction until groundwater ARARs were achieved and a land use control preventing residential land use. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-4: Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume

Capital Cost: $659,800
O & M Cost: $232,800
Present Worth Cost: $892,600
Construction Time: Excavation of soil will take approximately 2 months, depending on weather, setting up the staging area and construction of an equipment decontamination pad will take approximately 1 week. An air stripper for treatment of the groundwater recovered during the excavation would be on-site for the duration of the excavation. The stripper will be operated in batch mode as sufficient water is collected.

This option consists of excavation of the soils that make up the western 3/4 of the fire demonstration pad, outlined in **Figure 6-1**. This remedial action would remove approximately 1,350 CY of chemically impacted soils to a depth of 6 feet that are the source of the groundwater plume at SEAD-25. The limits of excavation were established so that there would not be any residual contamination in soils above TAGM levels. The soils would be removed using standard construction equipment, such as a front-end loader or bulldozer. The excavated soils would be immediately transported to a permitted off-site landfill or treatment facility.

A significant amount of groundwater would be treated during implementation of the source removal under this alternative. The groundwater at the source, which would be recovered during excavation of soil, would be treated using an on-site air stripper. During the excavation, confirmatory sampling, and backfilling process, additional groundwater would be treated as the excavation pit is de-watered. Clean backfill would be used to replace the excavated soil, preventing future leaching of volatiles to the groundwater and dermal contact to human and environmental receptors. Because there could be minor amounts of residual contamination, the groundwater would be closely monitored during ongoing sampling.

Over time, approximately 10 years based on modeling results, the concentration of volatiles remaining in groundwater would be expected to decrease to levels that meet stringent NYSDEC Class GA groundwater standards. Long-term monitoring will confirm that the plume is attenuating.

Land use controls, which are an element of this alternative, would include a groundwater use restriction until groundwater ARARs were achieved and a land use control preventing residential land use. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-5: Source Removal, Off-site Disposal, and Air Stripping of Plume

Capital Cost: $716,700
O & M Cost: $190,300
Present Worth Cost: $907,000
Construction Time: Excavation of soil should take 2-3 months depending on weather. Construction and start-up of the air stripping system should take 2 to 4 months.

Alternative RA25-5 uses the source removal approach described previously in RA25-4. If the source removal excavation is conducted when the groundwater table is high, the groundwater would be recovered and delivered to the air stripper system, described below, which would be used to treat the downgradient portions of the plume. For the treatment of groundwater, this alternative consists of the installation of two interceptor trenches that would collect groundwater, which would then be pumped to a treatment unit. Each trench would be approximately 200 feet long by 3 feet wide by 8 feet deep. The trench would extend from the ground surface to the competent shale bedrock. The trenches would be excavated with a bucket loader and the outside walls would be lined with a geotextile filter. Perforated PVC pipe would be placed in the bottom of the trench to facilitate drainage to the collection sumps. The trench would then be filled in with gravel to a depth of 2 to 3 feet below grade. Geotextile would be placed over the gravel, and the trench would be backfilled to grade with the soil previously removed. The water would be pumped from the trenches to the treatment system where metals would be removed from it. Suspended solids in the groundwater would be filtered and removed. Hardness and organics would also be removed from the groundwater. After treatment, groundwater would pass through a liquid phase carbon unit (polish) that would remove any volatiles via carbon adsorption. This water would then be discharged to the drainage ditches adjacent to the patrol roads, and eventually to Kendaia Creek. The treated groundwater would require sampling, and, if appropriate, a State Pollutant Discharge Elimination System (SPDES) equivalent permit.

Threat from releases during the excavation would be minimized using techniques described in Alternative RA25-4. The excavations of the interceptor trenches would be in areas where the concentrations of hazardous contaminants in the groundwater are low. Because of the low chemical concentrations in the groundwater, emissions from the air stripper would meet all NYSDEC and USEPA air standards and would, therefore, be protective of human health.

The groundwater treatment system would operate until the concentrations of volatile organics in the groundwater are below the NYSDEC criteria for Class GA groundwater; estimated as less than 1 year. Any soils removed for the groundwater treatment trenches would be from areas in which previous soil sampling has indicated little or no soil impacts. Such soil can be used as fill. Other

soils could be treated on-site or sent off-site to an appropriate treatment, storage, and disposal facility. The potential treatment residual is spent activated carbon, if carbon is used to polish the liquid stream. This carbon would be sent off-site for regeneration or disposal.

Annual O&M costs for this alternative include groundwater monitoring until cleanup standards are achieved. Monitoring is expected to be performed for approximately 5 years. This includes energy, equipment maintenance, and replacement of spent carbon and filter beds for the air stripping system.

Land use controls, which are an element of this alternative, would include a groundwater use restriction until groundwater ARARs were achieved and a land use control preventing residential land use. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-6: Source Removal, Off-site Disposal, and Air Sparging of Plume

Capital Cost: $682,100
O & M Cost: $506,100
Present Worth Cost: $1,188,200
Construction Time: Construction and start up of air sparging system should take 2 to 3 months. Excavations should take 2-3 months depending on weather.

Alternative RA25-6 involves the excavation and removal of soil as described in alternative RA25-4 and the installation of air sparging trenches as described in RA25-3. Excavated soils would be disposed of off-site. Groundwater recovered during the excavation would be treated in an air sparging system, similar to that described under alternative RA25-3. The treatment system would be run until the concentrations in the groundwater are below the NYSDEC criteria for Class GA groundwaters.

Air sparging would take 10 years and groundwater monitoring would be conducted until cleanup standards are achieved.

Land use controls, which are an element of this alternative, would include a groundwater use restriction until groundwater ARARs were achieved and a land use control preventing residential land use. Details regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-3R: Bioventing/Air Sparging/Sediment Removal - Residential Alternative

Capital Cost: $422,300
O & M Cost: $411,200
Present Worth Cost: $833,500
Construction Time: construction and start-up of the bioventing/air sparging system should take 2 to 3 months.

Alternative RA25-3R addresses a future residential use of SEAD-25 even though the intended future use of SEAD-25 is industrial. As a result, to achieve acceptable human health risk under the residential scenario, sediment must be incorporated into the media of concern, in addition to soil and groundwater, which were both considered under the industrial scenario. To evaluate residential scenarios, the removal of sediment has been incorporated into three high-ranking alternatives under the industrial scenario, RA25-3, RA25-3A, and RA25-4. As previously mentioned, cleanup of this site to unrestricted use is warranted because of the long-term costs associated with maintaining and enforcing land use controls to limit the future use of this site.

Alternative RA25-3R would be implemented exactly as alternative RA25-3 except that sediment from the ditch northwest of the pad at SEAD-25 (approximately 175 CY) would be excavated and disposed off-site. The dimensions of the extent of contamination common to both RA25-3 and RA25-3R are an area that covers approximately 6,000 square feet (sf) to a depth of 6 feet and a volume of approximately 1350 CY. In order to comply with a residential scenario, an additional remedial area is defined the northwest ditch, covering approximately 2,360 sf, (roughly 780 linear and a width of 3 feet) to a depth of 2 feet, and with a volume of 175 CY. This is different from the FS, which proposed that sediment from both ditches be removed. The removal would occur at the northwestern ditch because it was shown in the RI to have the highest concentrations of COCs (PAHs, metals, and pesticides) and it presents the most risk, compared to the other ditch that is adjacent to Administrative Avenue and Ordnance Drive. The air sparging system is estimated to run for approximately 10 years, and the bioventing system for approximately 5 years. Groundwater monitoring would be conducted until cleanup standards are achieved.

Institutional controls, such as a groundwater use restriction, are included as an element of this remedy until groundwater ARARs are achieved. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-3AR: Bioventing/Natural Attenuation/Sediment Removal - Residential Alternative

Capital Cost: $285,200
O & M Cost: $511,100
Present Worth Cost: $796,300
Construction Time: Construction and start-up of the bioventing system should take 2 to 3 months.

Alternative RA25-3AR also addresses a future residential use of SEAD-25 and, for reasons discussed in alternative RA25-3R, the removal of sediment has been incorporated into this alternative.

The dimensions of the extent of contamination common to both RA25-3A and RA25-3AR are an area that covers approximately 6,000 square feet (sf) to a depth of 6 feet and a volume of approximately 1350 CY. Alternative RA25-3AR would be implemented exactly as alternative RA25-3A except that sediment from the ditch northwest of the pad at SEAD-25 would be excavated and disposed off-site. Approximately 175 CY of sediment would be removed from this ditch to a depth of 2 feet, which is estimated as 780 linear feet, with a width of 3 feet. The removal would occur at the northwestern ditch because it was shown in the RI to have the highest concentrations of COCs and it presents the most risk, as noted in the previous alternative. Again, this is different from the FS, which states that sediment from both ditches will be removed.

The bioventing system will run for approximately 5 years; groundwater monitoring would be conducted until cleanup standards are achieved.

Institutional controls, such as a groundwater use restriction, are included as an element of this remedy until groundwater ARARs are achieved. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA25-4R: Source Removal/Off-site Disposal/ Long-Term Monitoring of Plume/Sediment Removal – Residential Alternative

Capital Cost: $701,000
O & M Cost: $221,200
Present Worth Cost: $922,200
Construction Time: Excavation of soil will take approximately 2 months, depending on weather, setting up the staging area and construction of an equipment decontamination pad will take approximately 1 week. Air stripper for groundwater recovered during the excavation would have to be operated for less than 1 week; setting up air stripper would take 1-2 months.

Alternative RA25-4R addresses a future residential use of SEAD-25 even through the intended future use of SEAD-25 is industrial. This alternative was not addressed in the FS, but was included in the Proposed Plan to consider an alternative similar to RA25-4 that meets acceptable human health risk goals for a residential scenario. Also, as mentioned previously, the long-term cost savings associated

with remediating this site to an unrestricted use level justify the consideration of a response action consistent with a residential use scenario. Alternative RA25-4 can be implemented in the least amount of time without a long-term operating system on-site. In the evaluation of alternatives, time to implement and elimination of operating systems have gained increased importance since the FS was issued due to the fact that the transfer of property at Seneca has become a higher priority. As a result, a residential scenario was evaluated for RA25-4 and it was found that in order to achieve acceptable human health risk under the residential scenario, sediment must be incorporated into the media of concern, in addition to soil and groundwater, which were both considered under the industrial scenario.

Alternative RA25-4R is identical to RA25-4 except that approximately 175 CY (roughly 780 linear feet and a width of 3 feet) of sediment from the ditch northwest of the pad at SEAD-25 be excavated to a depth of 2 feet and disposed of along with the soils. The removal would occur at the northwestern ditch because it was shown in the RI to have the highest concentrations of COCs and it presents the most risk, as noted in the previous two alternatives.

The excavation of the soils and sediments would take a few months and long-term monitoring to confirm that natural biodegradation is occurring would continue until cleanup standards are achieved (estimated to be approximately 10 years).

Institutional controls, such as a groundwater use restriction, are included as an element of this remedy until groundwater ARARs are achieved. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA26-1: No-Action Alternative

The No-action alternative means that no remedial activities will be undertaken at the site. No monitoring or security measures will be undertaken other than those currently implemented at the site. Any attenuation of the threats posed by the site to human health and the environment would be the result of natural processes.

Alternative RA26-2: Soil Removal, Off-site Disposal, and Monitoring of Plume

Capital Cost: $411,700
O & M Cost: $339,100
Present Worth Cost: $750,800
Construction Time: Excavation of soil will take approximately 2 months, depending on weather; setting up the staging area and construction of an equipment decontamination pad will take approximately 1 week.

It should be noted that this alternative has been modified since the Proposed Plan in order to eliminate the need for permanent land use controls at the site. The levels of carcinogenic polycyclic aromatic

hydrocarbons (PAHs) in soils contributed to carcinogenic risk at the site. Although the carcinogenic risk to a resident (7E-05) was within the USEPA target risk range (1E-04 to 1E-06), the risk was at the upper end of this range; a limited removal of carcinogenic PAHs would reduce this risk alleviating State and USEPA concerns about unrestricted access to the site (e.g. for use as a child care center). Consequently, the Army has revised Alternative RA26-2 (formerly *Institutional Controls and Monitoring of Plume*) by adding a limited removal action for PAHs, as described below, in order to restore the land for unrestricted use, which increases the administrative feasibility of this alternative and will result in a long-term cost savings associated with not having to maintain and enforce land use controls.

The soil removal, off-site disposal, and monitoring of plume alternative involves removal of soils that contain elevated levels of carcinogenic PAHs and monitoring of the groundwater concentrations in well MW26-7 and several other wells. The remedial action would remove surface soils, with total carcinogenic PAH concentrations greater than 10 ppm, to a depth of 1 foot, which amounts to approximately 1050 CY of soils. The removal of soil, which would be disposed of off-site, would eliminate the need for permanent land use restrictions. It should be noted that, according to available data, the total carcinogenic PAH levels in ditch soils and subsurface soils are below 10 ppm.

The concentrations of volatile contaminants in the well could be expected to decline over time, through dispersal of the hazardous contaminants in the groundwater and natural biodegradation. Additionally, the volume of impacted groundwater would be expected to decrease over time. This option includes groundwater monitoring and security measures as an element of the remedy, which effectively eliminates access to the area, until ARARs are achieved. Institutional controls, such as a groundwater use restriction, are included as an element of this remedy until groundwater ARARs are achieved. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA26-3: Air Sparging of Plume

Capital Cost: $299,800
O & M Cost: $504,800
Present Worth Cost: $804,600
Construction Time: Construction and start-up of the air sparging system should take 1 to 2 months.

Alternative RA26-3 involves injecting air into the well that exceeded ARARs for VOCs (well MW26-7). Vertical piping into the existing well would be used to deliver air to the groundwater. The air promotes volatilization of the organic contaminants in the groundwater, and also promotes aerobic biodegradation. Due to the low concentration of organics in the groundwater there would not be a need for vapor recovery wells, or off gas treatment. Periodic groundwater monitoring would be used to assess the progress of the treatment.

The remediation would be designed and implemented such that any air emissions generated by the air sparging system would be below all USEPA and NYSDEC air quality standards.

The treatment system would be run until the concentrations of BTEX in the groundwater are below the NYSDEC criteria for Class GA groundwater.

The basis of this technology is the volatility of BTEX dissolved in the groundwater. Air would be bubbled into the bottom of well MW26-7, which would cause the dissolved volatile solvents to undergo a phase transfer from the liquid phase to the gaseous phase. Given the low concentrations of BTEX, a vacuum collection system would not be required. Air sparging systems are easy to implement, especially one as fundamental as what is required at SEAD-26. Hydraulically, there would be the potential to cause the groundwater to mound in the area surrounding the well due to the increase in pressure from the sparging system. This may cause the groundwater plume to spread around the well. The administrative feasibility of this alternative is reasonable; however, it may be complicated by the presence of permanent land use controls as an element of the alternative. There would be few air emissions from the sparging system due to the low VOC concentrations present.

Cost for this alternative includes operation of air sparging system and groundwater monitoring until cleanup standards are achieved (estimated at 10 years).

Groundwater monitoring and a groundwater use restriction are included as an element of this remedy until ARARs are achieved. Permanent land use controls preventing land use for residential purposes and for a daycare facility will be part of the remedy, as well. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

Alternative RA26-4: Air Stripping of Plume

Capital Cost: $340,200
O & M Cost: $463,400
Present Worth Cost: $803,600
Construction Time: 1 to 2 months

Alternative RA26-4 consists of the installation of a pump that would be used to extract the groundwater around the BTEX-impacted well (MW26-7) and deliver it to a treatment unit with a 5,000-gallon tank. Suspended solids in the groundwater would be filtered and removed. Metals, hardness and organics would also be removed from the groundwater. After treatment, if necessary, groundwater would pass through a liquid phase carbon unit (polish) and would discharge to the drainage ditches adjacent to the patrol roads, and eventually to Kendaia Creek.

The treatment system would be run until the concentrations of BTEX in the groundwater are below the NYSDEC criteria for Class GA groundwater. There would be little or no treatment residuals.

The potential treatment residual is spent activated carbon, if carbon is used to polish the liquid stream. This carbon would be sent off-site for regeneration or disposal.

Cost for this alternative includes air stripping and groundwater monitoring until cleanup standards are achieved (estimated for 10 years). This includes energy, equipment maintenance, and replacement of spent carbon and filter beds.

Groundwater monitoring and a groundwater use restriction are included as an element of this remedy until ARARs are achieved. Permanent land use controls preventing land use for residential purposes and for a daycare facility will be part of the remedy, as well. Information regarding implementation and enforcement of land use controls would be included in the Remedial Design Plan.

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, several factors set out in CERCLA § 121, 42 U.S.C. §9621 were considered. Based on these specific statutory mandates the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01, presents nine evaluation criteria to be used in assessing the individual alternatives.

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

A detailed alternative analysis using the nine NCP evaluation criteria was performed to select a site remedy. This section presents a summary of the comparison of each alternative's strengths and weaknesses with respect the nine evaluation criteria. Because this ROD addresses alternatives for both SEAD-25 and SEAD-26, the evaluation for each is presented separately.

10.1 SUMMARY OF EVALUATION CRITERIA

The nine NCP criteria are summarized as follows:

Threshold Criteria - The following two threshold criteria must be met for the alternatives to be eligible for selection in accordance with the NCP:

1. **Overall protection of human health and the environment** addresses whether or not remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether a remedy will meet all of the ARARs of other federal and state environmental laws and/or will provide grounds for invoking a waiver.

Primary Balancing Criteria - Once an alternative satisfies the threshold criteria, the following five criteria are used to compare and evaluate the elements of the alternative.

1. **Long-term effectiveness and permanence** addresses the criteria that are used to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.

2. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives use recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principle threats posed by the site.

3. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals are achieved.

4. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services to implement a particular option.

5. **Cost** includes estimated capital, operation and maintenance (O&M), and present-worth costs.

Modifying Criteria - The modifying criteria are used in the final evaluation of remedial alternatives generally after the lead agency has received public comment on the RI/FS and Proposed Plan.

1. **State acceptance** addresses the state's position and key concerns related to the Selected Remedy and other alternatives, and the state's comments on ARARs or the proposed use of waivers.

2. **Community acceptance** addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS.

The assembled alternatives were screened as described in the USEPA guidance. These alternatives were evaluated against short-term and long-term aspects of three broad criteria: effectiveness, implementability and cost. Because the purpose of screening is to reduce the number of alternatives that will undergo detailed analysis, the screening conducted in this section is of a general nature. Although this is necessarily 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. **Tables 10-1** and **10-2** provide summaries of each alternative for SEAD-25 and SEAD-26, respectively, and how each alternative complies with the requirements.

10.2 COMPARISON OF THE ALTERNATIVES

10.2.1 SEAD-25

Overall Protectiveness of Human Health and the Environment

Overall protection of human health and the environment is a threshold criterion because each alternative must meet this in order to be carried through the ranking process. With the exception of the RA25-1 (No-action), which was retained for comparative purposes, all the alternatives were rated highly for protectiveness of human health and the environment.

Table 5-1A in the FS presents human risk predicted at the site after implementation of each of the above alternatives compared to the risk calculated in the baseline risk assessment. Risk was calculated not only for the intended use of the site (industrial), but also for the future residential scenario. By re-calculating human health risks as performed in the Remedial Investigation after attaining the cleanup goals set forth in Section 2.0 of the RI, human health risk would be acceptable for both the current site worker and future on-site construction worker under Alternatives RA25-3, RA25-3A, RA25-4, RA25-5, and RA25-6. Human health risk would remain unacceptable for the future on-site construction worker under Alternative RA25-1 and RA25-2 since the remediation of site soils would not be addressed. In addition, human health risk would be acceptable to a future resident under alternatives RA25-3R, RA25-3AR, and RA25-4R.

Compliance with ARARs

Compliance with ARARs is a threshold criterion because each alternative must meet this to be carried through the ranking process. With the exception of the RA25-1 (No-action), which was retained for comparative purposes, all the alternatives were rated highly for ARAR compliance. Although RA25-2 is in compliance with ARARs, it would require a relatively long period of time to meet remediation standards. While the more aggressive alternatives would achieve ARAR compliance sooner than approaches employing natural mechanisms, all are expected to comply with ARAR and cleanup goals.

Long-Term Effectiveness and Permanence

The criterion of long-term effectiveness addresses the long-term protectiveness to human health and the environment, permanence of the remedial alternative, magnitude of remaining risk and adequacy and reliability of controls. Alternative RA25-3 (Bioventing of Soil and Air Sparging of Plume) ranked highest for long-term effectiveness because it ranks as a permanent solution, and is considered an on-site treatment. Currently there is no off-site migration of the groundwater plume, and there would be long-term groundwater monitoring to assess its movement. Once the groundwater and soil at the site meet the treatment criteria, the remedial action would be considered permanent.

Alternative RA25-3A (Bioventing of Soil and Natural Attenuation of Plume) ranked just below RA25-3 because of the longer term groundwater monitoring required. Since this alternative addresses the source of the release of volatiles to groundwater, natural attenuation of groundwater is considered to offer greater permanence than those alternatives where the source is not addressed.

Alternatives RA25-4 (Source Removal, Off-site Disposal, & Long-Term Monitoring of Plume), RA25-4R, which includes sediment removal, RA25-5 (Source Removal, Off-site Disposal, & Air Stripping of Plume) and RA25-6 (Source Removal, Off-site Disposal, & Air Sparging of Plume) scored lower since the soil at the site would not be treated, and, consequently, the remedial action for soil does not constitute a permanent solution. However, for alternative RA25-4 (and subsequently RA25-4R which includes sediment removal), air stripping of the groundwater removed during the excavation would provide a permanent solution to the most chemically impacted portion of the plume; and natural attenuation of groundwater does provide a permanent solution over time, since the alternative does address the source of the volatiles being released to the groundwater. Additionally, it is noted that under RA25-5, once the groundwater at the site meets the treatment criteria, the remedial action would be considered permanent.

Alternative RA25-2 (Institutional Controls and Natural Attenuation of Plume) ranked the lowest because there is no on-site treatment. In the source area, contaminants are expected to continue to leach to the groundwater, and if impacts are realized in off-site locations, remediation may be required at a later date. Therefore, this alternative is not considered permanent.

The goal of all remedial alternatives is to have no residual contamination in soils above TAGM levels. After the remedial action, residual contamination would be assessed, with the aim that no contamination would remain above TAGM levels. Residual groundwater contamination would be monitored to ensure that the plume is biodegrading. While the goal of the remedial objective is to achieve TAGM levels, remedial success will be achieved once contamination levels no longer pose an unacceptable risk to human health and the environment.

Reduction of Toxicity, Mobility or Volume

SEAD-25 alternatives were ranked relative to the decreases in the volume/toxicity, mobility, and permanence of the hazardous contaminants present at the site.

The No-action alternative (RA25-1) and RA25-2 (Institutional Controls and Natural Attenuation of Plume) ranked the lowest in this category because these alternatives do not effectively reduce the volume, toxicity, or mobility of the hazardous contaminants at the site. While natural attenuation in alternative RA25-2 would reduce the toxicity and volume of the contaminants on-site in the groundwater, any reduction would need to be documented via long term monitoring.

RA25-3 (Bioventing of Soil and Air Sparging of Plume) and RA25-3A (Bioventing of Soil and Natural Attenuation) and corresponding alternatives RA25-3R and RA25-3AR which include

sediment removal, ranked the highest in this category because they all effectively reduce the volume/toxicity and mobility of the hazardous contaminants in both soil and groundwater using on-site treatment technologies. RA25-4 (Source Removal, Off-Site Disposal and Long-Term Monitoring of Plume), RA25-4R, which includes sediment removal, RA25-5 (Source Removal, Off-Site Disposal, and Air Stripping of Plume), and RA25-6 (Source Removal, Off-Site Disposal, and Sparging of Plume) ranked lower because they rely on a non-destructive technology (excavation) as the remedial action for on-site soils.

RA25-3 (Bioventing of Soil and Air Sparging of Plume) and RA25-3A (Bioventing of Soil and Natural Attenuation of Plume) and corresponding alternatives RA25-3R and RA25-3AR which include sediment removal, ranked the highest for reduction in mobility of wastes because they treat both the soils and groundwater and, therefore, reduce the overall volume of wastes at the site by 90-100%. In alternatives RA25-3 and RA25-3R, air sparging would reduce the volume of impacted groundwater through in-situ treatment. For RA25-3, RA25-3R, RA25-3A, and RA25-3AR, bioventing would reduce the volume of impacted soil and eliminate the source of volatile organics to groundwater. The toxicity of the contaminants present in the groundwater would be diminished through aerobic biodegradation in the aquifer.

Alternatives RA25-4, RA25-4R, RA25-5 and RA25-6 were ranked moderately effective at reducing the toxicity, mobility, or volume at the site. The air stripping action in RA25-5 would effectively reduce the mobility, toxicity, and volume of the hazardous contaminants present in groundwater at the site. The interceptor trenches would effectively eliminate the mobility of the plume, and ensure that no off-site migration occurs. The volume of contaminated groundwater would decrease over time as the organics are removed. The air sparging alternative (RA25-6) would reduce the volume of chemically impacted groundwater through an in-situ treatment. The toxicity of the contaminants present in the groundwater would be diminished through aerobic biodegradation and volatilization. However, RA25-4, RA25-4R, RA25-5 and RA25-6 do not reduce the mobility of hazardous contaminants significantly because of the off-site landfilling of source soils and, therefore, they rank slightly lower in this category.

RA25-1 and RA25-2 rank the lowest in this category because they essentially do not effectively treat either soils or groundwater.

All of the alternatives that involve active treatment are considered permanent once the remedial action objectives are met. Alternative RA25-3 (Bioventing of Soil and Air Sparging of Plume) and RA25-3A (Bioventing of Soil and Natural Attenuation of Plume) and corresponding alternatives RA25-3R and RA25-3AR which include sediment removal, received the highest ranking because they would remove all the COCs from the media of concern. The No-action alternative received the lowest score because most of the contaminants would not be treated or removed. The remaining alternatives (RA25-4, RA25-4R, RA25-5, and RA25-6) received equal ranking because they would involve excavation and off-site disposal of soils.

Short-Term Effectiveness

Alternative RA25-1 (No-action) and RA25-2 (Institutional Controls and Natural Attenuation of Plume) were ranked highest for short-term protection of human health and the environment. Neither of these alternatives requires any construction of remedial systems and, therefore, poses the least risk to the community and on-site workers and, in addition, they do not create any adverse environmental impacts. These alternatives would, however, take much longer to achieve the remedial response action objectives than other alternatives evaluated.

Alternatives RA25-3 (Bioventing of Soil and Air Sparging of Plume), RA25-3A (Bioventing of Soil and Natural Attenuation of Plume), and RA25-4 (Source Removal, Off-site Disposal, & Long-Term Monitoring of Plume) and corresponding alternatives RA25-3R, RA25-3AR, RA25-4R, which include sediment removal, were rated equally and ranked slightly below alternative RA25-2 (Institutional Controls and Natural Attenuation of Plume). Under a residential scenario, access control would minimize the possibility of exposure to contaminants. For construction workers, exposure could be minimized by the use of proper protective equipment, such as respirators, dust masks, and Tyvek protective clothing. Dust generation at the excavation can be minimized by using water or other dust control chemicals. Air monitoring may be used to determine if there is a significant threat from the inhalation of vapors or particulates. Site workers would be required under 29 CFR 1910.120 to meet the entire OSHA training and medical monitoring requirements prior to working on-site. Short-term protectiveness must also consider environmental impacts during the remedial action. The SEDA boundary is at a distance of approximately 1500 feet, and the likelihood of any dust migrating off-site is negligible. There is little potential for release of hazardous contaminants during remedial action. VOC emissions from the air stripper are not a concern due to the low level of volatiles in groundwater. There are no sensitive environments that would be disturbed by the construction activities.

Alternatives RA25-5 (Source Removal, Off-site Disposal, and Air Stripping of Plume) and RA25-6 (Source Removal, Off-site Disposal, and Air Sparging of Plume) ranked just below RA25-3, RA25-3A, RA25-4 and their residential alternative counterparts because they involve excavation of the source soils, which would lower short-term protection to workers, and involve treatment technologies that result in the volatilization of organic contaminants. The techniques previously mentioned to limit exposure to contaminants for residents and site-workers could also be utilized for RA25-5 and RA25-6. In general, all the alternatives scored relatively high for short-term protection.

Implementability

The alternatives carried to the detailed analysis score well on implementability. For technical implementability in the FS report, alternatives RA25-1 (No action), RA25-3A (Bioventing of Soil and Natural Attenuation of Plume) including its residential counterpart RA25-3AR, and RA25-4 (Source Removal, Off-Site Disposal, and Long-Term Monitoring of Plume) including its residential counterpart RA25-4R, scored slightly higher than the other alternatives due to the ease of

construction (either no construction at all, or no construction to address groundwater contamination). Although the technical feasibility of RA25-3A and RA25-3AR is good, there are uncertainties associated with innovative in-situ technologies and the ability of naturally occurring bacteria to breakdown these chemicals. Since the FS was written, the efficient transfer of property at the installation has gained increased importance. In order to transfer the property at SEAD-25 in the near future, alternative RA25-4 and RA25-4R have increased in administrative feasibility and may be more easily implemented since it has no long-term system to operate or maintain. In addition, the technical and administrative feasibility of RA25-4 and RA25-4R are extremely favorable since excavation and air stripping are well-established, reliable technologies that are readily available and any necessary construction, excavation, or hauling permits or manifests are easily attainable by experienced contractors.

Alternative RA25-2 (Institutional Controls and Natural Attenuation of Plume) ranked slightly lower since this future remedial action may be necessary due to the continued presence of the source soils. Alternatives RA25-3, RA25-5, and RA25-6 ranked lowest due to the uncertainties associated with air sparging (i.e., mounding, effects of fluctuating groundwater table) and implementing groundwater collection in a collection trench. The sparging may also require field scale pilot testing.

All alternatives were ranked equally as requiring “normal coordination” with agencies and for obtaining necessary permits and approvals.

All the alternatives scored equally for availability of services and materials.

Cost

Capital costs and operating and maintenance costs were estimated for the ten remedial action alternatives. Capital costs include those costs for professional labor, treatability study costs, construction and equipment costs, site work, monitoring and testing, and treatment and disposal costs. Operating costs include administrative and professional labor costs, monitoring, and utilities. Administrative costs include the costs for restricting future land use to non-residential for alternatives RA25-2, RA25-3, RA25-3A, RA25-4, RA25-5, and RA25-6 that, when implemented, would achieve industrial use standards only. All costs discussed are present worth estimates using a common discount rate of 5%. Table 5-2 in the FS summarizes the capital and operating costs for alternatives RA25-1 through RA25-6, however, these costs have been revised since the completion of the FS, as noted in the Proposed Plan and in **Table 10-1**. The O&M costs have been revised since the Proposed Plan to adjust the costs for groundwater monitoring for all alternatives. Costs for alternatives evaluated under a residential scenario are also provided in **Table 10-1**. The highest ranking alternative corresponds to the alternative with the lowest cost.

Alternative RA25-1 (No-action) is not considered to have any associated capital or operating costs. This alternative is used as a basis of comparison for all other alternatives. RA25-3A (Bioventing of Soil and Natural Attenuation of Plume) ranked the highest for costs as a result of its present worth

costs of $762,900. The capital cost is $236,400 and includes equipment costs for the bioventing system, professional labor, and engineering design. The operating and maintenance costs were estimated using a planned life of 15 years for monitoring the natural attenuation.

RA25-3 (Bioventing of Soil and Air Sparging of Plume), and its related residential alternative RA25-3R, ranked second highest for costs with total present worth costs of $796,100 and $833,500, respectively. Capital costs for these alternatives are estimated to be $373,500 and $422,300, respectively. These costs include equipment costs for a soil bioventing system and groundwater air sparging system, treatability studies, site work, professional labor, and engineering design and construction costs; the residential alternative also includes removal of sediment from the northwestern ditch. The operating costs include costs for operation of the bioventing system for 5 years and operation of the air sparging system for 10 years. RA25-3AR was ranked slightly lower than RA25-3 and RA25-3A because the total present worth costs of this remedial action alternatives were estimated to be slightly higher at $796,300. The capital costs for this alternative was estimated to be $285,200, which is slightly higher than the capital costs for RA25-3A, since sediment removal is included in the residential counterpart.

RA25-4 (Source Removal, Off-site Disposal, and Monitoring of the Plume) and its residential counterpart, RA25-4R ranked fairly low for cost in comparison to other alternatives. The capital costs include construction costs for the excavation of soils, site work, design, professional labor, treatment of excavated groundwater, and transportation and off-site disposal of soils. While the capital costs for RA25-4 and RA25-4R were lower than RA25-5, $659,800 and $701,000 respectively, the operating costs are higher as a result of the long term monitoring costs for natural degradation. The residential option has the added cost of sediment removal from the northwestern ditch.

RA25-6 (Source Removal, Off-site Disposal, and Air Sparging of Plume) ranked the lowest in terms of cost. The total present worth of this alternative was $1,188,200 and its capital cost was $682,100. This alternative is ranked lower than the others because of the cost of operating the groundwater air sparging system and the need to perform field-scale testing prior to the implementation of that system. The operating costs were estimated using a planned operation time of 10 years for the air sparging.

RA25-2 (Institutional Controls and Natural Attenuation of Plume) ranked moderately in terms of costs compared to the other five alternatives other than the no-action alternative. This alternative has no capital construction costs other than professional labor. Operating costs are for groundwater monitoring until cleanup standards are achieved, which is estimated to be 150 years. This is based upon groundwater modeling that suggests that concentrations of volatile organics would meet the NYSDEC GA groundwater standards in this time frame by natural attenuation. The total present worth cost for RA25-2 is $819,900.

State Acceptance

State acceptance addresses technical and administrative concerns of the State with regard to remediation. The NYSDEC has provided input during the preparation of the Proposed Plan and ROD and their concurrence with the selected remedy is given in **Appendix B**.

Community Acceptance

Community acceptance addresses public comments received on the Administrative Record and the Proposed Plan. Community comments to the selected remedy were evaluated following the public comment period and are discussed in the Responsiveness Summary, **Appendix C**.

10.2.2 SEAD-26

Overall Protectiveness of Human Health and the Environment

Overall protection of human health and the environment is a threshold criterion because each alternative must meet this to be carried through the process. With the exception of the No-Action alternative, which was retained for comparative purposes, all the alternatives were rated highly protective of human health and the environment. The BRA performed as part of the Remedial Investigation (RI) indicates that, in the short-term, the No-action alternative is protective of human health, since the calculated carcinogenic risk for current site workers is 1.1×10^{-6}, which is at the lower end of the USEPA target risk range. The non-carcinogenic risk (HI) of 0.004 is less than the criterion of 1 and is protective of human health. According to the baseline risk assessment, ecological risk at this site is negligible.

Compliance with ARARs

Compliance with ARARs is a threshold criterion because each alternative must meet this in order to be carried through the process. With the exception of the No-Action alternative, which was retained for comparative purposes, all the alternatives were rated highly for ARAR compliance. While the more aggressive alternatives will achieve ARAR compliance sooner than approaches employing natural mechanisms, all are expected to comply with ARARs and cleanup goals.

Long-Term Effectiveness and Permanence

The criterion of long-term effectiveness addresses the long-term protectiveness to human health and the environment. Most of the evaluated alternatives are highly effective in eliminating the long-term threats. The results of the BRA indicate that for current and intended future industrial use of this site, the risks are within the USEPA target range for carcinogenic risks and below the acceptable target value for non-carcinogenic risks. Under a residential scenario, carcinogenic risk (7E-05) is at the higher end of the acceptable USEPA target risk range due to carcinogenic PAHs and arsenic in soil. The child receptor experiences a non-carcinogenic risk, with a hazard index of 1.3 due to bis(2-ethylhexyl)phthalate, arsenic, and thallium. Because BTEX compounds exceed groundwater cleanup

standards, the no-action alternative is not protective of the environment and ranked lowest. Alternative RA26-2 ranked highest since it addresses elevated levels of PAHs that contribute to carcinogenic risk at the site. Alternatives RA26-3 and RA26-4 were rated lower, but equally for long-term effectiveness.

Reduction in Toxicity, Mobility or Volume

Alternatives have been compared relative to the decreases in the volume/toxicity, mobility, and permanence of the hazardous contaminants present at the site.

RA26-2 ranked the highest for volume/toxicity reduction since it addresses on-site soil contamination by reducing the volume of PAHs in soils. With the exception of RA26-1 (No-action), all the remaining alternatives received the same score for volume/toxicity reduction. The No-action alternative was ranked lowest because there is no-action taken to monitor ARAR exceedances. All of the other alternatives effectively reduce the volume and/or toxicity of contaminants at the site. However, the No Action alternative will not monitor contaminants on-site, whereas the other alternatives will be shown to meet cleanup goals prior to their completion. The primary difference between the alternatives is the time to achieve the reductions. According to groundwater modeling results, Alternative RA26-2 (Soil Removal, Off-site Disposal, and Monitoring of Plume) would reduce BTEX levels in groundwater to cleanup goal levels in 20 years. Alternative RA26-3 (Air Sparging of Plume) and RA26-4 (Air Stripping of Plume) are expected to meet the cleanup goals sooner (conservatively estimated at 10 years). RA26-3 would reduce the toxicity of the contaminants present in the groundwater through aerobic biodegradation and volatilization in the aquifer. Air stripping the plume (RA26-4) would decrease the volume of contaminated groundwater over time as organics are removed.

The No-action alternative scored lowest for reduction in mobility because when the alternative is complete there will still be contaminants in the groundwater capable of migrating off-site. However, even with No-action, off-site migration is unlikely. The remaining alternatives were equally rated because they all prevent the migration of contaminants off-site.

In terms of permanence, the no-action alternative was rated lowest due to the lack of destruction of contaminants upon completion. The remaining alternatives effectively provide permanent destruction of the COCs once the remedial action objectives have been obtained.

Short-Term Effectiveness

Alternative RA26-1 (No-action) ranked highest in terms of short-term protection of human health and the environment. This is due to the low risk to human health and the environment that the site currently poses. Administrative and land use controls currently in place also contribute to the short-term effectiveness. Alternatives RA26-2 through RA26-4 were rated equally in terms of short-term effectiveness. They were ranked slightly lower due to the time required to implement the

remedy. RA26-2 (Soil Removal, Off-site Disposal, and Monitoring of Plume) is expected to take more time than the other alternatives to meet ARAR levels for BTEX in groundwater. Alternative RA26-3 (Air Sparging of Plume) and RA26-4 (Air Stripping of Plume) were also ranked slightly lower than the No-action alternative due to the potential treatment time. Protection from exposure can be minimized through site access controls and the use of proper protective equipment for site workers, such as respirators, dust masks and Tyvek protective clothing. Air monitoring may be used to determine if there is a significant threat from the inhalation of vapors or particulates. Dust generation at the excavation can be minimized by using water or other dust control chemicals. It should also be noted that all the site workers would be required to meet all the OSHA training and medical monitoring requirements prior to working on-site. There is little potential for release of hazardous contaminants during the remedial action.

Implementability

The alternatives carried to the detailed analysis score well on implementability. For technical feasibility, alternative RA26-1 (No-action) scored highest due the lack of technical concerns. Alternative RA26-2 (Soil Removal, Off-site Disposal, and Monitoring of Plume) rated slightly lower than the No-action alternative due to the uncertainties associated with natural biodegradation of contaminants in groundwater. However, Alternative RA26-2 is rated more favorably than RA26-3 and RA26-4 since there would be no permanent land use controls to implement. Alternative RA26-3 (Air Sparging of Plume) and RA26-4 (Air Stripping of Plume) were rated lower due to the difficulties associated with setting up the groundwater treatment system and implementing groundwater collection in a groundwater trench.

All of the alternatives were rated as “required coordination is normal” because each option can be expected to require coordination with other offices and agencies (e.g., obtaining permits for off-site activities or rights-of-way for construction).

All the alternatives scored equally high on the issue of availability of services and materials. None of the alternatives pose a challenge from this standpoint.

Cost

This comparison evaluated the present worth costs of the alternatives. The O&M costs have been revised since the Proposed Plan to adjust the costs for groundwater monitoring. The capital, present worth annual and total present worth costs are presented in **Table 10-2**.

The least expensive alternative is RA26-1 (No-action) which has no costs associated with it. RA26-2 (Soil Removal, Off-site Disposal, and Monitoring of Plume) rated second in terms of cost. RA26-4 (Air Stripping of Plume) rated third in terms of cost. These tasks could be performed by local vendors using local materials. The most expensive alternative is the RA26-3 (Air Sparging of Plume)

due to the present worth costs of constructing an air sparging system. Costs for institutional controls are included in the O&M costs for RA26-3 and RA26-4.

State Acceptance

State acceptance addresses technical and administrative concerns of the State with regard to remediation. The NYSDEC has provided input during the preparation of the Proposed Plan and ROD and their concurrence with the selected remedy is given in **Appendix B**.

Community Acceptance

Community acceptance addresses public comments received on the Administrative Record and the Proposed Plan. Community comments to the selected remedy were evaluated following the public comment period and are discussed in the Responsiveness Summary, **Appendix C**.

11.0 SELECTED REMEDY

SEAD-25

While the goal of the remedial action is to have no residual contamination in soils above TAGM levels, remedial action success will be achieved when soils have been remediated to the level that eliminates an unacceptable risk to human health. Based on the evaluation of the various options, the U.S. Army recommends Alternative RA25-4R (Source Removal, Off-site Disposal, Long-Term Monitoring of Plume, and Sediment Removal) (**Figures 6-1** and **6-2**). The elements that compose the remedy include:

- Excavate soil at the source in an area approximately 60 feet by 100 feet to a depth of 6 feet (approximately 1,350 CY), as depicted in **Figure 6-2**;
- Excavate a volume of sediment approximately 780 feet long, 3 feet wide and 2 feet deep (approximately 175 CY) from the northwest ditch, as depicted in **Figure 6-2**;
- Dispose of excavated soils in an appropriate off-site facility;
- Dewater the excavation pit;
- Treat groundwater that is recovered during excavation and during dewatering of excavation pit with an on-site air stripper;
- Replace excavated soil with clean backfill and establish a ground cover to avoid soil erosion;
- Conduct groundwater monitoring of the plume until NYSDEC Class GA groundwater standards are achieved (approximately 10 years);
- Establish and maintain land use controls to prevent access to or use of groundwater until cleanup standards are met;
- Complete a review of the selected remedy every five-years (at minimum), in accordance with Section 121(c) of the CERCLA;
- Prepare a contingency plan that may include additional monitoring and air sparging of the plume, as necessary; and
- Once groundwater cleanup standards are achieved, the groundwater use restriction may be eliminated.

The frequency of long-term monitoring will be detailed in the RD plan. The cleanup standards for groundwater at the site are NYSDEC Class GA groundwater standards, presented in **Table 1-1B**. Until the contaminant levels in the groundwater meet the cleanup standards, a land use control (or institutional control) in the form of a groundwater use restriction will be a part of the remedy, as specified in the discussion of the remedy for SEAD-25.

A summary of the SEAD-25 and SEAD-26 Land Use Controls is provided below.

The present worth cost of this alternative is $922,200. The capital cost and the O&M cost of RA25-4R are $701,000 and $221,200, respectively.

This alternative was selected as the preferred alternative since it eliminates source soils from further impacting groundwater at the site, eliminates sediments that contribute to human health risk, and effectively treats the most highly impacted groundwater at the site. This alternative does not require any treatability or pilot studies as other alternatives do, and does not require any long-term operating system, while maintaining its effectiveness. In addition, the U.S. Army believes that in selecting this alternative, property transfer at this site may be expedited since the time to implement this remedy is relatively short. The removal of soils and sediments from the site so that the source of contamination no longer exists ranked as one of the highest remedies for effectiveness and implementability among the other alternatives considered in the FS. While it is not the most cost-effective solution, it will provide an effective and efficient solution requiring the least amount of operation and maintenance and restores the land for unrestricted use, thereby reducing the long-term costs associated with maintaining and enforcing land use controls.

SEAD-26

Based on the evaluation of the various options, the U.S. Army recommends Alternative RA26-2 (Soil Removal, Off-site Disposal, and Monitoring of Plume) (**Figure 11-1**). The preferred remedy consists of the following elements:

- Excavate surface soils with total carcinogenic PAH concentrations above 10 ppm, for an estimated total of 1050 CY;
- Dispose of excavated soils in an appropriate off-site facility;
- Conduct groundwater monitoring until the groundwater cleanup standards are met (approximately 20 years) in order to ensure that the VOCs present do not migrate off-site;
- Establish and maintain groundwater use controls to restrict groundwater access and use until cleanup standards are achieved;
- Complete a review of the selected remedy every five-years (at minimum), in accordance with Section 121(c) of the CERCLA;
- Prepare a contingency plan that may include additional monitoring and air sparging of the plume, as necessary, which would protect against VOC contamination migrating off-site; and
- Remove groundwater use restrictions once groundwater cleanup standards are achieved.

The cleanup goal for the PAHs is a value of 10 ppm for total carcinogenic PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene] at each sample location. It should be noted that a review of the available site data suggests that the highest concentrations of the greatest contributors to carcinogenic risk (benzo(a)pyrene and dibenz(a,h)anthracene) that would remain on-site following a removal action with 10 ppm as a cleanup goal would be 1200 μg/Kg and 410 μg/Kg, respectively.

The frequency of long-term monitoring will be detailed in the RD plan. The cleanup standards for groundwater at the site are NYSDEC Class GA groundwater standards, presented in **Table 1-1B**.

Until the contaminant levels in the groundwater meet the cleanup standards, a land use control (or institutional control) in the form of a groundwater use restriction will be a part of the remedy, as specified in the discussion of the remedy for SEAD-25. A summary of the SEAD-25 and SEAD-26 Land Use Controls is provided below.

The present worth cost of this alternative is $750,800. The capital cost and the O&M cost of RA26-2 are $411,700 and $339,100, respectively.

This alternative was selected as the preferred alternative because the groundwater is impacted by relatively low concentrations of VOCs in only one well on-site and it would be suitable to monitor the groundwater and restrict its access until cleanup standards are achieved. In addition, removal of PAH contaminated soils would eliminate the need for any permanent land use controls. In comparison to other remedies considered in the FS, this alternative ranks high for protection of the environment, ARAR compliance, and short and long-term effectiveness. This alternative also ranks highest for implementability (administrative and technical feasibility) and cost, although it is estimated to take longer than other remedies to achieve cleanup goals.

SEAD 25 AND 26 Land Use Control Performance Objectives

The LUC performance objectives for SEAD 25 and 26 are to:

- Prevent access or use of the groundwater until cleanup levels are met; and
- Maintain the integrity of any current or future remedial or monitoring system.

The land use controls would be implemented over the area bounded by the site boundary at SEAD-25 (**Figure 6-2**) and SEAD-26 (**Figure 11-1**). The LUCs will continue until the groundwater beneath has been reduced to levels that allow for unlimited exposure and unrestricted use. With the approval of USEPA, once groundwater cleanup standards are achieved, the groundwater use restrictions may be eliminated and the site may be released for unrestricted use.

In order to implement the Army's remedy, which includes the imposition of land use controls, a LUC Remedial Design for SEAD-25 and 26 will be prepared which satisfies the applicable requirements of Paragraphs (a) and (c), Environmental Conservation Law (ECL) Article 27, Section 1318: Institutional and Engineering Controls. In addition, the Army will prepare an environmental easement for SEADs 25 and 26, consistent with Section 27-1318(b) and Article 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at the time of the property's transfer from federal ownership. A schedule for completion of the draft SEAD 25 and 26 LUC Remedial Design Plan (LUC RD) will be completed within 21 days of the ROD signature, consistent with Section 14.4 of the Federal Facilities Agreement (FFA).

The Army shall implement, inspect, report and enforce the LUCs objectives described in this ROD in accordance with the approved LUC RD. Although the Army may later transfer these responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall

retain ultimate responsibility for remedy integrity. Should the Army transfer these responsibilities, the Army shall provide timely written notice to the regulators of the transferee, which shall include the entity's name, address, and general remedial responsibility.

Finally, it should be noted that a deed notice will be included to notify future users that site-related contaminants are present in the adjacent roadside ditch (along Administration Avenue) at SEAD-25. These site-related contaminants do not contribute to an unacceptable human health risk at the site. The Army will have no additional LUC implementation responsibilities with respect to the roadside ditch contaminants.

12.0 STATUTORY DETERMINATIONS

As noted previously, CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

For reasons discussed below, the remedial action selected for implementation at SEAD-25 and SEAD-26 is consistent with CERCLA §121, 42 U.S.C. §9621 and, to the extent practical, the NCP. The Selected Remedy is protective of human health and the environment, attains ARARs, and is cost effective.

12.1 SEAD-25

12.1.1 The Selected Remedy Is Protective of Human Health and the Environment

The Selected Remedy is protective of human health and the environment through source removal, off-site disposal, and long-term monitoring of the groundwater plume. Alternative RA25-4R reduces human health risks by excavating the soil and sediment that could cause a potential human health risk for a future resident. Alternative RA25-4R also provides long-term monitoring of the groundwater, until ARARs are achieved; and, land use controls would be in place to prevent the use of the groundwater. The BRA was recalculated using the concentrations of COCs that would remain on-site after the removal action, and RA25-4R eliminates human health risk for all receptors, including a future resident.

12.1.2 The Selected Remedy Attains ARARs

Alternative RA25-4R will comply with ARARs. In the short-term, land use controls will be imposed at SEAD-25 until ARARs for groundwater are achieved. Once ARARs are achieved, no land use controls would be required.

12.1.3 The Selected Remedy is Cost Effective

The capital costs include construction costs for the excavation of soils, site work, design, professional labor, treatment of excavated groundwater, and transportation and off-site disposal of soils. While the O&M costs were lower than other alternatives, the capital costs are higher as a result of the additional soil excavation. While it is not the most cost-effective solution, it will provide an effective

solution requiring the least amount of operation and maintenance. Time to implement and elimination of operating systems have gained increased importance due to the fact that the transfer of property at Seneca has become a higher priority. This alternative provides overall protectiveness to human health and the environment, and the simple implementability justifies the selection of RA25-4R despite its higher cost.

12.1.4 The Selected Remedy Utilized Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

The Selected Remedy will be considered permanent when the concentrations of contaminants in soils, sediment, and groundwater are reduced to the site-specific cleanup standards. Air stripping of the groundwater removed during the excavation would provide a permanent solution to the most chemically impacted portion of the plume. RA25-4R meets the statutory requirement for permanence by disposing of the excavated soils and sediment off-site in a landfill. The Selected Remedy affords the best balance of criteria as compared to other alternatives, since RA25-4R has a reasonable cost and the best implementability in light of the importance of future land transfer, while providing the required level of overall protectiveness of human health and the environment.

12.1.5 The Selected Remedy Satisfies the Preference for Treatment that Permanently and Significantly Reduces the Toxicity, Mobility, or Volume of Hazardous Substances as a Principal Element

The statutory preference for treatment as a principal element is satisfied by the Selected Remedy, which relies on excavation and off-site disposal in a landfill of contaminated media. Although the Selected Remedy does not rely on treatment as the principal element for soils and sediment, it does address the principal threats posed by soils and sediment. A significant portion of the groundwater would be treated during the excavation process using an on-site air stripper. The Selected Remedy provides the most easily implementable alternative that can achieve the maximum extent of overall protection of human health and the environment at a reasonable cost.

12.2 SEAD-26

12.2.1 The Selected Remedy Is Protective of Human Health and the Environment

The Selected Remedy, RA26-2, is protective of human health and the environment through the removal of soils with elevated PAHs and the implementation of a groundwater use restriction until groundwater cleanup standards are achieved. In the risk assessment, the calculated carcinogenic and non-carcinogenic risks for all receptors other than the resident child, were within acceptable ranges. The land use controls implemented under the Selected Remedy will ensure that risks to the resident child are eliminated by preventing access to site groundwater.

12.2.2 The Selected Remedy Attains ARARs

Alternative RA26-2 was rated highly for compliance with ARARs. While other options that are more aggressive would achieve ARARs sooner than the Selected Remedy, which employs natural mechanisms, RA26-2 is expected to comply with ARARs. In the short-term, land use controls would be imposed at SEAD-26 until ARARs for groundwater are achieved. Once ARARs are achieved for groundwater, land use controls would no longer be required.

12.2.3 The Selected Remedy is Cost Effective

The Selected Remedy is cost effective alternative. RA26-2 is the lowest cost alternative and the absence of permanent land use restrictions, offsets the higher capital cost incurred in the limited soil excavation. Although RA26-2 may take a longer time until the action is complete, it also ranked highest for implementability, and it ranked high for protection of the environment, ARAR compliance, and short and long-term effectiveness.

12.2.4 The Selected Remedy Utilized Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

The results of the BRA indicate that for current and intended future use of this site, the risks are within the USEPA target range for carcinogenic risks and below the acceptable target value for non-carcinogenic risks for all receptors other than the resident child. The environmental risk assessment concluded there was negligible risk at SEAD-26 to the environment. The Selected Remedy was rated equally as the more aggressive alternatives for long-term effectiveness. Alternative RA26-2 is expected to achieve cleanup standards and provide permanent solutions. The Selected Remedy affords the best balance of protection of the environment, ARAR compliance, short and long-term effectiveness, implementability (technical feasibility) and cost.

12.2.5 The Selected Remedy Satisfies the Preference for Treatment that Permanently and Significantly Reduces the Toxicity, Mobility, or Volume of Hazardous Substances as a Principal Element

The statutory preference for treatment as a principal element is satisfied by the Selected Remedy, which relies on excavation and off-site disposal in a landfill of soils with elevated levels of PAHs. Although the Selected Remedy does not rely on treatment as the principal element for soils and groundwater, it does address the principal threats posed by soils. Additionally, the monitoring of the plume and the groundwater use restriction will effectively protect future receptors from the threat of contact with the contaminated groundwater.

13.0 DOCUMENTATION OF SIGNIFICANT CHANGES

(Reserved).

14.0 STATE ROLE

(Reserved).

Table 1-1A
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Site-Specific Cleanup Goals for All Media of Concern

	Soil NYSDEC TAGM[1] ug/kg	Groundwater NYSDEC Class GA Standard[2] ug/L	Sediment NYSDEC TAGM[1] ug/kg
Volatile Organic Compounds			
1,1,1-Trichloroethane	800	5	NA
1,1-Dichloroethane	200	5	NA
1,2-Dichloroethene (total)		5	NA
Benzene	60	1	NA
Chloroform	300	7	NA
Ethyl benzene	5,500	5	NA
Toluene	1,500	5	NA
Trichloroethene	700	5	NA
Xylene (total)	1200	5	NA
Semivolatile Organic Compounds			
Benzo(a)anthracene	NA	NA	224 or MDL [4]
Benzo(a)pyrene	NA	NA	61 or MDL [4]
Benzo(b)fluoranthene	NA	NA	1100
2-Methylnaphthalene	36,400	NA	NA
2-Methylphenol[3]	NA	1	NA
2,4-Dimethylphenol[3]	NA	1	NA
3',3'-Dichlorobenzidine	NA	5	NA
4-Methylphenol[3]	NA	1	NA
Naphthalene	13,000	NA	NA
Phenol[3]	30	1	NA

1. NYSDEC TAGM values from Technical and Administrative Guidance Memorandum HWR-92-4046, January 24, 1994 (Tables 1, 2, and 3).
2. NYSDEC AWQS for Class GA waters. From 6 NYCRR Parts 701-705. TOGS 1.1.1, June 1998.
3. For groundwater, a standard of 1 µg/L applies to the sum of total phenolic compounds.
4. For semivolatile organic compounds the Minimum Detection Limit (MDL) is 330 ug/Kg.

NA indicates that the compound is not a COC in that media.

Table 1-1B
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Site-Specific Cleanup Goals for All Media of Concern

	Groundwater NYSDEC Class GA Standard[1] ug/L
Volatile Organic Compounds	
Benzene	1
Ethyl benzene	5
Xylene (total)	5
1,2,4-Trimethylbenzene[2]	5
1,3,5-Trimethylbenzene[2]	5
n-Propylbenzene[2]	5
p-Isopropyltoluene[2]	5

1. NYSDEC AWQS for Class GA waters. From 6 NYCRR Parts 701-705. TOGS 1.1.1, June 1998.
2. Principal organic contaminant standard applies (TOGS 1.1.1, June 1998).

	Soils (Subsurface, Surface, and Ditch)
Total Carcinogenic PAHs[3]	10 ppm

3. Carcinogenic PAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

TABLE 6-1A
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Surface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit		No. of Hits>TAGM
Volatile Organics							
Acetone	106.7	UG/KG	NYSDEC GW Prot.	5.6	5.0		0
Semivolatile Organics							
Benzo[a]anthracene	224 OR MDL [(2)]	UG/KG	USEPA Health Based	176.2	78.0	[(4)]	0
Benzo[a]pyrene	61 OR MDL [(2)]	UG/KG	USEPA Health Based	161.1	87.0	[(4)]	2
Benzo[b]fluoranthene	1067	UG/KG	NYSDEC GW Prot.	162.4	86.0	[(4)]	0
Benzo[ghi]perylene	50000	UG/KG	NYSDEC Rec.	159.9	82.0	[(4)]	0
Benzo[k]fluoranthene	1067	UG/KG	NYSDEC GW Prot.	180.0	96.0	[(4)]	0
Chrysene	388	UG/KG	NYSDEC GW Prot.	129.9	110.0	[(4)]	0
Dibenz[a,h]anthracene	14 or MDL [(2)]	UG/KG	USEPA Health Based	168.0	42.0	[(4)]	2
Fluoranthene	50000	UG/KG	NYSDEC Rec.	92.3	200.0		0
Indeno[1,2,3-cd]pyrene	3104	UG/KG	NYSDEC GW Prot.	172.9	55.0	[(4)]	0
Phenanthrene	50000	UG/KG	NYSDEC Rec.	153.9	130.0	[(4)]	0
Pyrene	50000	UG/KG	NYSDEC Rec.	82.7	170.0		0
Pesticides/PCBs							
Endosulfan I	873	UG/KG	NYSDEC Rec.	1.3	2.1		0
Endrin aldehyde		UG/KG		2.9	8.4		0
Metals [(3)]							
Lead	21.86	MG/KG	Site Background	33.0	44.4		8
Selenium	2	MG/KG	NYSDEC Rec.	1.0	1.3		0
Thallium	0.28	MG/KG	Site Background	0.9	1.8		7

1. NYSDEC TAGM values are based on Technical and Administrative Guidance Memorandum HWR-94-4046 January 24, 1994. The TAGMs are TBCs and are for comparison purposes only. NYSDEC Groundwater Protection Standards are dependent on the organic content of surface soils at SEAD-25 which is 0.97%.
2. For semivolatile organic compounds the Minimum Detection Limit (MDL) is 330 ug/Kg.
3. According to the statistical analysis conducted in Section 6.2.3 of the RI report, lead, selenium, and thallium are the only elements that tend to be greater than the inorganic element concentrations that were detected in the same background media.
4. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.

TABLE 6-1B
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Surface and Subsurface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit		No. of Hits>TAGM
Volatile Organics							
1,1,1-Trichloroethane	592.8	UG/KG	NYSDEC GW Prot.	136.5	170.0		0
1,2-Dichloroethene (total)		UG/KG		125.0	310.0		0
2-Butanone	234	UG/KG	NYSDEC GW Prot.	6.4	10.0		0
Acetone	85.8	UG/KG	NYSDEC GW Prot.	217.6	2800.0		3
Benzene	46.8	UG/KG	NYSDEC GW Prot.	134.8	100.0	[4]	1
Carbon disulfide	2106	UG/KG	NYSDEC GW Prot.	5.6	2.0	[4]	0
Chloroform	234	UG/KG	NYSDEC GW Prot.	6.3	9.0		0
Ethyl benzene	4290	UG/KG	NYSDEC GW Prot.	488.0	17000.0		1
Methylene chloride	78	UG/KG	NYSDEC GW Prot.	116.4	390.0		2
Toluene	1170	UG/KG	NYSDEC GW Prot.	183.3	4500.0		1
Total Xylenes	936	UG/KG	NYSDEC GW Prot.	3828.9	130000.0		5
Trichloroethene	546	UG/KG	NYSDEC GW Prot.	124.6	280.0		0
Semivolatile Organics							
1,2,4-Trichlorobenzene	2652	UG/KG	NYSDEC GW Prot.	796.0	1600.0		0
1,4-Dichlorobenzene	6630	UG/KG	NYSDEC GW Prot.	798.4	1700.0		0
2,4-Dinitrotoluene		UG/KG		796.0	1600.0		0
2-Chlorophenol	624	UG/KG	NYSDEC GW Prot.	819.8	2600.0		1
2-Methylnaphthalene	28392	UG/KG	NYSDEC GW Prot.	925.3	8900.0		0
4-Chloro-3-methylphenol	187.2	UG/KG	NYSDEC GW Prot.	819.8	2600.0		1
4-Nitrophenol	78	UG/KG	NYSDEC GW Prot.	1578.2	1700.0		1
Acenaphthene	50000	UG/KG	NYSDEC Rec.	732.2	2000.0		0
Benzo[a]anthracene	224 or MDL [2]	UG/KG	USEPA Health Based	182.9	230.0		1
Benzo[a]pyrene	61 or MDL [2]	UG/KG	USEPA Health Based	183.9	87.0	[4]	2
Benzo[b]fluoranthene	858	UG/KG	NYSDEC GW Prot.	184.2	86.0	[4]	0
Benzo[ghi]perylene	50000	UG/KG	NYSDEC Rec.	176.3	120.0	[4]	0
Benzo[k]fluoranthene	858	UG/KG	NYSDEC GW Prot.	303.5	360.0		0
Bis(2-Ethylhexyl)phthalate	50000	UG/KG	NYSDEC Rec.	557.2	750.0		0
Chrysene	312	UG/KG	NYSDEC GW Prot.	165.3	110.0	[4]	0
Dibenz[a,h]anthracene	14 or MDL [2]	UG/KG	USEPA Health Based	260.1	360.0		3
Fluoranthene	50000	UG/KG	NYSDEC Rec.	155.6	200.0		0
Fluorene	50000	UG/KG	NYSDEC Rec.	456.6	1900.0		0
Indeno[1,2,3-cd]pyrene	2496	UG/KG	NYSDEC GW Prot.	187.1	55.0	[4]	0
N-Nitrosodiphenylamine		UG/KG		673.6	1500.0		0
N-Nitrosodipropylamine		UG/KG		803.2	1900.0		0
Naphthalene	10140	UG/KG	NYSDEC GW Prot.	387.7	4300.0		0
Pentachlorophenol	780	UG/KG	NYSDEC GW Prot.	1900.1	2300.0		1
Phenanthrene	50000	UG/KG	NYSDEC Rec.	471.3	4600.0		0
Phenol	23.4	UG/KG	NYSDEC GW Prot.	815.1	2400.0		1
Pyrene	50000	UG/KG	NYSDEC Rec.	591.2	2000.0		0
Pesticides/PCBs							
4,4`-DDE	2100	UG/KG		2.0	4.8		0
4,4`-DDT	1950	UG/KG	NYSDEC GW Prot.	1.9	3.4		0
Alpha-Chlordane		UG/KG		1.0	2.5		0
Aroclor-1254	1560	UG/KG	NYSDEC GW Prot.	21.9	130.0		0
Endosulfan I	702	UG/KG	NYSDEC GW Prot.	1.1	2.5		0
Endrin	78	UG/KG	NYSDEC GW Prot.	1.9	3.4		0
Endrin aldehyde		UG/KG		2.1	8.4		0
Heptachlorepoxide	15.6	UG/KG	NYSDEC GW Prot.	1.1	2.9		0
Metals [3]							
Lead	21.86	MG/KG	NYSDEC TAGM	31.7	291.0		14
Selenium	2	MG/KG	NYSDEC TAGM	0.7	2.3		1
Thallium	0.28	MG/KG	NYSDEC TAGM	0.6	1.8		20
Herbicides							
Dicamba		UG/KG		3.0	6.4		0
MCPP		UG/KG		2875.0	4075.0		0

1. NYSDEC TAGM values are based on Technical and Administrative Guidance Memorandum HWR-94-4046 January 24, 1994. The TAGMs are TBCs and are for comparison purposes only.
   NYSDEC Groundwater Protection Standards are dependent on the organic content of surface soils at SEAD-25 which is 0.78%.
2. For semivolatile organic compounds the Minimum Detection Limit (MDL) is 330 ug/Kg.
3. According to the statistical analysis conducted in Section 6.2.3 of the RI report, lead, selenium, and thallium are the only elements that tend to be greater than the inorganic element concentrations that were detected in the same background media.
4. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.

TABLE 6-1C
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Groundwater Analysis Results

Parameter	NYSDEC AWQS*	Units	Source	Mean	Max. Hit		No. of Hits>AWQS
Volatile Organics							
1,1,1-Trichloroethane	5	UG/L	NYSDEC AWQS-GA	5.4	37.0		3
1,1-Dichloroethane	5	UG/L	NYSDEC AWQS-GA	2.2	8.0		1
1,1-Dichloroethene	5	UG/L	NYSDEC AWQS-GA	0.6	1.0		0
1,2-Dichloroethene (total)	5	UG/L	NYSDEC AWQS-GA	8.9	40.0		4
2-Butanone (2)	50	UG/L	NYSDEC Guidance	9.7	130.0		1
Benzene	1	UG/L	NYSDEC AWQS-GA	79.2	1000.0		7
Bromoform (2)	50	UG/L	NYSDEC Guidance	1.8	6.0		0
Chlorodibromomethane (2)	50	UG/L	NYSDEC Guidance	1.3	3.0		0
Chloroform	7	UG/L	NYSDEC AWQS-GA	4.5	17.0		2
Ethyl benzene	5	UG/L	NYSDEC AWQS-GA	25.8	520.0		5
Tetrachloroethene	5	UG/L	NYSDEC AWQS-GA	0.6	1.0		0
Toluene	5	UG/L	NYSDEC AWQS-GA	71.9	1400.0		6
Total Xylenes (3)	5	UG/L	NYSDEC AWQS-GA	231.0	3300.0		7
Trichloroethene	5	UG/L	NYSDEC AWQS-GA	2.5	10.0		2
Semivolatile Organics							
2,4-Dimethylphenol (4)	1	UG/L	NYSDEC AWQS-GA	8.5	86.0		3
2-Methylnaphthalene (5)		UG/L		9.2	69.0		0
2-Methylphenol (4)	1	UG/L	NYSDEC AWQS-GA	15.5	23.0		2
3,3`-Dichlorobenzidine (6)	5	UG/L	NYSDEC AWQS-GA	8.9	10.0		1
4-Methylphenol (4)	1	UG/L	NYSDEC AWQS-GA	37.5	42.0		2
Fluorene (2)	50	UG/L	NYSDEC Guidance	5.0	1.0	(7)	0
Naphthalene (2)	10	UG/L	NYSDEC Guidance	14.9	160.0		3
Phenanthrene (2)	50	UG/L	NYSDEC Guidance	5.0	1.0	(7)	0
Phenol (4)	1	UG/L	NYSDEC AWQS-GA	10.0	56.0		1
Metals **							
Arsenic	25	UG/L	NYSDEC AWQS-GA	2.0	8.9		0
Cadmium	5	UG/L	NYSDEC AWQS-GA	0.2	0.4		0
Selenium	10	UG/L	NYSDEC AWQS-GA	1.8	4.8		0
Thallium (2)	0.5	UG/L	NYSDEC Guidance	1.9	4.7		2

*NYSDEC AWQS for Class GA waters. From 6 NYCRR Parts 703.5, March 12, 1998.
**According to the statistical analysis conducted in Section 6.2.3 of the RI report, arsenic, cadmium, selenium, and thallium were found to be at concentrations in portions of SEAD-25 which exceed concentrations in portions of background areas.
2. NYS Guidance Value, "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations", TOGS 1.1.1, June 1998.
3. A standard of 5 ug/L has been assigned to each of the following xylene isomers (1,2-xylene, 1,3-xylene, and 1,4-xylene).
4. A standard of 1 ug/L applies to the sum of total phenolic compounds.
5. No standard or guidance value for groundwater is available for these substances as of June 1998.
6. Principal Organic Contaminant Standard applies (TOGS, June 1998).
7. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.

TABLE 6-2A
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Surface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit		No. of Hits>TAGM
Volatile Organics							
1,1-Dichloroethene	388	UG/KG	NYSDEC GW Prot.	5.6	2.0	[4]	0
Acetone	106.7	UG/KG	NYSDEC GW Prot.	7.0	31.0		0
Benzene	58.2	UG/KG	NYSDEC GW Prot.	5.6	3.0	[4]	0
Carbon disulfide	2619	UG/KG	NYSDEC GW Prot.	5.6	2.0	[4]	0
Chlorobenzene	1649	UG/KG	NYSDEC GW Prot.	5.6	4.0	[4]	0
Chloroform	291	UG/KG	NYSDEC GW Prot.	5.6	5.8		0
Methylene chloride	97	UG/KG	NYSDEC GW Prot.	5.8	11.0		0
Toluene	1455	UG/KG	NYSDEC GW Prot.	5.5	4.0	[4]	0
Total Xylenes	1164	UG/KG	NYSDEC GW Prot.	5.6	7.0		0
Trichloroethene	679	UG/KG	NYSDEC GW Prot.	5.6	4.0	[4]	0
Semivolatile Organics							
1,2,4-Trichlorobenzene	3298	UG/KG	NYSDEC GW Prot.	375.9	430.0		0
2,4,5-Trichlorophenol	97	UG/KG	NYSDEC GW Prot.	747.6	850.0		1
2,4-Dinitrophenol	194	UG/KG	NYSDEC GW Prot.	816.4	960.0		9
2-Methylnaphthalene	35308	UG/KG	NYSDEC GW Prot.	775.6	590.0	[4]	0
2-Nitroaniline	417.1	UG/KG	NYSDEC GW Prot.	1853.9	4400.0		16
2-Nitrophenol	320.1	UG/KG	NYSDEC GW Prot.	357.1	430.0		15
3,3`-Dichlorobenzidine		UG/KG		932.6	1800.0		0
3-Nitroaniline	485	UG/KG	NYSDEC GW Prot.	1756.4	5900.0		2
4,6-Dinitro-2-methylphenol		UG/KG		747.5	840.0		0
4-Chloro-3-methylphenol	232.8	UG/KG	NYSDEC GW Prot.	369.6	400.0		4
4-Chloroaniline	213.4	UG/KG	NYSDEC GW Prot.	322.1	390.0		5
4-Nitroaniline		UG/KG		1712.2	1800.0		0
Acenaphthene	50000	UG/KG	NYSDEC Rec.	844.6	990.0		0
Anthracene	50000	UG/KG	NYSDEC Rec.	879.5	1600.0		0
Benzo[a]anthracene	224 or MDL [2]	UG/KG	USEPA Health Based	1157.0	4700.0		18
Benzo[a]pyrene	61 or MDL [2]	UG/KG	USEPA Health Based	1114.6	4400.0		30
Benzo[b]fluoranthene	1067	UG/KG	NYSDEC GW Prot.	1233.2	5000.0		8
Benzo[ghi]perylene	50000	UG/KG	NYSDEC Rec.	958.1	2800.0		0
Benzo[k]fluoranthene	1067	UG/KG	NYSDEC GW Prot.	1066.2	4200.0		5
Bis(2-Ethylhexyl)phthalate	50000	UG/KG	NYSDEC Rec.	304.2	400.0		0
Butylbenzylphthalate	50000	UG/KG	NYSDEC Rec.	877.3	730.0	[4]	0
Carbazole		UG/KG		880.0	1400.0		0
Chrysene	388	UG/KG	NYSDEC GW Prot.	1213.3	4900.0		15
Di-n-butylphthalate	7857	UG/KG	NYSDEC GW Prot.	604.7	6200.0		0
Dibenz[a,h]anthracene	14 or MDL [2]	UG/KG	USEPA Health Based	835.2	750.0	[4]	16
Dibenzofuran	6014	UG/KG	NYSDEC GW Prot.	462.1	480.0		0
Fluoranthene	50000	UG/KG	NYSDEC Rec.	1893.8	11000.0		0
Fluorene	50000	UG/KG	NYSDEC Rec.	833.8	960.0		0
Hexachlorobutadiene		UG/KG		375.8	430.0		0
Hexachlorocyclopentadiene		UG/KG		379.2	430.0		0
Indeno[1,2,3-cd]pyrene	3104	UG/KG	NYSDEC Rec.	959.1	2800.0		0
Isophorone	4268	UG/KG	NYSDEC Rec.	357.1	430.0		0
Naphthalene	1261	UG/KG	NYSDEC GW Prot.	185.0	36.0	[4]	0
Nitrobenzene	194	UG/KG	NYSDEC GW Prot.	332.8	400.0		8
Pentachlorophenol	970	UG/KG	NYSDEC GW Prot.	871.4	960.0		0

TABLE 6-2A
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Surface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit	No. of Hits>TAGM
Phenanthrene	50000	UG/KG	NYSDEC Rec.	1395.3	8900.0	0
Pyrene	50000	UG/KG	NYSDEC Rec.	1116.0	8500.0	0
Pesticides/PCBs						
4,4`-DDD	2900	UG/KG	USEPA Health Based	2.9	22.0	0
4,4`-DDE	2100	UG/KG	USEPA Health Based	7.3	140.0	0
4,4`-DDT	2100	UG/KG	USEPA Health Based	5.3	66.0	0
Alpha-Chlordane		UG/KG		1.2	1.6	0
Beta-BHC	194	UG/KG	NYSDEC GW Prot.	1.2	1.4	0
Pesticides/PCBs (cont)						
Delta-BHC	291	UG/KG	NYSDEC GW Prot.	1.1	1.2	0
Dieldrin	44	UG/KG	USEPA Health Based	2.3	4.4	0
Endosulfan I	873	UG/KG	NYSDEC GW Prot.	1.3	5.6	0
Endosulfan II	873	UG/KG	NYSDEC GW Prot.	4.9	60.0	0
Endosulfan sulfate	970	UG/KG	NYSDEC GW Prot.	3.7	23.0	0
Endrin	97	UG/KG	NYSDEC GW Prot.	2.4	8.0	0
Endrin aldehyde		UG/KG		3.7	23.0	0
Endrin ketone		UG/KG		2.6	13.0	0
Gamma-Chlordane	540	UG/KG	USEPA Health Based	1.3	7.8	0
Heptachlor	97	UG/KG	NYSDEC GW Prot.	1.3	2.9	0
Heptachlorepoxide	19.4	UG/KG	NYSDEC GW Prot.	1.3	2.8	0
Methoxychlor		UG/KG		11.3	21.0	0
Nitroaromatics						
2,4-Dinitrotoluene		UG/KG		148.5	410.0	0
4-amino-2,6-Dinitrotoluene		UG/KG		68.3	97.5	0
HMX		UG/KG		76.2	120.0	0
Metals [3]						
Arsenic	7.5	MG/KG	NYSDEC Rec.	6.3	12.2	14
Lead	21.86	MG/KG	Site Background	28.6	522.0	15
Selenium	2	MG/KG	NYSDEC Rec.	0.4	0.9	0
Thallium	0.28	MG/KG	Site Background	0.6	1.3	31
Zinc	82.5	MG/KG	Site Background	99.9	503.0	34
Herbicides						
2,4,5-T	1843	UG/KG	NYSDEC GW Prot.	26.1	220.0	0
2,4-D	485	UG/KG	NYSDEC GW Prot.	50.7	260.0	0

1. NYSDEC TAGM values are based on Technical and Administrative Guidance Memorandum HWR-94-4046 January 24, 1994. The TAGMs are TBCs and are for comparison purposes only.
   NYSDEC Groundwater Protection Standards are dependent on the organic content of surface soils at SEAD-26 which is 0.97%.
2. For semivolatile organic compounds the Minimum Detection Limit (MDL) is 330 ug/Kg.
3. According to the statistical analysis conducted in Section 7.2.3 of the RI report, arsenic, lead, selenium, thallium, and zinc are the only elements that tend to be greater than the inorganic element concentrations that were detected in the same background media.
4. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.

TABLE 6-2B
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Surface and Subsurface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit		No. of Hits>TAGM
Volatile Organics							
1,1-Dichloroethene	124	UG/KG	NYSDEC GW Prot.	5.7	2.0	[4]	0
2-Butanone	93	UG/KG	NYSDEC GW Prot.	28.1	19.0	[4]	0
Acetone	34.1	UG/KG	NYSDEC GW Prot.	33.2	120.0		2
Benzene	18.6	UG/KG	NYSDEC GW Prot.	5.7	3.0	[4]	0
Carbon disulfide	837	UG/KG	NYSDEC GW Prot.	5.6	2.0	[4]	0
Chlorobenzene	527	UG/KG	NYSDEC GW Prot.	5.7	4.0	[4]	0
Chloroform	93	UG/KG	NYSDEC GW Prot.	5.7	5.8		0
Ethyl benzene	1705	UG/KG	NYSDEC GW Prot.	24.4	360.0		0
Methylene chloride	31	UG/KG	NYSDEC GW Prot.	31.8	365.0		1
Toluene	465	UG/KG	NYSDEC GW Prot.	5.6	4.3	[4]	0
Total Xylenes	372	UG/KG	NYSDEC GW Prot.	23.8	310.0		0
Trichloroethene	217	UG/KG	NYSDEC GW Prot.	5.7	4.0	[4]	0
Semivolatile Organics							
1,2,4-Trichlorobenzene	1054	UG/KG	NYSDEC GW Prot.	452.8	430.0	[4]	0
2,4,5-Trichlorophenol	31	UG/KG	NYSDEC GW Prot.	849.8	930.0		3
2,4-Dinitrophenol	62	UG/KG	NYSDEC GW Prot.	879.8	960.0		9
2-Methylnaphthalene	11284	UG/KG	NYSDEC GW Prot.	688.0	5300.0		0
2-Nitroaniline	133.3	UG/KG	NYSDEC GW Prot.	1471.3	4400.0		22
2-Nitrophenol	102.3	UG/KG	NYSDEC GW Prot.	378.8	430.0		17
3,3`-Dichlorobenzidine		UG/KG		702.4	1800.0		0
3-Nitroaniline	155	UG/KG	NYSDEC GW Prot.	1367.0	5900.0		2
4,6-Dinitro-2-methylphenol		UG/KG		850.2	950.0		0
4-Chloro-3-methylphenol	74.4	UG/KG	NYSDEC GW Prot.	352.9	400.0		4
4-Chloroaniline	68.2	UG/KG	NYSDEC GW Prot.	354.7	390.0		5
4-Nitroaniline	309.69	UG/KG	NYSDEC GW Prot.	1340.8	1800.0		1
Acenaphthene	27900	UG/KG	NYSDEC GW Prot.	614.3	990.0		0
Anthracene	50000	UG/KG	NYSDEC Rec.	650.0	1600.0		0
Benzo[a]anthracene	224 or MDL [2]	UG/KG	USEPA Health Based	832.5	4700.0		20
Benzo[a]pyrene	61 or MDL [2]	UG/KG	USEPA Health Based	799.2	4400.0		37
Benzo[b]fluoranthene	341	UG/KG	NYSDEC GW Prot.	880.0	5000.0		18
Benzo[ghi]perylene	50000	UG/KG	NYSDEC Rec.	708.4	2800.0		0
Benzo[k]fluoranthene	341	UG/KG	NYSDEC GW Prot.	769.2	4200.0		17
Bis(2-Ethylhexyl)phthalate	50000	UG/KG	NYSDEC Rec.	683.7	1300.0		0
Butylbenzylphthalate	37820	UG/KG	NYSDEC GW Prot.	658.5	730.0		0
Carbazole		UG/KG		650.2	1400.0		0
Chrysene	124	UG/KG	NYSDEC GW Prot.	873.0	4900.0		35
Di-n-butylphthalate	2511	UG/KG	NYSDEC GW Prot.	492.8	6200.0		1
Dibenz[a,h]anthracene	14 or MDL [2]	UG/KG	USEPA Health Based	625.7	1100.0		20
Dibenzofuran	1922	UG/KG	NYSDEC GW Prot.	604.0	520.0	[4]	0
Fluoranthene	50000	UG/KG	NYSDEC Rec.	1354.8	13000.0		0
Fluorene	50000	UG/KG	NYSDEC Rec.	616.3	1200.0		0
Hexachlorobutadiene		UG/KG		456.8	430.0	[4]	0
Hexachlorocyclopentadiene		UG/KG		366.4	430.0		0
Indeno[1,2,3-cd]pyrene	992	UG/KG	NYSDEC GW Prot.	720.9	2800.0		6
Isophorone	1364	UG/KG	NYSDEC GW Prot.	378.8	430.0		0
Naphthalene	4030	UG/KG	NYSDEC GW Prot.	641.8	850.0		0
Nitrobenzene	62	UG/KG	NYSDEC GW Prot.	360.8	400.0		8
Pentachlorophenol	310	UG/KG	NYSDEC GW Prot.	840.9	960.0		1

TABLE 6-2B
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Surface and Subsurface Soil Analysis Results

Parameter	NYSDEC TAGM [1]	Units	Source	Mean	Max. Hit	No. of Hits>TAGM
Phenanthrene	50000	UG/KG	NYSDEC Rec.	1032.4	8900.0	0
Pyrene	50000	UG/KG	NYSDEC Rec.	834.3	8500.0	0
Pesticides/PCBs						
4,4`-DDD	2900	UG/KG	USEPA Health Based	2.5	22.0	0
4,4`-DDE	1364	UG/KG	NYSDEC GW Prot.	5.2	140.0	0
4,4`-DDT	775	UG/KG	NYSDEC GW Prot.	3.9	66.0	0
Pesticides/PCBs (cont)						
Alpha-Chlordane		UG/KG		1.1	1.6	0
Beta-BHC	62	UG/KG	NYSDEC GW Prot.	1.1	1.4	0
Delta-BHC	93	UG/KG	NYSDEC GW Prot.	1.1	1.2	0
Dieldrin	44	UG/KG	USEPA Health Based	2.1	4.4	0
Endosulfan I	279	UG/KG	NYSDEC GW Prot.	1.2	5.6	0
Endosulfan II	279	UG/KG	NYSDEC GW Prot.	3.7	60.0	0
Endosulfan sulfate	310	UG/KG	NYSDEC GW Prot.	3.0	23.0	0
Endrin	31	UG/KG	NYSDEC GW Prot.	2.2	8.0	0
Endrin aldehyde		UG/KG		3.1	23.0	0
Endrin ketone		UG/KG		2.3	13.0	0
Gamma-Chlordane	540	UG/KG	USEPA Health Based	1.2	7.8	0
Heptachlor	31	UG/KG	NYSDEC GW Prot.	1.1	2.9	0
Heptachlor epoxide	6.2	UG/KG	NYSDEC GW Prot.	1.1	2.8	0
Methoxychlor		UG/KG		10.7	21.0	0
Nitroaromatics						
2,4-Dinitrotoluene		UG/KG		124.6	410.0	0
4-amino-2,6-Dinitrotoluene		UG/KG		67.3	97.5	0
HMX		UG/KG		73.0	120.0	0
Metals [3]						
Arsenic	7.5	MG/KG	NYSDEC Rec.	6.7	13.0	30
Lead	21.86	MG/KG	Site Background	31.1	522.0	20
Selenium	2	MG/KG	NYSDEC Rec.	0.4	1.1	0
Thallium	0.28	MG/KG	Site Background	0.5	1.4	44
Zinc	82.5	MG/KG	Site Background	96.9	503.0	52
Herbicides						
2,4,5-T	589	UG/KG	NYSEC GW Prot.	9.9	220.0	0
2,4-D	155	UG/KG	NYSDEC GW Prot.	35.7	260.0	1
Dicamba		UG/KG		3.3	9.1	0
MCPA		UG/KG		4172.0	29000.0	0
MCPP		UG/KG		3487.1	13000.0	0

1. NYSDEC TAGM values are based on Technical and Administrative Guidance Memorandum HWR-94-4046 January 24, 1994. The TAGMs are TBCs and are for comparison purposes only.
   NYSDEC Groundwater Protection Standards are dependent on the organic content of surface soils at SEAD-26 which is 0.31%.
2. For semivolatile organic compounds the Minimum Detection Limit (MDL) is 330 ug/Kg.
3. According to the statistical analysis conducted in Section 7.2.3 of the RI report, arsenic, lead, selenium, thallium, and zinc are the only elements that tend to be greater than the inorganic element concentrations that were detected in the same background media.
4. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.

TABLE 6-2C
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 Groundwater Analysis Results

Parameter	NYSDEC AWQS [1]	Units	Source	Mean	Max. Hit		No. of Hits>AWQS
Volatile Organics							
1,2,4-Trimethylbenzene	5	UG/L	NYSDEC AWQS-GA	1.6	17.0		2
1,3,5-Trimethylbenzene	5	UG/L	NYSDEC AWQS-GA	0.8	7.0		1
Acetone[2]	50	UG/L	NYSDEC Guidance	2.8	3.8		0
Benzene	1	UG/L	NYSDEC AWQS-GA	0.8	1.5		1
Ethyl benzene	5	UG/L	NYSDEC AWQS-GA	1.4	8.0		2
Isopropylbenzene	5	UG/L	NYSDEC AWQS-GA	0.7	5.0		1
Methyl chloride	5	UG/L	NYSDEC AWQS-GA	0.5	0.7		0
Naphthalene [2]	10	UG/L	NYSDEC Guidance	1.5	15.0		2
Toluene	5	UG/L	NYSDEC AWQS-GA	0.3	0.3		0
Total Xylenes [3]	5	UG/L	NYSDEC AWQS-GA	1.1	5.0		1
n-Butylbenzene	5	UG/L	NYSDEC AWQS-GA	0.4	3.0		0
n-Propylbenzene	5	UG/L	NYSDEC AWQS-GA	0.7	6.0		1
p-Isopropyltoluene	5	UG/L	NYSDEC AWQS-GA	0.7	6.0		1
sec-Butylbenzene	5	UG/L	NYSDEC AWQS-GA	0.6	4.0		0
tert-Butylbenzene	5	UG/L	NYSDEC AWQS-GA	0.3	0.6		0
Semivolatile Organics							
2-Methylnaphthalene [5]		UG/L		5.4	8.5		0
Acenaphthene [2]	20	UG/L	NYSDEC Guidance	5.1	3.5	[4]	0
Dibenzofuran [5]		UG/L		5.0	3.0	[4]	0
Diethyl phthalate [2]	50	UG/L	NYSDEC Guidance	5.0	0.5	[4]	0
Fluorene [2]	50	UG/L	NYSDEC Guidance	5.2	5.0	[4]	0
Naphthalene [2]	10	UG/L	NYSDEC Guidance	5.8	12.5		1
Phenanthrene [2]	50	UG/L	NYSDEC Guidance	5.0	3.0	[4]	0
Metals [6]							
Potassium [5]		UG/L		29452.0	108000.0		0

1. YSDEC AWQS for Class GA waters from 6 NYCRR Parts 703.5 March 12, 1998.
2. NYS Guidance Value, "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations", TOGS 1.1.1, June 1998.
3. A standard of 5 ug/L has been assigned to each of the following xylene isomers (1,2-xylene, 1,3-xylene, and 1,4-xylene).
4. The mean value may be greater than the maximum value due to elevated detection limits that are sometimes exhibited in samples reported as non-detect. Since non-detect samples are given a value equal to one-half their detection limit when calculating the mean, the mean can be greater than the maximum detected value.
5. No standard or guidance value for groundwater is available for these substances as of June 1998.
6. According to the statistical analysis conducted in Section 7.2.3 of the RI report, only potassium was found to be at concentrations in portions of SEAD-26 which exceed concentrations in portions of background areas.

TABLE 7-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Exposure Point Concentration Summary for Contaminants of Concern

Parameter	Units	No. of Valid Analyses	No. of Hits	Freq. (%)	Mean	Std. Dev.	Max. Hit	Normal?	95% UCL of Mean	EPC [1]
Soils										
VOLATILE ORGANICS										
Benzene	UG/KG	42	2	4.8%	135	543	100	FALSE	76	76
Groundwater										
VOLATILE ORGANICS										
Benzene	UG/L	34	7	20.6%	79	242	1,000	FALSE	371	371
Sediment										
SEMIVOLATILE ORGANICS										
Benzo[a]pyrene	UG/KG	10	7	70.0%	4,070	4,926	13,000	FALSE	84,180	84,180
Benzo[b]fluoranthene	UG/KG	9	7	77.8%	7,319	9,865	25,000	FALSE	3,827,400	3,827,400

EPC - Exposure Point Concentration

1. This value represents the EPC used in risk calculations in the RI/FS. In the RI/FS, the EPC may have been elevated due to the fact that the 95th UCL of the mean was always selected as the EPC, even if it was greater than the maximum concentration detected. Since the completion of the RI/FS, risk values have been recalculated using the lower of the 95% UCL of the mean and the maximum hit.

TABLE 7-2
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE

RECEPTOR	EXPOSURE ROUTE	Baseline Risk Assessment CHILD HAZARD INDEX	ADULT HAZARD INDEX	CANCER RISK	
CURRENT SITE WORKER	Inhalation of Volatile Organics in Ambient Air	NA	2E-05	5E-10	
	Inhalation of Dust in Ambient Air	NA	NQ	NQ	
	Ingestion of Onsite Soils	NA	1E-03	2E-07	(1a)
	Dermal Contact to Onsite Soils	NA	NQ	NQ	
TOTAL RECEPTOR RISK (Nc & CAR)		NA	***1E-03***	***2E-07***	(1a)
FUTURE RESIDENTIAL (Child and Adult)	Inhalation of Volatile Organics in Ambient Air	2E-03	4E-04	2E-08	
	Inhalation of Dust in Ambient Air	NQ	NQ	NQ	
	Ingestion of Onsite Soils	2E-01	2E-02	1E-05	(1b)
	Dermal Contact to Onsite Soils	NQ	NQ	NQ	
	Ingestion of Groundwater (Daily)	8E+00	4E+00	2E-04	
	Dermal Contact to Groundwater while Showering	9E-01	5E-01	3E-05	
	Inhalation of Groundwater while Showering	3E+00	1E+00	3E-05	
	Dermal Contact to Surface Water while Wading	8E-03	7E-03	2E-08	
	Dermal Contact to Sediment	5E-04	4E-04	8E-08	
	Ingestion of Onsite Sediment	3E-01	3E-02	7E-04	(1c)
TOTAL RECEPTOR RISK (Nc & CAR)		***1E+01***	***5E+00***	***1E-03***	(1d)
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Volatile Organics in Ambient Air	NA	4E+00	3E-06	
	Inhalation of Dust in Ambient Air	NA	6E-07	3E-12	
	Ingestion of Onsite Soils	NA	2E-02	8E-07	
	Dermal Contact to Onsite Soils	NA	3E-03	2E-09	
TOTAL RECEPTOR RISK (Nc & CAR)		NA	***4E+00***	***4E-06***	

Notes:

1. This value is based on risk calculations presented in the RI/FS, which used an elevated EPC value. Specifically, the 95th UCL of the mean was selected as the EPC, however, for the COC driving the risk, the 95th UCL of the mean was greater than the max hit. This resulted in a biased high cancer risk value. The cancer risk calculated using the maximum hit as the EPC, and that value would be lower than the risk presented in this table. The following are the revised cancer risk values if the correct EPC was used:

a) 3E-8 c) 4E-5
b) 2E-6 d) 3E-4

NA: Not Applicable
NQ: Not Quantified; toxicity or skin absorption factors not available for compounds with EPCs.
Bold and box indicates unacceptable risk or a value contributing to total unacceptable risk.

Table 7-3
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 Primary Contributors to Unacceptable Risk

Receptor / Exposure Route	Primary Contributor to Unacceptable Risk	Child HI	Adult HI	Cancer Risk
FUTURE RESIDENT				
Ingestion of groundwater	Benzene	8E+00	3E+00	2E-04
Dermal contact to groundwater	Benzene			2E-05
Inhalation of groundwater	Benzene	2E+00	1E+00	3E-05
Ingestion of sediment	Benzo(a)pyrene			1E-04 (1)
Ingestion of sediment	Benzo(b)fluoranthene			6E-04 (1)
FUTURE CONSTRUCTION WORKER				
Inhalation of volatile organics in ambient air	Benzene		5E+00	

NOTES:

1. This value is based on risk calculations presented in the RI/FS, which used an elevated EPC value. Specifically, the 95th UCL of the mean was selected as the EPC, however, for this COC the 95th UCL of the mean was greater than the max hit. This resulted in a conservative cancer risk value.

TABLE 7-4
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE

RECEPTOR	EXPOSURE ROUTE	Baseline Risk Assessment		
		CHILD HAZARD INDEX	ADULT HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Volatile Organics in Ambient Air	NA	1E-06	3E-11
	Inhalation of Dust in Ambient Air	NA	2E-05	2E-08
	Ingestion of Onsite Soils	NA	4E-03	1E-06
	Dermal Contact to Onsite Soils	NA	1E-04	2E-08
TOTAL RECEPTOR RISK (Nc & CAR)		***NA***	***4E-03***	***1E-06***
FUTURE RESIDENTIAL (Child and Adult)	Inhalation of Volatile Organics in Ambient Air	1E-04	2E-05	1E-09
	Inhalation of Dust in Ambient Air	3E-04	1E-04	2E-07
	Ingestion of Onsite Soils	**7E-01**	7E-02	6E-05
	Dermal Contact to Onsite Soils	4E-03	2E-03	5E-07
	Ingestion of Groundwater (Daily)	6E-02	3E-02	6E-07
	Dermal Contact to Groundwater while Showering	**3E-01**	1E-01	1E-06
	Inhalation of Groundwater while Showering	1E-02	5E-03	1E-07
	Dermal Contact to Surface Water while Wading	8E-02	7E-02	3E-06
	Ingestion of Onsite Sediment	**3E-01**	3E-02	6E-06
	Dermal Contact to Sediment	1E-02	9E-03	3E-07
TOTAL RECEPTOR RISK (Nc & CAR)		***1E+00***	***4E-01***	***7E-05***
FUTURE ON-SITE CONSTRUCTION WORKERS	Inhalation of Volatile Organics in Ambient Air	NA	2E-01	2E-07
	Inhalation of Dust in Ambient Air	NA	2E-04	1E-08
	Ingestion of Onsite Soils	NA	2E-01	2E-06
	Dermal Contact to Onsite Soils	NA	1E-03	9E-09
TOTAL RECEPTOR RISK (Nc & CAR)		***NA***	***4E-01***	***2E-06***

Note:

NA: Not Applicable

NQ: Not Quantified; toxicity or skin absorption factors not available for compounds with EPCs.

Bold and box indicates unacceptable risk or a value contributing to total unacceptable risk.

Table 10-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

	Industrial							Residential		
Criteria	**RA25-1 No Action**	**RA25-2 Institutional Controls and Natural Attenuation of Plume**	**RA25-3 Bioventing of Soil and Air Sparging of Plume**	**RA25-3A Bioventing of Soil and Natural Attenuation of Plume**	**RA25-4 Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume**	**RA25-5 Source Removal, Off-site Disposal, and Air Stripping of Plume**	**RA25-6 Source Removal, Off-site Disposal, and Air Sparging of Plume**	**RA25-3R Bioventing of Soil, Air Sparging of Plume and Sediment Removal (1 ditch)**	**RA25-3AR Bioventing of Soil, Natural Attenuation of Plume and Sediment Removal (1 ditch)**	**RA25-4R Source Removal, Off-site Disposal, Long-term Monitoring of Plume, and Sediment (1ditch)**
Protectiveness of Human Health and the Environment										
Human Health Protection (EPA target range $1x10^{-4}$ to $1x10^{-6}$ for carcinogenic risks and HI < 1.0 for noncarcinogenic risk)	Sum of risks…	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Sum of risks remaining after implementation of alternative are...	Summary of risks remaining after implementation of alternative are…	Summary of risks remaining after implementation of alternative are…
carcinogenic risk (1)(3)	$3x10^{-8}$, $3x10^{-4}$, $4x10^{-6}$	$3x10^{-8}$, $3x10^{-4(2)}$, $4x10^{-6}$	$3x10^{-8}$, $3x10^{-4(2)}$, $8x10^{-7}$	$3x10^{-8}$, $3x10^{-4(2)}$, $8x10^{-7}$	$3x10^{-8}$, $3x10^{-4(2)}$, $8x10^{-7}$	$3x10^{-8}$, $3x10^{-4(2)}$, $8x10^{-7}$	$3x10^{-8}$, $3x10^{-4(2)}$, $8x10^{-7}$	$3x10^{-8}$, $8x10^{-5}$, $8x10^{-7}$	$3x10^{-8}$, $8x10^{-5}$, $8x10^{-7}$	$3x10^{-8}$, $8x10^{-5}$, $8x10^{-7}$
noncarcinogenic risk - HI (1)(3)	0.001, 10 (child) and 5 (adult), 4	0.001, 1 (child) and 0.2 (adult), 4	0.001, 1 (child) and 0.2 (adult), 0.3	0.001, 1 (child) and 0.2 (adult), 0.3	0.001, 1 (child) and 0.2 (adult), 0.3	0.001, 1 (child) and 0.2 (adult), 0.3	0.001, 1 (child) and 0.2 (adult), 0.3	0.001, 0.7 (child) and 0.2 (adult), 0.3	0.001, 0.7 (child) and 0.2 (adult), 0.3	0.001, 0.7 (child) and 0.2 (adult), 0.3
Exposure Pathways	Not Protective - risks mainly from future residential exposure to groundwater and future construction worker inhalation of volatile organics in ambient air	Not Protective - risk from future construction worker inhalation of volatile organics. Fencing prevents exposure to surface soils and natural attenuation eliminates exposure to groundwater	Protective: risks are acceptable, soil exposure eliminated through bioventing and groundwater exposure is eliminated via sparging	Protective: risks are acceptable, soil exposure eliminated through bioventing and groundwater exposure is eliminated via natural attenuation	Protective: risks are acceptable, soil exposure eliminated through excavation of source area and off-site disposal and groundwater exposure is eliminated by treatment of recovered water with an air stripper and via biodegradation	Protective: risks are acceptable, soil exposure eliminated through excavation of source area and off-site disposal and groundwater exposure is eliminated via air stripping	Protective: risks are acceptable, soil exposure eliminated through excavation of source area and off-site disposal and groundwater exposure is eliminated via air sparging.	Protective - risks are acceptable; soil exposure eliminated through bioventing and groundwater exposure is eliminated via sparging; sediment removal from one ditch has acceptable risk	Protective: risks are acceptable, soil exposure eliminated through bioventing and groundwater exposure is eliminated via natural attenuation;sediment removal from one ditch has acceptable risk	Protective: risks are acceptable, soil exposure eliminated through excavation of source area and off-site disposal and groundwater exposure is eliminated by treatment of recovered water with an air stripper and via biodegradation; sediment removal from one ditch has acceptable risk
Protection of Ecological Receptors	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective: Depth to groundwater prevents ecological exposure; current ecological risk is negligible
Compliance with ARARs	Not Compliant with ARARS	Compliant with ARARs, but in groundwater will require a long period of time to meet remediation standards	Will Comply with all ARARs	Will Comply with all ARARs	Will Comply with all ARARs	Will Comply with all ARARs	Will Comply with all ARARs	Will Comply with all ARARs	Will Comply with all ARARs	Will comply with all ARARs

Table 10-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

	Industrial							Residential		
Criteria	**RA25-1 No Action**	**RA25-2 Institutional Controls and Natural Attenuation of Plume**	**RA25-3 Bioventing of Soil and Air Sparging of Plume**	**RA25-3A Bioventing of Soil and Natural Attenuation of Plume**	**RA25-4 Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume**	**RA25-5 Source Removal, Off-site Disposal, and Air Stripping of Plume**	**RA25-6 Source Removal, Off-site Disposal, and Air Sparging of Plume**	**RA25-3R Bioventing of Soil, Air Sparging of Plume and Sediment Removal (1 ditch)**	**RA25-3AR Bioventing of Soil, Natural Attenuation of Plume and Sediment Removal (1 ditch)**	**RA25-4R Source Removal, Off-site Disposal, Long-term Monitoring of Plume, and Sediment (1ditch)**
Long-Term Effectiveness and Permanence										
Magnitude of Residual Risk	Residual risk will exist for a relatively long period of time, until plume naturally degrades	Residual risk will exist for a relatively long period of time because source remains in place, constituents in source and plume will naturally degrade	No residual risk will exist; soil and groundwater will be treated until they meet treatment criteria	No residual risk will exist; soil and groundwater will be treated until they meet treatment criteria	No residual risk will exist on-site; groundwater will be monitored until it meets GA standard. Soil disposal will be off-site so there may be some associated residual risk of exposure. Some volatile constituents will be lost during excavation and biodegradation will continue to occur at the off-site disposal area.	No residual risk will exist on-site; groundwater will be treated until it meets treatment criteria. Soil disposal will be off-site so there may be some associated residual risk of exposure. Some volatile constituents will be lost during excavation and biodegradation will continue to occur at the off-site disposal area.	No residual risk will exist on-site; groundwater will be treated until it meets treatment criteria. Soil disposal will be off-site so there may be some associated residual risk of exposure. Some volatile constituents will be lost during excavation and biodegradation will continue to occur at the off-site disposal area.	No residual risk will exist; soil and groundwater will be treated until they meet treatment criteria	No residual risk will exist; soil and groundwater will be treated until they meet treatment criteria	No residual risk will exist on-site; groundwater will be monitored until it meets GA standard. Soil disposal will be off-site so there may be some associated residual risk of exposure. Some volatile constituents will be lost during excavation and biodegradation will continue to occur at the off-site disposal area.
Permanence	Not permanent, but will be permanent once natural mechanisms reduce concentrations	Not permanent, but will be permanent once natural mechanisms reduce concentrations	Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent	Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent	Excavation and off-site disposal of source soils is not permanent. Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent for groundwater	Excavation and off-site disposal of source soils is not permanent. Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent for groundwater	Excavation and off-site disposal of source soils is not permanent. Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent for groundwater	Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent	Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent	Excavation and off-site disposal of source soils is not permanent. Once treatment criteria of complying with groundwater standards for all COCs in groundwater is attained the action is permanent for groundwater
Reduction of Toxicity, Mobility, or Volume Through Treatment	Any reduction will not be documented	Any reduction in soil and groundwater concentrations due to natural degradation will be documented via long-term monitoring	Effective: constituents of concern in soil and groundwater are removed or destroyed	Effective: constituents of concern in soil and groundwater are removed or destroyed	Moderately Effective: constituents of concern in groundwater are removed or destroyed; in soil no significant reduction in toxicity because it is excavated and landfilled.	Moderately Effective: constituents of concern in groundwater are removed or destroyed; in soil no significant reduction in toxicity because it is excavated and landfilled.	Moderately Effective: constituents of concern in groundwater are removed or destroyed; in soil no significant reduction in toxicity because it is excavated and landfilled.	Effective: constituents of concern in soil and groundwater are removed or destroyed	Effective: constituents of concern in soil and groundwater are removed or destroyed	Moderately Effective: constituents of concern in groundwater are removed or destroyed; in soil no significant reduction in toxicity because it is excavated and landfilled.

Table 10-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

	Industrial							Residential		
Criteria	**RA25-1 No Action**	**RA25-2 Institutional Controls and Natural Attenuation of Plume**	**RA25-3 Bioventing of Soil and Air Sparging of Plume**	**RA25-3A Bioventing of Soil and Natural Attenuation of Plume**	**RA25-4 Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume**	**RA25-5 Source Removal, Off-site Disposal, and Air Stripping of Plume**	**RA25-6 Source Removal, Off-site Disposal, and Air Sparging of Plume**	**RA25-3R Bioventing of Soil, Air Sparging of Plume and Sediment Removal (1 ditch)**	**RA25-3AR Bioventing of Soil, Natural Attenuation of Plume and Sediment Removal (1 ditch)**	**RA25-4R Source Removal, Off-site Disposal, Long-term Monitoring of Plume, and Sediment (1ditch)**
Short-Term Effectiveness (Impact of Implementation of Alternative)										
Community Protection	No action is proposed. Impacts to community will be no greater than under current conditions. Future receptor risks are above acceptable ranges	Protective - the institutional controls (e.g., installation of fencing) and natural attenuation will have no added impacts on the community	Protective - air emissions from bioventing and sparging eliminated via carbon, will comply with air quality standards	Protective - air emissions from bioventing eliminated via carbon, will comply with air quality standards. Natural attenuation has no added impact on community.	Protective - during excavation, air monitoring will be performed at site boundaries to ensure that there are no community impacts. Long term monitoring has no added impact on community.	Protective - during excavation, air monitoring will be performed at site boundaries to ensure that there are no community impacts. Air emissions from stripping will be eliminated via carbon, will comply with air quality standards.	Protective - during excavation, air monitoring will be performed at site boundaries to ensure that there are no community impacts. Air emissions from sparging will be eliminated via carbon, will comply with air quality standards.	Protective - air emissions from bioventing and sparging eliminated via carbon, will comply with air quality standards	Protective - air emissions from bioventing eliminated via carbon, will comply with air quality standards. Natural attenuation has no added impact on community.	Protective - during excavation, air monitoring will be performed at site boundaries to ensure that there are no community impacts. Long term monitoring has no added impact on community.
Worker Protection	No action is proposed. Impacts to workers will be no greater than under current conditions. Current site worker risk is within acceptable ranges	Protective - the institutional controls (e.g., installation of fencing) and natural attenuation will have no added impacts on the workers, since any fencing would be installed outside the impacted areas.	Protective - dust produced during construction will be eliminated via standard dust suppression methods and workers will wear personal protective equipment	Protective - dust produced during construction will be eliminated via standard dust suppression methods and workers will wear personal protective equipment	Protective - dust produced during excavation will be eliminated via standard dust suppression methods and workers will wear personal protective equipment, which will also protect against inhalation of volatiles in air.	Protective - dust produced during excavation will be eliminated via standard dust suppression methods and workers will wear personal protective equipment, which will also protect against inhalation of volatiles in air.	Protective - dust produced during excavation will be eliminated via standard dust suppression methods and workers will wear personal protective equipment, which will also protect against inhalation of volatiles in air.	Protective - dust produced during construction will be eliminated via standard dust suppression methods and workers will wear personal protective equipment	Protective - dust produced during construction will be eliminated via standard dust suppression methods and workers will wear personal protective equipment	Protective -dust produced during excavation will be eliminated via standard dust suppression methods and workers will wear personal protective equipment, which will also protect against inhalation of volatiles in air.
Environmental Impacts	No action is proposed. Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment. During excavation, measures to protect impacts to surface water and sediment will be used (e.g., silt fences)	Current, short-term conditions are protective of environment. During excavation, measures to protect impacts to surface water and sediment will be used (e.g., silt fences)	Current, short-term conditions are protective of environment. During excavation, measures to protect impacts to surface water and sediment will be used (e.g., silt fences)	Current, short-term conditions are protective of environment; sediment removal from one ditch will temporarily disrupt any ecological communities	Current, short-term conditions are protective of environment; sediment removal from one ditch will temporarily disrupt any ecological communities	Current, short-term conditions are protective of environment. During excavation, measures to protect impacts to surface water and sediment will be used. Sediment removal from one ditch will temporarily disrupt any ecological communities.
Time Until Action is Complete	No action is performed. Not applicable.	Estimated to be 150 years for monitoring of plume	Estimated to be 5 years for bioventing of source area and 10 years for monitoring of plume	Estimated to be 5 years for bioventing of source area and 15 years for monitoring of plume	Estimated to be 10 years for monitoring of plume	Estimated to be 1 years for air stripping of plume and 5 years for monitoring	Estimated to be 10 years for sparging of plume and 10 years of monitoring	Estimated to be 5 years for bioventing source area and 10 years for monitoring the plume	Estimated to be 5 years for bioventing source area and 15 years for monitoring the plume	Estimated to be 10 years for monitoring of plume

Table 10-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

	Industrial							Residential		
Criteria	**RA25-1 No Action**	**RA25-2 Institutional Controls and Natural Attenuation of Plume**	**RA25-3 Bioventing of Soil and Air Sparging of Plume**	**RA25-3A Bioventing of Soil and Natural Attenuation of Plume**	**RA25-4 Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume**	**RA25-5 Source Removal, Off-site Disposal, and Air Stripping of Plume**	**RA25-6 Source Removal, Off-site Disposal, and Air Sparging of Plume**	**RA25-3R Bioventing of Soil, Air Sparging of Plume and Sediment Removal (1 ditch)**	**RA25-3AR Bioventing of Soil, Natural Attenuation of Plume and Sediment Removal (1 ditch)**	**RA25-4R Source Removal, Off-site Disposal, Long-term Monitoring of Plume, and Sediment (1ditch)**
Implementability										
Technical Feasibility	No action is performed, and nothing is implemented. Not applicable.	Feasible - reductions from natural attenuation are occurring based on site data and will continue to occur	Feasible - some uncertainty because bioventing and sparging of plume will require field-scale pilot testing to show it can reduce concentrations	Feasible - some uncertainty for bioventing, which will require field scale pilot testing; natural attenuation of plume will continue to reduce concentrations	Feasible - excavation and groundwater monitoring are easily implemented.	Feasible - excavation is easily implemented; air stripping is a proven technology for removing volatiles from groundwater.	Feasible - excavation is easily implemented; air sparging is a proven technology to remove volatile from groundwater.	Feasible - some uncertainty because bioventing and sparging of plume will require field-scale pilot testing to show it can reduce concentrations; there is no uncertainty with sediment removal	Feasible - some uncertainty for bioventing, which will require field scale pilot testing; natural attenuation of plume will continue to reduce concentrations; there is no uncertainty with sediment removal	Feasible - excavation and groundwater monitoring are easily implemented; there is no uncertainty with sediment removal
Ease of Doing More Action if Needed	No action is performed. Not applicable.	Least interference - the institutional controls would not prevent required future action	Minor Interference - the bioventing and sparging systems will have some impact on available space for future action, but would not prevent required future action.	Minor Interference - the bioventing system will have some impact on available space for future action, but would not prevent required future action.	Least interference - excavation would be performed but it would not prevent required future action	Minor interference - excavation would be performed but it would not prevent required future action, but air stripping equipment would potentially limit surface availability, but would also not prevent future action.	Minor interference - excavation would be performed but it would not prevent required future action, but air stripping equipment would potentially limit surface availability	Minor Interference - the bioventing and sparging systems will have some impact on available space for future action, but would not prevent required future action.	Minor Interference - the bioventing system will have some impact on available space for future action, but would not prevent required future action.	Least interference - excavation would be performed but it would not prevent required future action
Ability to Obtain Approvals and Coordinate with Other Agencies	Requires agency approvals.	Regulatory issues will be addressed.	Regulatory issues will be addressed.	Regulatory issues will be addressed.	Regulatory issues will be addressed.	Requires possible air permit for stripping system. Regulatory issues will be addressed.	Requires possible air permit for stripping system. Regulatory issues will be addressed.	Regulatory issues will be addressed.	Regulatory issues will be addressed.	Regulatory issues will be addressed.
Availability of Services and Materials	No services are required	All services required to undertake a monitoring program are available	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard	Material and services are available. All equipment required is standard.
Cost										
Capital	$ -	$38,100	$373,500	$236,400	$659,800	$716,700	$682,100	$422,300	$285,200	$701,000
Annual O $ M	$ -	$39,100	$67,000	$67,000	$39,200	$60,200	$65,600	$65,500	$65,500	$37,700
Operating Life in Years	0	150-monit.	5-bv, 10-monit.	5-bv, 15-monit.	1-strip, 10-monit.	1-strip, 5-monit.	10-sparg, 10-monit.	5-bv, 10-monit.	5-bv, 15-monit.	1-strip, 10-monit.
Operating Life Present Worth O & M Cost	$ -	$781,700	$422,600	$526,500	$232,800	$190,300	$506,100	$411,200	$511,100	$221,200
Total Present Worth Cost (Assumes 5% interest)	$ -	$819,800	$796,100	$762,900	$892,600	$907,000	$1,188,200	$833,500	$796,300	$922,200

Table 10-1
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

	Industrial							Residential		
Criteria	**RA25-1 No Action**	**RA25-2 Institutional Controls and Natural Attenuation of Plume**	**RA25-3 Bioventing of Soil and Air Sparging of Plume**	**RA25-3A Bioventing of Soil and Natural Attenuation of Plume**	**RA25-4 Source Removal, Off-site Disposal, and Long-Term Monitoring of Plume**	**RA25-5 Source Removal, Off-site Disposal, and Air Stripping of Plume**	**RA25-6 Source Removal, Off-site Disposal, and Air Sparging of Plume**	**RA25-3R Bioventing of Soil, Air Sparging of Plume and Sediment Removal (1 ditch)**	**RA25-3AR Bioventing of Soil, Natural Attenuation of Plume and Sediment Removal (1 ditch)**	**RA25-4R Source Removal, Off-site Disposal, Long-term Monitoring of Plume, and Sediment (1ditch)**
State Acceptance	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD
Community Acceptance	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD

Notes:
(1) Risk values are for the following receptors - **current site worker**, **future site residents (child and adult)**, and **future site construction worker**.
(2) Risk is a maximum - the risk for this scenario was not recalculated due to EPCs that were based on 95th UCLs that were higher than the maximum value detected on site.
(3) Some risk values are different than shown in the FS; EPCs were adjusted because in some instances they were based on 95th UCLs that were higher than the maximum value detected on-site.

Table 10-2
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

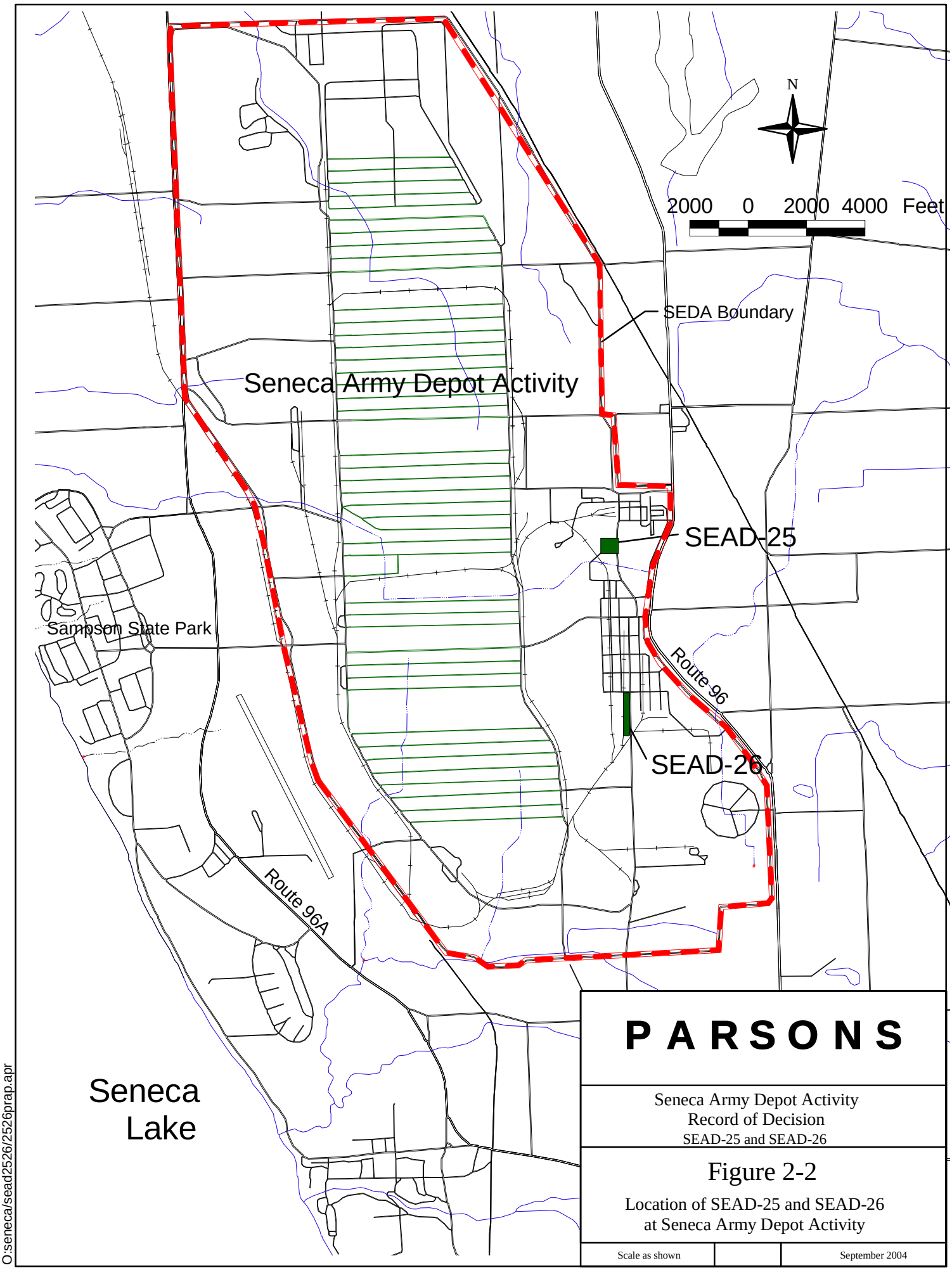
Criteria	Industrial			
	RA26-1 No Action	**RA26-2 Soil Removal, Off-site Disposal, and Monitoring of Plume**	**RA26-3 Air Sparging of Plume**	**RA26-4 Air Stripping of Plume**
Protectiveness of Human Health and the Environment				
Human Health Protection (EPA target range $1x10^{-4}$ to $1x10^{-6}$ for carcinogenic risks and HI < 1.0 for noncarcinogenic risk)	Sum of risks…	Sum of risks remaining after implementation of alternative...	Sum of risks remaining after implementation of alternative...	Sum of risks remaining after implementation of alternative...
carcinogenic risk (1)	$1x10^{-6}$, $7x10^{-5}$, $2x10^{-6}$	Current risks are below targets for intended future use. Carcinogenic risk will be reduced for residential scenario.	Not calculated; current risks below targets for intended future use (incl. daycare restriction)	Not calculated; current risks below targets for intended future use (incl. daycare restriction)
noncarcinogenic risk - HI (1)	0.004, 1 (child) and 0.4 (adult), 0.4	Current risks are below targets for intended future use. Carcinogenic risk will be reduced for residential scenario.	Not calculated; current risks below targets for intended future use (incl. daycare restriction)	Not calculated; current risks below targets for intended future use (incl. daycare restriction)
Exposure Pathways	Protective - risks are acceptable	Protective - risk are acceptable. Groundwater will be restricted until acceptable levels area achieved.	Protective: groundwater exposure is eliminated via air sparging. Daycare restriction prevents child exposure to soils.	Protective: groundwater exposure is eliminated via air stripping. Daycare restriction prevents child exposure to soils.
Protection of Ecological Receptors	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible	Protective - depth to groundwater prevents ecological exposure; current ecological risk is negligible
Compliance with ARARs	Not Compliant with ARARS	Compliant with ARARs, but will require a relatively long period of time to meet remediation standards for GW	Will Comply with all ARARs	Will Comply with all ARARs
Long-Term Effectiveness and Permanence				
Magnitude of Residual Risk	Residual risk will exist for a relatively long period, but they will biodegrade over time; current risks are below the EPA targets	Soil removal will reduce site risks immediately. Some residual risk will exist in groundwater until the plume degrades naturally.	No residual risk from GW will exist; GW in the one on-site well treated by sparging. Risk due to soil ingestion prevented through daycare center restriction.	No residual risk from GW will exist; GW in the one on-site well pumped/ treated by air stripping. Risk due to soil ingestion prevented through daycare center restriction
Permanence	Will be permanent once natural mechanisms reduce concentrations	Will be permanent once natural mechanisms reduce concentrations in GW and cleanup goals for PAHs in soils are achieved	Once treatment criteria of groundwater standards for all COCs in groundwater is attained the action is permanent	Once treatment criteria of groundwater standards for all COCs in groundwater is attained the action is permanent
Reduction of Toxicity, Mobility, or Volume Through Treatment	Any reduction will not be documented	PAHs in soil will be reduced at the site; any reduction in GW concentrations due to natural degradation will be documented via long-term monitoring	Effective: constituents in groundwater near the impacted well are removed or destroyed	Effective: constituents in groundwater near the impacted well are removed or destroyed
Short-Term Effectiveness				
Community Protection	No action is proposed. Impacts to community will be no greater than under current conditions. Future receptor risks are above acceptable ranges	Protective - during excavation, air monitoring will be performed at site boundaries to ensure that there are no community impacts. Long term monitoring has no added impact on community.	Protective: because the air sparging will be done in the well with relatively low VOC concentrations, there is not a need for vapor recovery and off-gas treatment; current risk is within acceptable ranges with daycare center restriction.	Protective: because the groundwater to be treated by air stripping has a low VOC concentrations, there is not a need for vapor recovery and off-gas treatment; current risk is within acceptable ranges with daycare center restriction.

Table 10-2
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
Summary of Detailed Evaluation of Alternatives

Criteria	Industrial			
	RA26-1 No Action	**RA26-2 Soil Removal, Off-site Disposal, and Monitoring of Plume**	**RA26-3 Air Sparging of Plume**	**RA26-4 Air Stripping of Plume**
Worker Protection	No action is proposed. Impacts to workers will be no greater than under current conditions. Current site worker risk is within acceptable ranges	Protective - dust produced during excavation will be eliminated via standard dust suppression methods; workers will wear PPE that will also protect against inhalation of volatiles in air.	Protective: workers installing the small sparging unit will wear personal protective equipment: current risk is within acceptable ranges for workers.	Protective: workers installing the small stripping unit will wear personal protective equipment: current risk is within acceptable ranges for workers.
Environmental Impacts	No action is proposed. Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment	Current, short-term conditions are protective of environment; water that is pumped from the well and treated by stripping will pass through a carbon polish before being discharged to nearby drainage ditches.
Time Until Action is Complete	No action is performed. Not applicable.	Estimated to be 20 years for monitoring of plume	Estimated to be 10 years for sparging and monitoring of plume	Estimated to be 10 years for air stripping and monitoring of plume
Implementability				
Technical Feasibility	No action is performed and nothing is implemented. Not applicable.	Feasible - reductions from natural degradation are occurring and will continue to occur. Soil excavation is easily implemented.	Feasible - sparging has been shown to be proven technology for treating volatile organic compounds in groundwater.	Feasible - air stripping has been shown to be proven technology for treating volatile organic compounds in groundwater.
Ease of Doing More Action if Needed	No action is performed. Not applicable.	Least interference - nothing would be done to prevent required future action	Very Minor Interference - the sparging system will have very little impact on available space for future action	Very Minor Interference - the air stripping system will have very little impact on available space for future action
Ability to Obtain Approvals and Coordinate with Other Agencies	Regulatory issues have been addressed	Regulatory issues have been addressed	Regulatory issues have been addressed	Regulatory issues have been addressed.
Availability of Services and Materials	No services are required	All services required to undertake a monitoring program are available	Material and services area available. All equipment required is standard	Material and services area available. All equipment required is standard
Cost (2)				
Capital	$ -	$411,700	$299,800	$340,200
Annual O $ M	$ -	$27,200	$65,400	$60,000
Operating Life in Years	0	20-mon.	10-sparg., 10-mon.	10-strip., 10-mon.
Operating Life Present Worth O & M Cost	$ -	$339,100	$504,800	$463,400
Total Present Worth Cost (Assumes 5% interest)	$ -	$750,800	$804,600	$803,600
State Acceptance	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD
Community Acceptance	Documented in the ROD	Documented in the ROD	Documented in the ROD	Documented in the ROD

Notes:
(1) Risk values are for the following receptors - **current site worker**, **future site residents (child and adult)**, and **future site construction worker**.
(2) Note the costs are revised relative to those shown in the FS (see text of Proposed Plan for explanations)

SITE
NEW YORK
VT
NH
MA
CT
PA
NJ
N
SENECA ARMY DEPOT ACTIVITY
SENECA LAKE
CAYUGA LAKE
Seneca Falls
Waterloo
Geneva
Auburn
Ithaca
Penn Yan
Corning
Watkins Glen
Hornell
Elmira
Bath
Newark
Canandaigua
Clyde
Savannah
Weedsport
Cato
Moravia
Groton
Dryden
Freeville
Trumansburg
Interlaken
Romulus
Kendaia
Phelps
Five Points
Oaks Corners
Orleans
Chapin
Shortsville
Manchester
Macedon
Palmyra
Fairville
Walworth
Marion
Lyons
Marbletown
Alloway
Marengo
Tyre
Montezuma
Port Byron
Throopsville
Sennett
Marysville
Skaneateles
Mottville
Cedarvale
Marietta
Mandana
Borodino
Owasco
Niles
New Hope
Spafford
Scipio Center
Scipioville
Levanna
Aurora
Poplar Ridge
Sherwood
Venice Center
Cascade
Southeast
Genoa
King Ferry
Ledyard
Sheldrake Sprs
Hayts Corners
Ovid
Willard
Dresden
Yatesville
Milo Center
Guyanoga
Branchport
Bluff Pt
Italy Hill
Himrod
Keuka
Pulteney
S Pulteney
Prattsburg
Wayne
Rock Stream
Urbana
Wheeler
Mitchellsville
Hammondsport
Bradford
Sonora
Savona
Campbell
Thurston
Risingville
Cameron Mills
Painted Post
Gang Mills
Gibson
S Corning
Big Flats
Elmira Hts
Horseheads
Erin
Breesport
Sullivanville
Tompkins Corners
Pine Valley
Midway
Post Creek
Chambers
Hornby
Millport
Catharine
Moreland
Beaver Dams
Montour Falls
Odessa
Townsend
Watkins Glen
Bennettsburg
Burdett
Smith Valley
Reading Center
Weston
Altay
Rock Stream
Reynolds Ville
Meckenburg
Enfield
Connecticut Hill
Slaterville Springs
Cayuga Hts
Etna
Lansing
Ludlowville
Myers
Jacksonville
Perry City
Logan
Hector
Lakemont
Dundee
Burdett
Watkins Glen
Covert
Caywood
Lansingville
W Groton
Groton City
McLean
West Dryden
Freeville
Dryden
Groton
Lansing
Ithaca
Cayuga Hts
Genoa
Locke
Summer Hill
Moravia
Dresserville
Cayuga
Auburn
Skaneateles
Marietta
Rose Hill
Amber



P A R S O N S

Seneca Army Depot Activity
Record of Decision
SEAD-25 and SEAD-26

Figure 2-2

Location of SEAD-25 and SEAD-26
at Seneca Army Depot Activity

Scale as shown		September 2004

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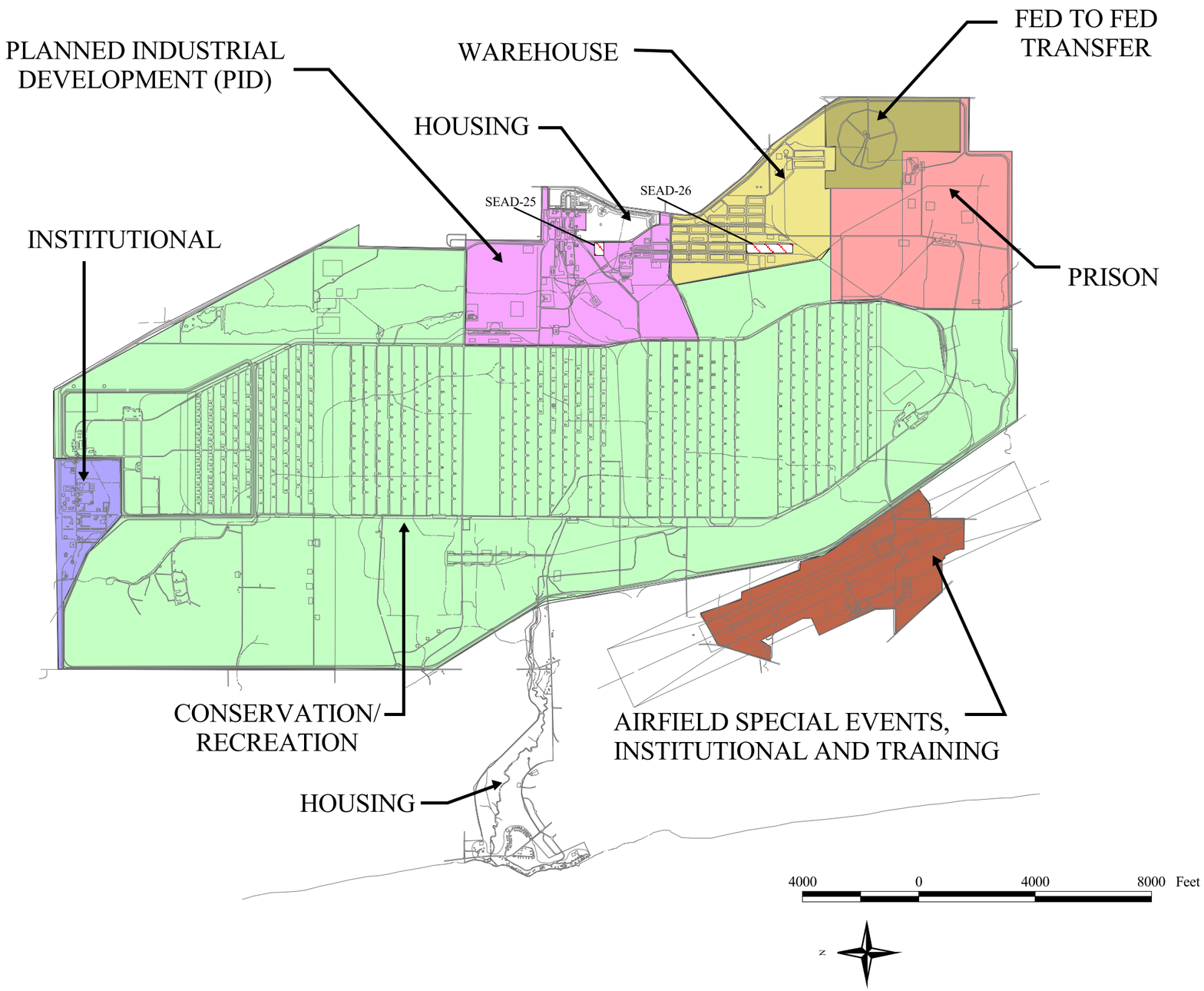
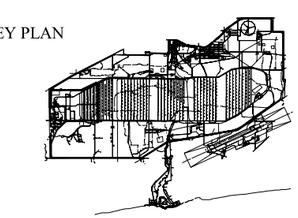


LEGEND

- Airfield
- Conservation
- Federal
- Industrial
- Institutional
- Prison
- Warehouse
- Housing

KEY PLAN



PARSONS

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-25 and SEAD-26

FIGURE 3-1
LAND REUSE MAP

DATE: September 2004

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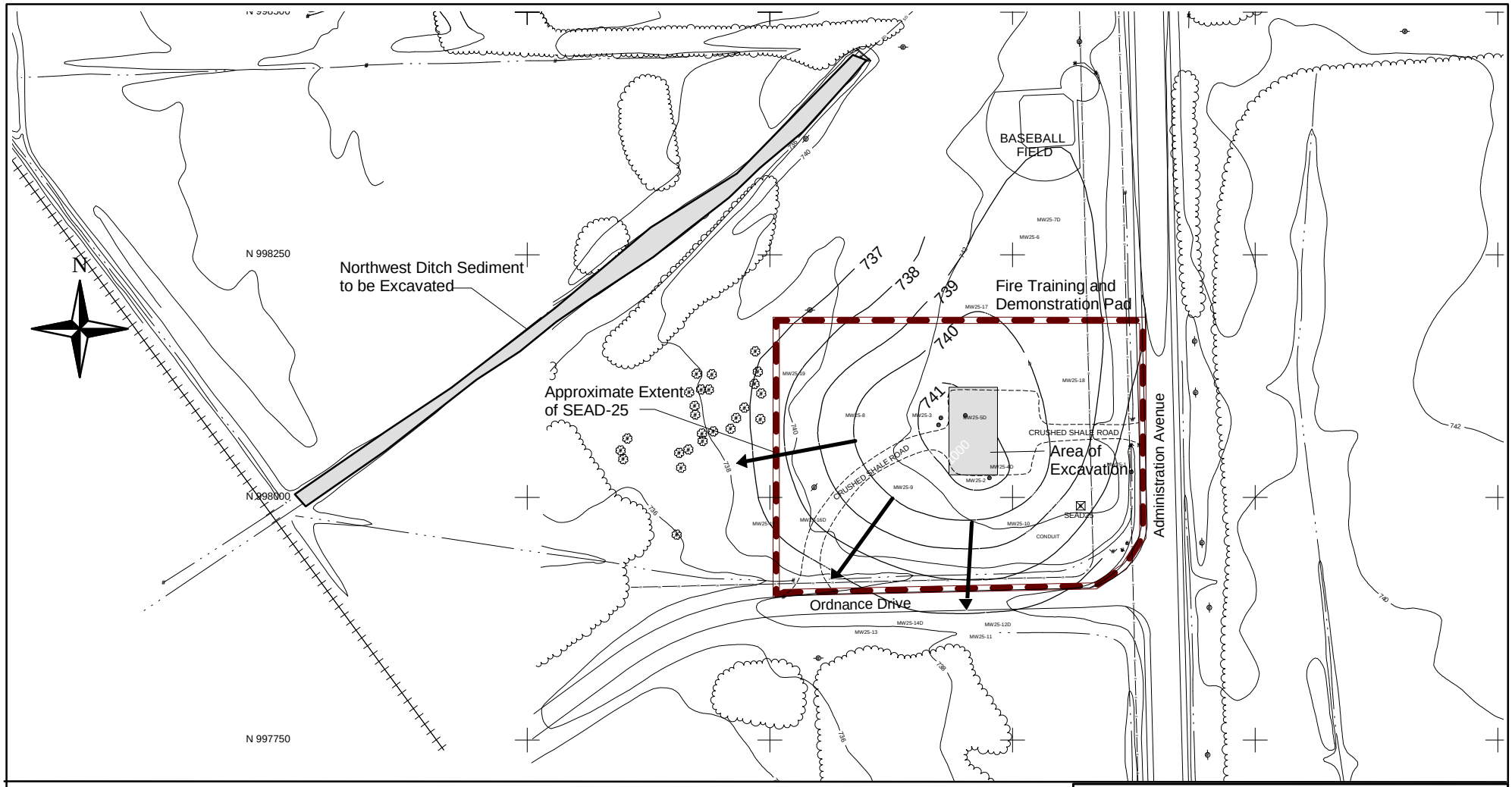
O:/seneca/Sead2526/2526prap.apr



LEGEND

- Area of Excavation
- Extent of Area Requiring Groundwater Use Restriction
- Groundwater Contour Lines (ft)
- Groundwater Flow Direction
- Monitoring Well
- Benchmark
- Road
- Water Line
- Electrical Line

150 0 150 Feet

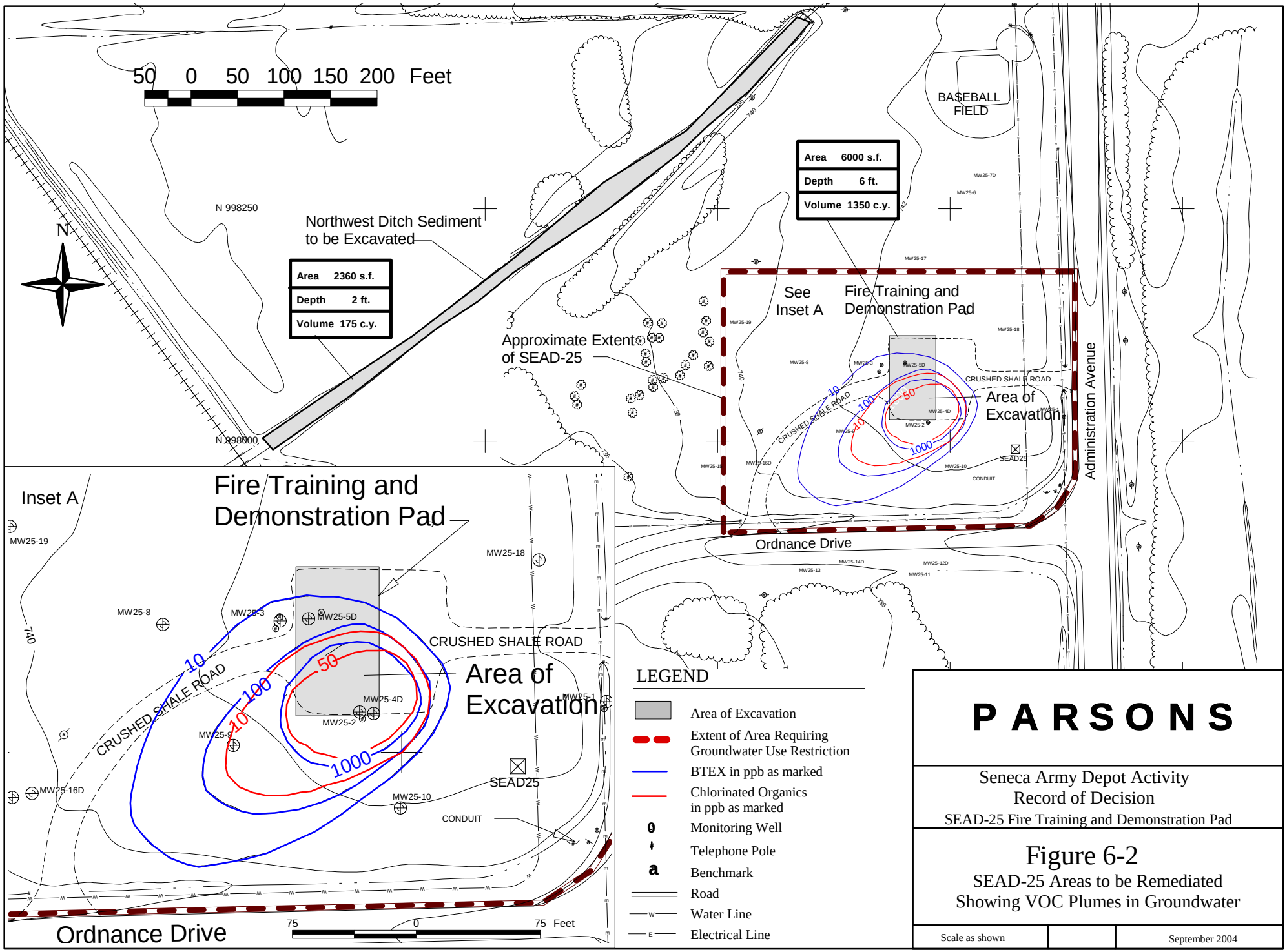
PARSONS

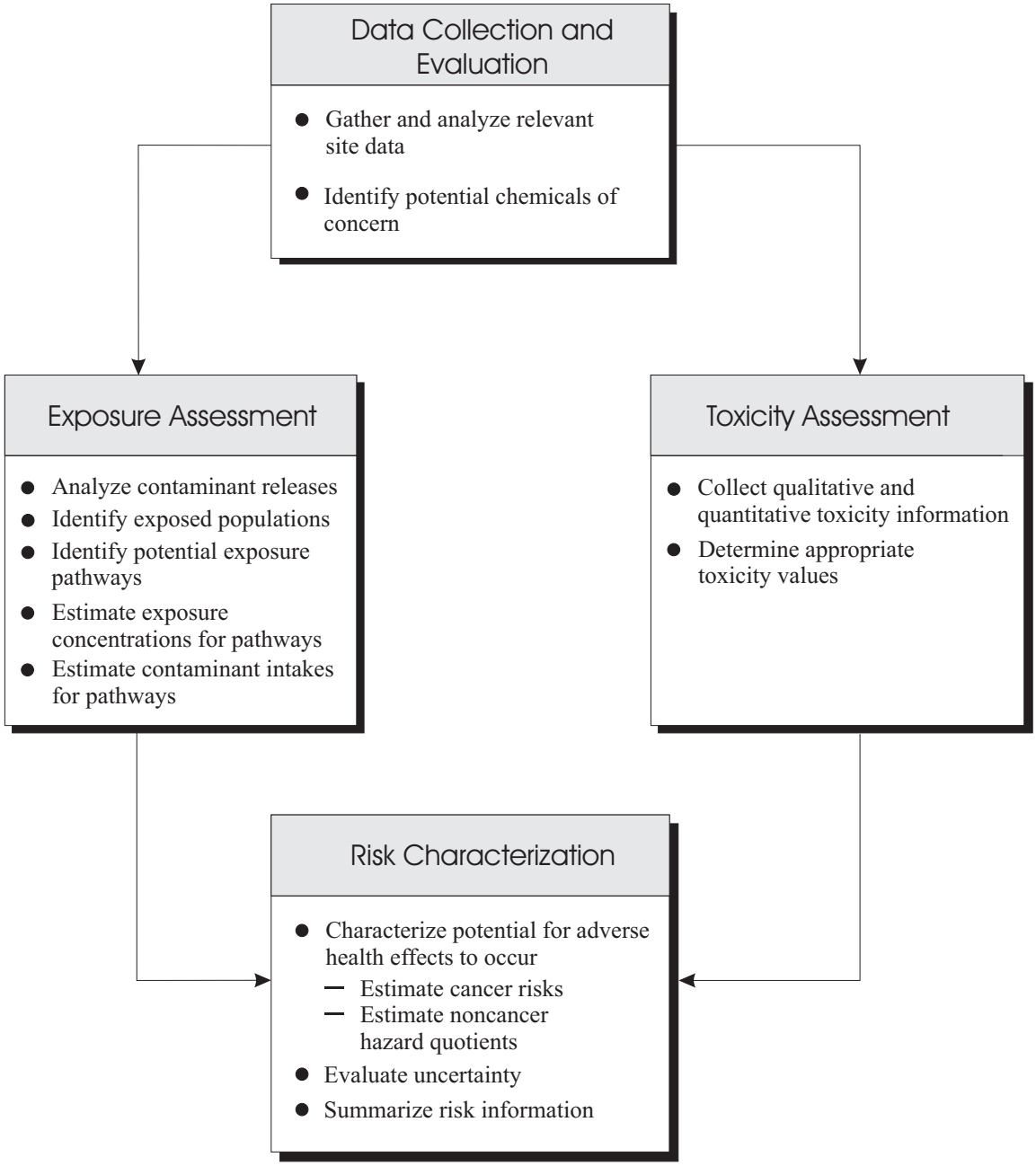
Seneca Army Depot Activity
Record of Decision
SEAD-25 Fire Training and Demonstration Pad

Figure 6-1
SEAD-25 Areas to be Remediated
Showing Groundwater Flow
Direction and Elevations

Scale as shown		September 2004

O:/seneca/Sead2526/2526prap.apr





Source: USEPA, 1989a

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
SEAD 25 AND 26

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 734516-01001

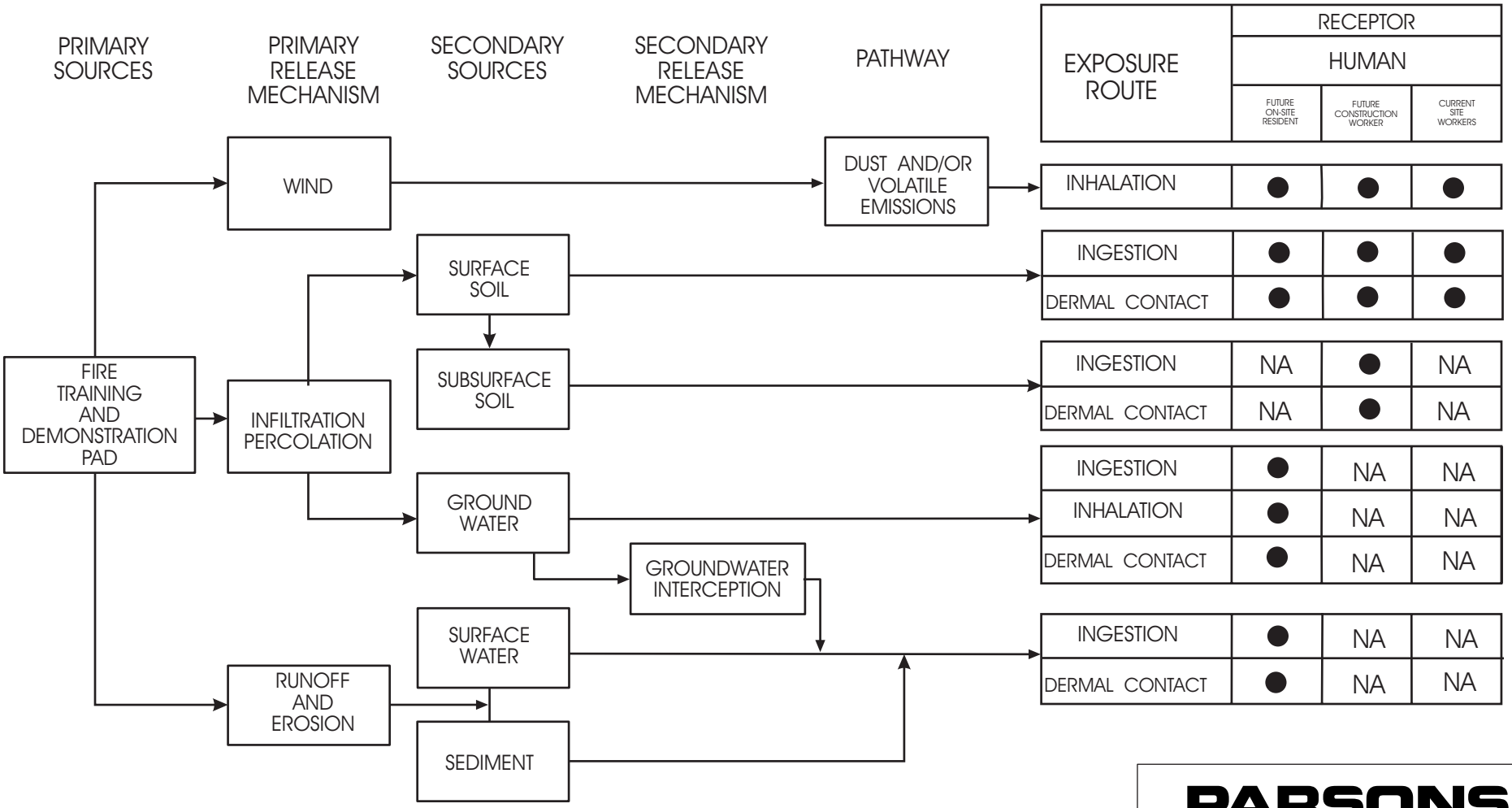
FIGURE 7-1

BASELINE RISK ASSESSMENT PROCESS

SCALE Not Applicable

DATE SEPTEMBER 2004

P:|PIT\PROJECTS\SENECA\S2526ROD\FINAL\FIGURES\BASE_RISK.CDR



EXPOSURE ROUTE	FUTURE ON-SITE RESIDENT	FUTURE CONSTRUCTION WORKER	CURRENT SITE WORKERS
INHALATION	●	●	●
INGESTION	●	●	●
DERMAL CONTACT	●	●	●
INGESTION	NA	●	NA
DERMAL CONTACT	NA	●	NA
INGESTION	●	NA	NA
INHALATION	●	NA	NA
DERMAL CONTACT	●	NA	NA
INGESTION	●	NA	NA
DERMAL CONTACT	●	NA	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
SEAD 25 AND 26

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 734516-01001

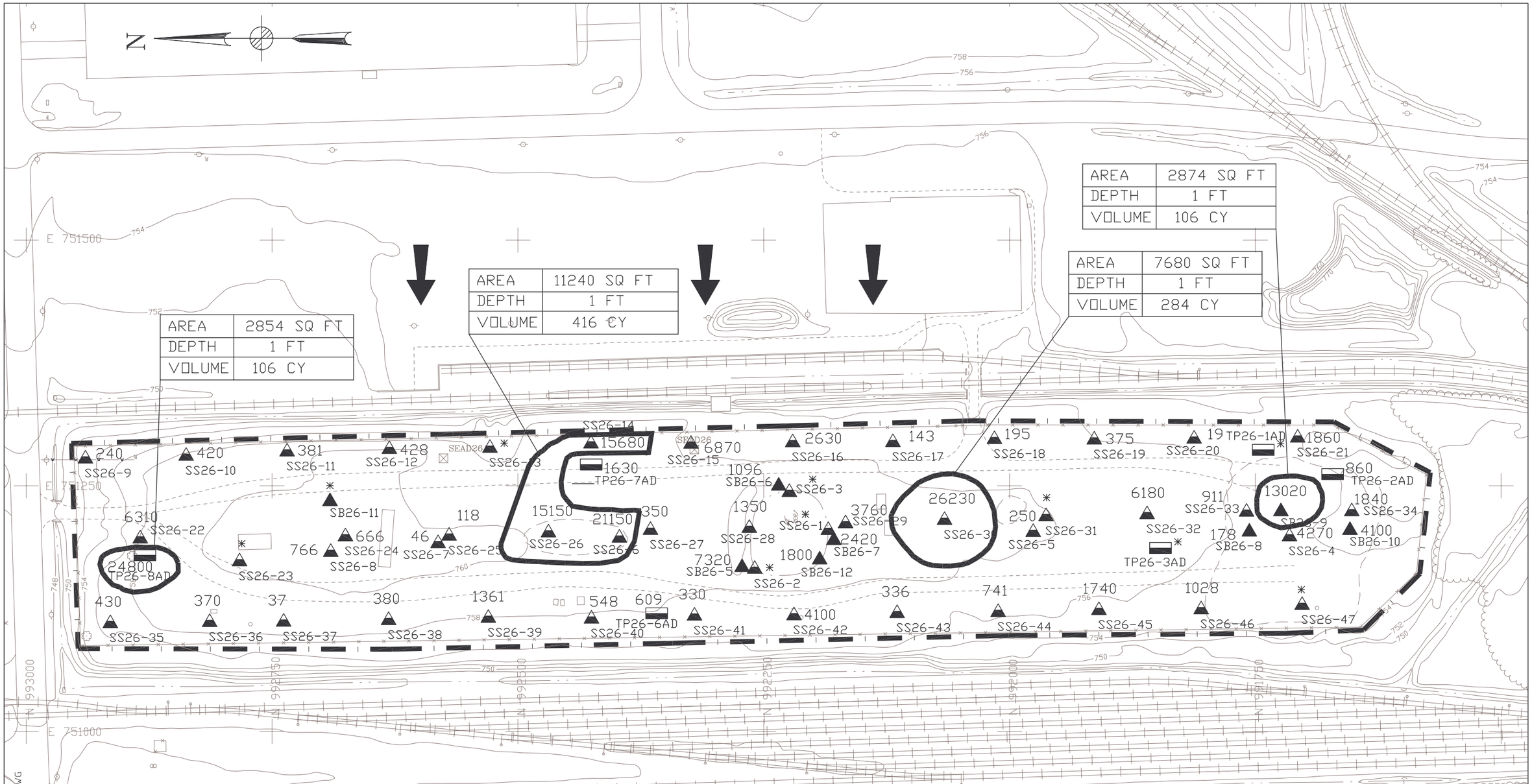
FIGURE 7-2

EXPOSURE PATHWAY SUMMARY

SCALE NA

DATE SEPTEMBER 2004

P:|PIT\PROJECTS\SENECA\S2526ROD\FINAL\FIGURES\EXP_PATH..CDR



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENT
- RAILROAD
- 760 — GROUND SURFACE ELEVATION CONTOUR
- UNDERGROUND ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

SEAD-26 ☒ SURVEY MONUMENT WITH LABEL

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE EXTENT OF SEAD-26 AND AREA REQUIRING GROUNDWATER USE RESTRICTION

1700 SS26-1 SURFACE SOIL SAMPLE LOCATION WITH TOTAL CARCINOGENIC PAH CONCENTRATION (ug/kg)

24800 TP26-8AD TEST PIT LOCATION WITH TOTAL CARCINOGENIC PAH CONCENTRATION IN SURFACE SOIL SAMPLE (ug/kg)

* INDICATES NONE WERE DETECTED

EXCAVATION LIMITS

TOTAL EXCAVATION VOLUME = 1050 CY
(INCLUDES 15% CONTINGENCY FACTOR)

CARCINOGENIC PAH CUG = 10 ppm

APPROXIMATE GROUNDWATER FLOW DIRECTION

50 0 50 100
(feet)

PARSONS

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-26 FIRE TRAINING PIT AND AREA

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 728059-02003

FIGURE 11-1
SEAD-26 EXCAVATION AREA
TO BE REMEDIATED

SCALE 1" = 100'
DATE SEPTEMBER 2004
REV A

ACAD:\SENECA\25-26rod\SD26PAH(FIG 11-1).DWG

APPENDIX A

ADMINISTRATIVE RECORD

APPENDIX A: ADMINISTRATIVE RECORD

MAIN, "Workplan for the Remedial Investigation/Feasibility Study (RI/FS) of the Open -Burning (OB) Grounds, August 1991.

Parsons Engineering Science, Inc., Remedial Investigation Report at the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26). Final. May, 1998.

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

Parsons Engineering Science, Inc., Expanded Site Inspection Seven Low Priority AOCs SEADs 60, 62, 63, 64(A, B, C and D), 67, 70, and 71, 1995a.

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

Parsons Engineering Science, Inc., 1996. Groundwater Modeling Report at the Ash Landfill Site, June 1996.

Parsons Engineering Science, Inc., October 1998, Draft Final Feasibility Study Report at the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26).

Parsons Engineering Science, Inc., September 2002, Final Proposed Plan at the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26).

Parsons Main, Inc., Work Plan for CERCLA ESI of Ten Solids Waste Management Units, January, 1993.

Woodward-Clyde Federal Services, March 1997, U.S. Army Base Realignment and Closure 95 Program, Environmental Baseline Survey Report.

APPENDIX B

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION DECLARATION OF CONCURRENCE

69

New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **FAX:** (518) 402-9020
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

JUL 28 2003

Mr. George Pavlou
Director
Emergency & Remedial Response
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866

Re: Draft Final Record of Decision for the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26), Seneca Army Depot, #8-50-006

Dear Mr. Pavlou:

The New York State Department of Health and the New York State Department of Environmental Conservation (NYSDEC) have reviewed the Draft Final Record of Decision (ROD), dated May 2003, for the above-referenced SEADs at the former Seneca Army Depot. Based upon this review, it is our understanding that the Army's preferred alternative consists of the following remedial actions:

SEAD-25

- Excavation and off-site disposal of approximately 1,525 cubic yards (CY) of contaminated soil and sediment;
- Removal of groundwater from the excavation to allow for removal of contaminated soils below the water table and treatment of recovered groundwater using on-site air stripping;
- Backfilling excavation with clean soil;
- Semi-annual groundwater monitoring of the contaminant plume until the groundwater meets NYSDEC groundwater standards;
- Placement of land use controls to prevent ingestion and/or use of groundwater for as long as the levels of contamination remain above NYSDEC groundwater standards;

- Five-year review of the selected remedy in accordance with Section 121(c) of CERCLA;
- Preparation of a contingency plan that may include additional monitoring and air sparging of the contaminant plume as necessary.

SEAD-26

- Excavation and off-site disposal of approximately 1050 CY of contaminated surficial soils (approximately 1' depth);
- Semi-annual groundwater monitoring of the contaminant plume until the groundwater meets NYSDEC groundwater standards;
- Placement of land use controls to prevent ingestion and/or use of groundwater for as long as the levels of contamination remain above NYSDEC groundwater standards;
- Five-year review of the selected remedy in accordance with Section 121(c) of CERCLA;
- Preparation of a contingency plan that may include additional monitoring and air sparging of the contaminant plume as necessary.

The State finds the above remedial actions to be protective of human health and the environment and concurs with the remedy as delineated in the RODs.

Sincerely,

Dale A. Desnoyers
Director
Division of Environmental Remediation

bc: G. Litwin
M. VanValkenburg/C. Bethoney
R. Wing/J. Vazquez
Daybook

APPENDIX C

PUBLIC COMMENTS AND RESPONSIVENESS SUMMARY

APPENDIX C

PUBLIC COMMENTS AND RESPONSIVENESS SUMMARY

FIRE TRAINING AND DEMONSTRATION PAD (SEAD-25) AND THE FIRE TRAINING PIT AND AREA (SEAD-26)

SENECA ARMY DEPOT SUPERFUND SITE

INTRODUCTION

A responsiveness summary is required by Superfund policy. It provides a summary of citizen's comments and concerns received during the public comment period, and the Army's responses to those comments and concerns.

OVERVIEW

Since the inception of this project, the Army has implemented an active policy of involvement with the local community. This involvement has occurred through the public forum provided by regular meetings of the Base Clean-up Team (BCT). During these meetings, representatives of the community, the Army and the regulators are brought together in a forum where ideas and concerns are voiced and addressed. The BCT has been routinely briefed by the Army in regards to the progress and the results obtained during both the investigation and remedial alternative selection process. In addition to regular project specific briefings, the Army has provided experts in various fields related to the CERCLA program that have provided lectures intended to educate the general public in the various technical aspects of the CERCLA program at SEDA. Lectures have been conducted on risk assessments, both human health and ecological, remedial alternatives, such as bioventing and natural attenuation, institutional controls, and the feasibility study process.

BACKGROUND ON COMMUNITY INVOLVEMENT

Initially, during the years from 1991 through 1995 the Army formed and solicited community involvement through quarterly meetings with the Technical Review Committee (TRC). The TRC was comprised of community leaders with an active interest in the on-goings of the CERCLA process at the depot. These meetings were open to the public and were announced in the local newspaper and the radio. Following inclusion of the depot on the final BRAC closure list in late 1995, the Army transitioned from the TRC and formed the Base Clean-up Team (BCT). The BCT was comprised of several of the TRC members with the addition of additional Army and regulatory representatives. The BCT increased the frequency of the meetings to a monthly basis. Since the formation of the TRC and the BCT, the Army has met with the local community

members on a regular basis and has discussed the finding of both the RI and the FS. In addition, the proposed plan has been presented to the BCT.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The RI report, the FS report and the Proposed Plan for the site have been released to the public for comment. These documents were made available to the public in the administrative record file at the information repositories at Building 123 within the Seneca Army Depot Activity, 5786 State Route 96, Romulus, New York, 14541-*5001. The notice of availability for the above-referenced documents was published in the Finger Lake Times and the Seneca Citizen on November 23, 1997, November 30, 1997 and December 14, 1997.* The public comment period on these documents was held from October 13, 2002 to November 12, 2002.

On October 22, 2002, the Army, the EPA and the NYSDEC conducted a public meeting at the Seneca County Board of Supervisors Room, located at the Seneca County Office Building in Waterloo, NY to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees. The meeting included poster board presentations and provided an opportunity for the public to speak to Army, EPA and NYSDEC representatives involved in the process. The public was given the opportunity to provide formal comments that would be documented and become part of the official record for the selected remedy.

SUMMARY OF COMMENTS AND RESPONSES

No formal comments were received from the community during the public meeting. There is no official transcript since no comments were provided. In addition, no formal comments were received from the community during the public meeting.

APPENDIX D
SUMMARY OF ARARS FOR THE SELECTED REMEDY

APPENDIX D: SUMMARY OF ARARS FOR THE SELECTED REMEDY

D.1 ARAR-BASED REMEDIAL OBJECTIVES

The investigation and cleanup of SEAD-25 and SEAD-26 falls under the jurisdiction of both the State of New York regulations (administered by NYSDEC) and Federal regulations (administered by USEPA Region II). Three categories of potentially applicable state and federal requirements are reviewed separately in the subsequent subsections. The three categories of Applicable or Relevant and Appropriate Requirements (ARARs) are chemical specific, location specific and action specific. A brief regulatory discussion of ARARs is given below.

In 40 CFR §300.5, USEPA defines applicable requirements as those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental, or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. Relevant and appropriate requirements are defined as those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Any standard, requirement, criterion, or limitation under any federal or state environmental or facility siting law may be either applicable or relevant and appropriate to a specific action; they can not be both. 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.

As mentioned earlier in this section, three categories of ARARs were analyzed. They are as follows: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs address certain contaminants or a class of contaminants and relate to the level of contamination allowed for a specific pollutant in various environmental media (water, soil, air). Chemical-specific ARARs are identified below, sub-divided into media-specific sections. 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 "To Be Considered" (TBC) regulatory items. CERCLA indicates that the TBC category could include advisories, criteria or guidance that were developed by USEPA, other federal agencies or states that may be useful in developing CERCLA remedies. These advisories, criteria or guidance are not promulgated and, therefore, are not legally enforceable standards such as ARARs.

The NCP §300.430 (P)(5)(ii)(B) requires that the selected remedy attains federal and state ARARs, or obtains a waiver of an ARAR.

D.2 CHEMICAL-SPECIFIC ARARs

Chemical-specific ARARs are usually health or risk-based standards limiting the concentration of a chemical found in, or discharged to, the environment. They govern the extent of site remediation by providing actual cleanup levels, or the basis for calculating such levels for specific media. Specific chemical-specific ARARs for SEAD-25 and SEAD-26 are:

- 40 CFR Part 141 (applicable): National Primary Drinking Water Regulations. This part establishes primary drinking water regulators pursuant to Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act.

- 40 CFR Part 141.11 (applicable): Maximum Inorganic Chemical Contaminant Levels. This section establishes maximum contaminant levels (MCLs) for inorganic chemicals in drinking water.

- 40 CFR Part 141.12 (applicable): Maximum Organic Chemical Contaminant Levels. This section establishes MCLs for organic chemicals in drinking water.

- 40 CFR Part 264 Subpart F (applicable): Releases from Solid Waste Management Units. Standards for protection of groundwater are established under this citation. This ARAR is applicable to long-term monitoring of the site.

- 6 NYCRR subparts 701 and 702 (applicable): These subparts provide classification definitions for surface water and groundwaters and describe procedures that may be used to obtain guidelines or standards that will be protective of human health and aquatic life.

- 6 NYCRR subpart 703 (applicable): This subpart establishes groundwater standards specified to protect groundwater for drinking water purposes.
- 6 NYCRR subpart 373-2.6 and 373-2.11 (applicable): This regulation requires groundwater monitoring for releases from solid waste management units.

- 6 NYCRR subpart 373-2 (relevant and appropriate): This regulation establishes post closure care and groundwater monitoring requirements. Consideration: This regulation applies after the SEAD-25 and -26 sites have been closed under CERCLA requirements.

- 6 NYCRR Part 5 (relevant and appropriate): This regulation establishes criteria for drinking water supplies. Specifically, NYSDOH has established MCLs for water. Consideration: These criteria are relevant and appropriate to drinking water sources in NY State.

- NYSDEC TOGS 1.1.1 (relevant and appropriate): This document compiles water quality standards and guidance values for use in NYSDEC programs.

D.3 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)
- RCRA Location Requirements and 100-year Floodplains (40 CFR 264.18(b)).
- Clean Water Act, Section 404, and Rivers and Harbor Act, Section 10 (requirements for Dredge and Fill Activities) 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).
- New York State Inactive Hazardous Waste Disposal Sites (6 NYCRR 375).
- 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.

D.4 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.

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

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal systems, (i.e., landfill, incinerators, tanks, containers, etc.) (40 CFR parts 264 and 265); RCRA section 3004(o), 42 USC 6924(o) (RCRA statutory minimum technology requirements).
- RCRA, Subtitle C, Closure and Post-Closure Standards (40 CFR 264, Subpart G).
- RCRA Groundwater Monitoring and Protection Standards (40 CFR, Subpart F).
- RCRA Generator Requirements for Manifesting Waste for 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).
- Safe Drinking Water Act, Underground Injection Control Requirements (40 CFR parts 144 and 146).
- RCRA Land Disposal Restrictions (40 CFR part 268) (on and off-site disposal of excavated soil).

- CWA--NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR parts 122-125).
- CWA--Effluent Guidelines for Organic Chemicals, Plastics and Synthetic Fibers (discharge limits) (40 CFR part 414).
- CWA--Discharge to POTW—general Pretreatment regulations (40 CFR part 403).
- DOT Rules for Hazardous Materials Transport (49 CFR part 107, and 171.1-171.500).
- 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 Environmental Conservation Law (ECL) Article 27, Section 1318: Institutional and Engineering Control**s** paragraphs (a) and (c)
- 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 RCRA Hazardous Management Standards for Hazardous Waste Treatment Facilities (*i.e.*, landfills, incinerators, tanks, containers, etc.) and Minimum Technology Requirements (6 NYCRR 370-373).
- 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).

D.5 TO BE CONSIDERED (TBC) CRITERIA AND GUIDANCE

- NYSDEC Technical and Administrative Guidance Manuals (TAGMs) (TBCs): The New York State rules for inactive hazardous waste disposal sites are provided in these documents. Cleanup levels for hazardous constituents in soil have been proposed by the State of New York through Technical and Administrative Guidance Manuals (TAGMs) specifically, #HWR-92-4046.

- EPA OSWER 7/99 (TBC): A Guide to Preparing Superfund Proposed Plans, Records of Decision and Other Remedy Decision Documents.

APPENDIX E

RESPONSE TO COMMENTS

Response to Comments from the United States Environmental Protection Agency

Subject: Draft Final Record of Decision (ROD) for SEAD-25, 26
Seneca Army Depot
Romulus, New York

Comments Dated: December 18, 2003

Date of Comment Response: July 1, 2004

General Comments:

Comment 1: Section 1.0, page 1-1, Statement of Basis and Purpose: On the 1st paragraph under this heading, the last statement needs to be modified to reflect that NYSDEC concurred with the selected remedy. Please include NYSDEC letter dated July 28, 2003 in Appendix B.

Response 1: The letter is included in Appendix B.

Comment 2: Section 1.0, page 1-2, Description of the Selected Remedy:

Comment 2-1: 7th bullet: This bullet should accurately represent the objectives in the 3rd paragraph. See comment #2 [2-2] below.

Response 2-1: The 7th bullet has been revised to state "establish and maintain land use controls to prevent access or use of the groundwater until cleanup levels are met and to maintain the integrity of any current or future remedial or monitoring system."

Comment 2-2: 3rd paragraph: The language on IC objectives and goals is unclear (the first two sentences). *Delete* the first two sentences and *replace* with:

> "The objectives of the land use restrictions are as follows and will also be incorporated into deeds and/or leases for this property:
> - Prevent access or use of the groundwater until cleanup levels are met.
> - Maintain the integrity of any current or future remedial or monitoring system.
>
> The LUCs will be continued until the concentration of hazardous substances in the soil and the groundwater beneath have been reduced to levels that allow for unlimited exposure and unrestricted use."

Clarifications to the objectives should be made throughout the ROD to be consistent with this Section.

Response 2-2: The requested text has been removed and the suggested text has been inserted in its place. The text has been revised throughout the document to clarify the IC language.

Comment 2-3: 5th bullet: The Army should also establish a ground cover to avoid soil erosion.

Response 2-3: The establishment of a ground cover has been added to the bullet.

Comment 2-4: 10th bullet: This bullet is inconsistent with the wording on the next page which says GW restrictions "may" be removed. It must be consistent with the wording on the next page.

Response 2-4: The bullet has been revised as follows: "Once groundwater cleanup goals are achieved, the groundwater use restriction may be eliminated."

Comment 3: Section 1.0, page 1-3, Description of the Selected Remedy:

Comment 3-1: 1st paragraph, 2nd sentence ("For this site…"). *Delete* and *replace* with:

> "A LUC Remedial Design for SEAD-25 will be prepared as the land use component of the Remedial Design. Within 90 days of ROD signature, the Army shall prepare and submit to EPA for review and approval a LUC remedial design that shall contain implementation and maintenance actions, including periodic inspections."

Response 3-1: The Army will include language that refers to the schedule outlined in the FFA. The text has been revised as follows:

> In order to implement the Army's remedy, which includes the imposition of land use controls, a LUC Remedial Design for SEAD-25 and 26 will be prepared which satisfies the applicable requirements of Paragraphs (a) and (c), Environmental Conservation Law (ECL) Article 27, Section 1318: Institutional and Engineering Controls. In addition, the Army will prepare an environmental easement for SEADs 25 and 26, consistent with Section 27-1318(b) and Article 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at the time of the property's transfer from federal ownership. A schedule for completion of the draft SEAD 25 and 26 LUC Remedial Design Plan (LUC RD) will be completed within 21 days of the ROD signature, consistent with Section 14.4 of the Federal Facilities Agreement (FFA).

Comment 3-2: 1st paragraph, 3rd sentence ("Entities…"). This sentence is too vague. *Delete* and *replace* with:

> "The Army shall be responsible for implementing, inspecting, reporting and enforcing the LUCs described in this ROD in accordance with the approved LUC remedial design.

> Although the Army may later transfer these procedural responsibilities to another party to by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity."

Response 3-2: The text has been revised accordingly.

Comment 3-3: 1st paragraph, 4th sentence. *Revise* as follows:

> "With the approval of EPA, once groundwater cleanup goals are achieved, the groundwater use restrictions may be eliminated and the site may be released for unrestricted use."

Response 3-3: The text has been revised accordingly.

Comment 3-4: 1st paragraph, last sentence: Include technical assessment within the language.

Response 3-4: A technical assessment has been added within the language.

Comment 4: <u>SEAD-26</u>

Comment 4-1: 1st paragraph, 4th sentence. *Delete* "temporary". If it is important to someone (developer?) to state that the restrictions will end someday, then include the same language as for SEAD-25, as follows:

> "With the approval of EPA, once groundwater cleanup goals are achieved, the groundwater use restrictions may be eliminated and the site may be released for unrestricted use."

Also, please explain how the groundwater use restriction will prevent migration of VOCs contamination off-site.

Response 4-1: The word *temporary* has been removed and the suggested text has been added.

The groundwater monitoring program, coupled with the contingency plan, will prevent migration of VOCs off-site. The text has been revised to clarify this detail by adding a statement to the 2nd and 5th bullet.

Comment 4-2: 3rd bullet. *Revise*:

> "Establish and maintain groundwater use controls to restrict groundwater use until cleanup levels are achieved and maintain the integrity of any current or future remedial or monitoring system."

Response 4-2: The text has been revised accordingly.

Comment 5: Section 1.0, page 1-4:

Comment 5-1: 2nd paragraph. Add.

> "A LUC Remedial Design for SEAD-26 will be prepared as the land use component of the Remedial Design. Within 90 days of ROD signature, the Army shall prepare and submit to EPA for review and approval a LUC remedial design that shall contain implementation and maintenance actions, including periodic inspections. The LUCs will be continued until the concentration of hazardous substances in the soil and the groundwater beneath have been reduced to levels that allow for unlimited exposure and unrestricted use. The Army shall be responsible for implementing, inspecting, reporting and enforcing the LUCs described in this ROD in accordance with the approved LUC remedial design. Although the Army may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Army shall retain ultimate responsibility for remedy integrity."

Note- Alternatively, you could also just rewrite the Description of the Selected Remedy to include the IC language common to both SEAD 25 and 26 and avoid the repetition.

Also, in the last sentence of the paragraph above "State Concurrence," replace SEAD-25 with SEAD-26 right before "shown in Figure 11-1."

Response 5-1: The land use control language for SEAD-25 applies to the remedy for SEAD-26. This is stated in the document on Page 1-4: "Until the contaminant levels in the groundwater meet these cleanup goals, a land use control in the form of a groundwater use restriction will be a part of the remedy, as specified in the *Description of the Selected Remedy* for SEAD-25."

An additional statement has been added to Page 1-3, which states "This description of LUCs applies to the remedy for SEAD-26 as well."

Comment 6: Section 1.0, page 1-8:

Please insert appropriate name and title.

Response 6: The appropriate name and title have been added.

Comment 7: Section 1.0, page 1-10:

Please update the signatory name and information as follows:

Mr. George Pavlou, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2

Response 7: This information has been added.

Comment 8: Section 7.0, page 7-1 :

Please insert the acronym "(BRA)" after "the baseline risk assessment."

Response 8: Agreed.

Comment 9: Section 8.0, page 8-1:

Comment 9-1: 1st bullet. *Replace* "adversely impacted" with "contaminated."

Response 9-1: The text has been revised accordingly.

Comment 9-2: 4th bullet: Explain how the Army would prevent off-site migration of contaminants under the selected remedy (e.g., monitor and implement contingency).

Response 9-2: The bullet has been revised: "Prevent off-site migration of contaminants above levels protective of public health and the environment by groundwater monitoring and by implementation of a contingency plan, if necessary."

Comment 10: Section 11.0:

Make this section consistent with our comments of Section 1.0 above.

Response 10: The text in Section 11.0 has been revised accordingly.

Response to Comments from the United States Environmental Protection Agency

Subject: Draft Record of Decision (ROD) for SEAD-25, 26
Seneca Army Depot
Romulus, New York

Comments Dated: January 24, 2003

Date of Comment Response: May 19, 2003

General Comments:

Comment 1: The preferred remedies proposed for these sites include a temporary groundwater monitoring program to allow for contaminant levels to naturally attenuate. However, none of these remedies provide a contingency for contaminants levels that do not decrease according to model, nor do they address the completion stage of the action whenever levels reach cleanup goals. Please add a contingency strategy to trigger more active groundwater actions, as well as an exit strategy to be part of the proposed groundwater remedies for these sites.

Response 1: Acknowledged. The purpose of 5-year reviews is to review the success of the selected remedial alternative and to assess whether that alternative is effective in achieving the remediation goals. If it is determined that the selected remedy is not effective, then an alternative remediation plan may be developed and implemented. The remedy will include a statement that a contingency plan of air sparging or other alternative may be implemented if the selected technology is not shown to be effective. Trigger values, statistic parameters, and other data quality parameters will be specified in the Remedial Design Plan in accordance with EPA guidance documents *Data Quality Objectives Process for Hazardous Waste Site investigations (QA/G-4HW)* (January 2000), and *Guidance for Data Quality Assessment: Practical Methods for Data Analysis (QA/G-9)* (July 2000). A statement on the exit strategy will be included that states that the temporary groundwater restrictions will be removed once groundwater cleanup goals are achieved.

Comment 2: Furthermore, the preferred remedies proposed include institutional controls (ICs). Please insert the following text at the end of Section 11, Selected Remedy.

"The Army will establish mechanisms and procedures to be used to implement, maintain, monitor, and enforce Institutional Controls (ICs). The ICs should be an element of the monitoring program or similar document developed by the Army for institutionalizing how to achieve each IC and to ensure future users are aware of the necessary restrictions and precautions that should be taken. Such document or sections thereof for the ICs in this ROD will be submitted as an enforceable component of and be subject to the same review periods and procedures as the Remedial Design or Remedial Action Workplans for Operable Unit 3 (OU-3) and will contain the following:

- Identification of the Army point'(s) of contact who will be responsible for implementing and maintaining the ICs, who will be responsible for monitoring and reporting on the integrity and effectiveness of the ICs, and who will enforce such restrictions;

- Identification of each OU-specific IC objective (e.g., to restrict use of groundwater, to restrict disturbance of landfill caps, to restrict excavation or other development of the landfills) and the area affected by the IC (e.g., maps); a description of the mechanisms through which the ICs will be implemented, (e.g., notice of restriction in deed, base master plan or equivalent document); a description of the specific actions required to achieve each OU-specific objective (e.g., install/maintain a fence, post warning signs, record notice of restriction in appropriate document); date when it is anticipated the restrictions will be created and their anticipated duration; the frequency of IC monitoring;

- Provision for the submission of IC Monitoring Reports on the status of the ICs to be submitted to USEPA and NYSDEC on a regular basis for review; the Monitoring Reports will include a checklist of elements assessed during regularly scheduled on-site inspections;

- Description of procedures to be conducted if and when it is determined that land use has changed and become inconsistent with the IC objectives, including reevaluation of the exposure scenarios for human health and the environment for OU-3, as necessary, and a description of the process for removing or modifying the IC, if appropriate;

- Provisions for notification of USEPA and NYSDEC in the event of a change in land use or land use designation or transfer of property encompassed by OU-3; the Army will notify USEPA and NYSDEC within 72 hours upon discovery of any activity that is inconsistent with the OU specific IC objectives for the site; the Army will notify USEPA and NYSDEC at least six months prior to any transfer, sale or lease of any property subject to ICs so that the regulators can be involved in discussions to ensure that appropriate provisions are included in transfer documents to maintain effective ICs.

Response 2: Acknowledged. The selected remedy for SEAD-26, Alternative RA26-2, has been revised to include excavation of surface soils with total carcinogenic PAH (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene) concentrations above 10 ppm, for an estimated total volume of 1050 cubic yards (CY). According to available data, the total carcinogenic PAH levels in ditch soils and subsurface soils are below 10 ppm. It should be noted that a review of the available site data suggests that the highest concentrations of the greatest contributors to carcinogenic risk (benzo(a)pyrene and dibenz(a,h)anthracene) that would remain on-site following a removal action with 10 ppm as a cleanup goal would be 1200 μg/kg and 410 μg/kg, respectively. The area of excavation is presented

in a revised Figure 11-1. This remedial action will eliminate the need for any permanent land use restrictions at SEAD-26. However, a temporary groundwater use restriction will be imposed on the site until ARARs for groundwater are achieved. The following language on land use controls has been added to the ROD:

> Until the contaminant levels in the groundwater meet the cleanup goals, a land use control (or institutional control) in the form of a groundwater use restriction to ensure no withdrawal and/or use of groundwater until ARARs are achieved will be a part of the remedy. The goal of the land use control is to ensure protection of human health and the environment, and to preserve and promote the long-term effective operation of remedial alternatives proposed for the sites. The land use controls would be implemented over the area bounded by the site boundary at SEAD-25, shown in **Figure 6-1**. For this site, the Army's selected land use controls will include supplemental measures that will be documented in an implementation and enforcement plan detailing implementation actions, which will be provided in the Remedial Design Plan. Entities expected to be responsible for implementing and maintaining the remedy are the Army and any other entity (e.g., a transferee) who the Army subsequently identifies to the regulators through timely written notice, which shall include the entity's name, address, and general remedial responsibility. Once groundwater cleanup goals are achieved, the groundwater use restriction may be eliminated and the site may be released for unrestricted use. The five-year reviews, conducted in accordance with 121(c) of CERCLA, are intended to evaluate whether the response actions remain protective of public health and the environment, and they would consist of document review, ARAR review, interviews, inspection/technology review, and reporting.

Details on the implementation and enforcement of the land use controls will be specified in the remedial design plan.

Specific Comments:

Comment 1: Section 1.0: Declaration, page 1-3: The last sentence of the paragraph located below the three bullets on top of the page states that "the site-related contaminants do not contribute to an unacceptable risk at the site." If this would be the case no action would have been necessary. Please purge the sentence from the document.

Response 1: Agreed. The statement has been clarified to state "(I)t should be noted, however, that these site-related contaminants do not contribute to an unacceptable human health risk at the site."

Comment 2: Section 1.0: Declaration, page 1-3: The remedy for SEAD-26 includes a land use restriction of a daycare facility. Since the soil slightly exceed acceptable levels for children, SEAD-26 should include restrictions on any residential use as well.

Response 2: Acknowledged. The preferred remedy for SEAD-26 has been revised to include excavation of soils and ditch soils with total carcinogenic PAH concentrations above 10 ppm, for an estimated total volume of 1050 CY. The area of excavation is presented in a revised Figure 11-1. This remedial action, which received concurrence from the EPA in an email dated 2/20/2003, will eliminate the need for any permanent land use control. Therefore, there will not be a residential or daycare land use restriction at SEAD-26. It should be noted that a temporary groundwater use restriction will be imposed on the site until ARARs for groundwater are achieved. The text has been revised accordingly.

Comment 3: Section 1.0: Declaration, page 1-11: Ms. Jane Kenny, Regional Administrator is the signatory official for EPA.

Response 3: Agreed. The text has been revised.

Comment 4: Section 4.0: Public Participation, page 4-1: Note that EPA is currently consulting with federally-recognized Indian Nations/Tribes as it would with a State, and is requesting other federal agencies (such as DoD) to do the same on all CERCLA decision documents. Please indicate your consultation with Native Americans stakeholders.

Response 4: Agreed. Coordination with Native American stakeholders will be consistent with the programmatic agreements between the State Historic Preservation Office, recognized Native American Tribes, and the Advisory Council for Historic Preservation.

Comment 5: Section 9.0: Description of Alternatives, Page 9-2 & 9-10: The last sentence of the second paragraph of page 9-2 and the last sentence of the second paragraph of page 9-10 mention the permanency of the land use restriction as a day care facility under RA 26-2. See Specific Comment 2 above for additional restriction.

Response 5: Acknowledged. The selected remedy for SEAD-26, Alternative RA26-2, has been revised to include excavation surface soils with total carcinogenic PAH (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene) concentrations above 10 ppm, for an estimated total volume of 1050 cubic yards (CY). According to available data, the total carcinogenic PAH levels in ditch soils and subsurface soils are below 10 ppm. It should be noted that a review of the available site data suggests that the highest concentrations of the greatest contributors to carcinogenic risk (benzo(a)pyrene and dibenz(a,h)anthracene) that would remain on-site following a removal action with 10 ppm as a cleanup goal would be 1200 μg/kg and 410 μg/kg, respectively. The area of excavation is presented in a revised Figure 11-1. This remedial action will eliminate the need for any permanent land use

restrictions at SEAD-26. However, a temporary groundwater use restriction will be imposed on the site until ARARs for groundwater are achieved. It is the Army's understanding that the EPA will not require this recommended language for temporary land use controls, such as a groundwater use restriction.

The text has been revised to state that there would be a permanent land use restriction against a daycare facility and residential use under RA26-3 and RA26-4.

Comment 6: Section 11.0: Selected Remedy, page 11-1 & 11-2: For SEAD-25 in page 11-1, please indicate soil contaminants of concern (COCs) and their cleanup goals. Also, please indicate if removed soils will be acceptable for "beneficial" reuse application(s). For SEAD-26 see Specific Comment 2 above for additional restriction.

Response 6: Agreed. The tables presenting the soil COCs and cleanup goals (**Tables 1-1A** and **1-1B**) have been referenced in the text for SEAD-25 and SEAD-26, respectively. As previously noted, the selected remedy for SEAD-26 has been modified such that a permanent land use restriction, as mentioned in Specific Comment 2, is no longer necessary.

Comment 7: Tables: Table 7-2 SEAD-25 Risk, page unnumbered: Please enumerate tables according to the current ROD document. Please insert a table similar to this one for SEAD-26.

Response 7: Agreed. The table numbers have been revised. A table presenting human health risk at SEAD-26, Table 7-4, has been added.

Comment 8: Appendices App. B and App. C Concurrence from NYSDEC & Responsiveness Summary: These appendices were missing from the original Draft ROD document received. Please insert these missing appendices.

Response 8: Agreed. These appendices will be included in the Final ROD.

Response to Comments from the New York State Department of Environmental Conservation (NYSDEC) and Health (NYSDOH)

Subject: Draft Record of Decision (ROD) for the Fire Training and Demonstration Pad (SEAD-25) and the Fire Training Pit and Area (SEAD-26)
Seneca Army Depot
Romulus, New York

Comments Dated: December 6, 2002

Date of Comment Response: May 19, 2003

General Comments:

Comment 1: It is unclear why quarterly monitoring is proposed for SEAD-25 while annual monitoring is proposed for SEAD-26. Semi-annual monitoring (for example) should be proposed for both SEADs.

Response 1: The Army proposed annual monitoring at SEAD-26 since there was no distinguishable plume, and annual monitoring was sufficient to determine if cleanup goals had been achieved. Quarterly monitoring was proposed at SEAD-25 since there was a plume and more frequent monitoring was required to determine if natural attenuation was occurring. The Army agrees that it is more practical to conduct monitoring at similar intervals. Semi-annual monitoring of the contaminants of concern meets requirements at both sites and is now proposed for SEAD-25 and SEAD-26.

Comment 2: For any deed restriction which may be instituted to ensure that the proposed remedy is adequately protective of human health and the environment, please include a clause compelling the property owner to annually certify to the NYSDEC that the deed restriction is in place, and that the use of the property is consistent with that restriction. This clause should be included in the Statement of Declaration, Remedy Selection, and Description of Alternatives.

Response 2: The selected alternative for SEAD-26, RA26-2 (Institutional Controls and Monitoring of Plume) has been modified since the submission of the Draft ROD in order to eliminate the requirement for permanent land use controls at the site. Based on an agreement between the Army, NYSDEC, and EPA, soils with total carcinogenic PAH (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene) concentrations above 10 ppm will be excavated, for an estimated total volume of 1050 cubic yards (CY). According to available data, the total carcinogenic PAH levels in ditch soils and subsurface soils are below 10 ppm. It should be noted that a review of the available site data suggests that the highest concentrations of the greatest contributors to carcinogenic risk (benzo(a)pyrene and dibenz(a,h)anthracene) that would remain on-site following a removal action

with 10 ppm as a cleanup goal would be 1200 μg/kg and 410 μg/kg, respectively. The area of excavation is presented in a revised Figure 11-1. Land use controls in the form of a groundwater restriction will be an element of the remedy until NYSDEC Class GA groundwater standards are achieved. Details on the implementation and enforcement of the land use controls will be specified in the remedial design plan.

Comment 3: If appropriate, the Army may want to only restrict access to the site groundwater "without proper treatment" until cleanup goals are achieved.

Response 3: Agreed. The areas requiring groundwater use restrictions without proper treatment until ARARs are achieved have been delineated on Figures 6-2 and 11-1 for SEAD-25 and SEAD-26, respectively. The concentrations in the outermost wells within the defined area comply with groundwater ARARs.

Comment 4: The description of the remedy for SEAD-25 does not include the soil and sediment cleanup goals proposed to ensure protection of human health and the environment. Please include.

Response 4: Agreed. Table 1-1A, which presents the soil and ditch soil cleanup goals, has been referenced in the text.

Comment 5: Please revise remedial alternative RA26-2 to reflect that the institutional control of a daycare use restriction is a permanent institutional control, and not an interim one as stated. In addition, a land use restriction to prevent residential use is implied due to the anticipated future use as industrial, yet this restriction is not stated. Please state that the property in question will be restricted to industrial use only.

Response 5: Alternative RA26-2 has been revised (as described in Response 2) to include excavation of surface soils to eliminate the need for any permanent land use restrictions at SEAD-26. However, a temporary groundwater use restriction will be imposed on the site until ARARs for groundwater are achieved. The implementation and enforcement of the groundwater use restriction will be detailed in the remedial design plan. The text has been revised.

Comment 6: It is unclear how there would be a difference between the O&M cost for alternative RA25-3 and RA25-3R, and RA25-4 and RA25-4R where the only significant difference in the remedies is that RA25-3R and RA25-4R call for additional remediation (i.e., excavation of sediment contamination). Please reconcile.

Response 6: The annual O&M cost for non-residential scenarios, which was revised for semi-annual monitoring, includes a $1500 attorney's fee to handle issues relating to land use controls. The

unrestricted use scenarios, such as RA25–3R and RA25–4R, do not include the attorney's fee. This accounts for the difference in the O&M costs.

Comment 7: This document should indicate in a figure(s) the extent of deed restrictions, both temporary and permanent, to be implemented.

Response 7: Agreed. There are no permanent land use restrictions, however, there will be temporary groundwater use restrictions at both sites. The areas requiring groundwater use restrictions until ARARs are achieved have been delineated on Figures 6–2 and 11-1 for SEAD-25 and SEAD-26, respectively. The concentrations in the outermost wells within the defined area comply with groundwater ARARs.

Comment 8: New tables that are incorporated in this document as a result of comments issued on the Proposed Plan, are dated months prior to the final Proposed Plan. Please ensure that pages of the document are completely dated so as to avoid confusion.

Response 8: Agreed. The dates on the tables have been updated.

Specific Comments:

Comment 9: Page vi. Acronyms: The Army defines "COC" and "COPC" as a chemical of (potential) concern, however it is applied incorrectly. For instance, on page 9-7, "chemicals of concern (PAHs, metals, and pesticides)," incorrectly defines metals as chemicals. In addition, the Army uses other terms such as "constituents of concern," where COC/COPC should be used. To avoid confusion, the Army should define COC and COPC as "contaminant of (potential) concern", and consistently refer to that definition.

Response 9: Agreed. The text has been revised.

Comment 10: Page 1-1, Declaration of the Record of Decision: The NYSDEC has not "been delegated the authority to approve this Record of Decision (ROD)," but has been consulted with and will presumably concur with the selected remedial action. Please correct.

Response 10: Agreed. The text has been revised.

Comment 11: Page 1-2, Description of the Selected Remedy: For the sixth bulleted item, it should be stated that the Army will conduct groundwater monitoring of the plume "until ARARs are achieved (approximately 10 years)." The word "public" should be removed from the seventh bulleted item. Lastly, for the eighth bulleted item, the Army states that five-year reviews will be completed.

The Army should expand it by stating that "every five years (at a minimum), a review of the selected remedy will be undertaken by the Army and USEPA in accordance with Section 122(c) of the CERCLA."

The second sentence in the third paragraph beginning with "(T)hese standards are based on USEPA Maximum Contaminant Levels (MCLS)," is incorrect, and should be removed from the text.

Response 11: The text has been revised. The sixth bullet states "Conduct semi-annual groundwater monitoring of the plume for COCs until NYSDEC Class GA groundwater standards are achieved (approximately 10 years);" The eighth bullet states "Complete a review of the selected remedy every five-years (at minimum), in accordance with Section 121(c) of the CERCLA."

Comment 12: Page 1-3 Description of the Remedy: Under SEAD-25, it should be clarified that it will be noted that the site-related contaminants in the adjacent roadside ditch do not contribute to an unacceptable "human health" risk at the site. Under SEAD-26, the second bulleted item should be revised to read "…until the groundwater clean up goals are met as well as a land use restriction to prohibit use as a daycare facility."

Response 12: Agreed. The text for SEAD-25 has been revised.

Alternative RA26-2 has been revised to include excavation of soils to eliminate the need for any land use restrictions at SEAD-26; however, a temporary groundwater use restriction will be imposed on the site until ARARs for groundwater are achieved. The text has been revised to add bullets describing the excavation of PAH contaminated soils and the groundwater use restriction.

Comment 13: Page 1-7, Declaration: Because this is the ROD, albeit a draft version, the tense should be changed from future tense to past tense. Also, please note that the NYSDOH forwards their letter of concurrence to the NYSDEC. We then, in turn, forward our concurrence to the USEPA.

Response 13: At the request of EPA, this section has been removed from the text due to redundancy. The following text has been added to the *Concurrence* section on page 1-4: "The New York State Department of Health (NYSDOH) forwarded a letter of concurrence regarding the selection of a remedial action to the New York State Department of Environmental Conservation (NYSDEC), and NYSDEC, in turn, forwarded to the U.S. Environmental Protection Agency (EPA) a letter of concurrence regarding the selection of a remedial action in the future."

Comment 14: Page 1-9, Declaration: Please indicate the name of the US Army Material Command Chief of Staff who will be signing the document.

Response 14: Acknowledged. The name will be added once the ROD is Final.

Comment 15: Page 2-1, Site Name, Location and Description: First sentence should indicate that SEDA is a "former" military facility. The last statement in this section regarding vehicular access should denote that it is "currently provided to the site via locking gate on 7th Street."

Response 15: Agreed. The text has been revised.

Comment 16: Page 3-1, Site History and Enforcement Activities: This section should include a statement denoting the closure of the base.

Response 16: Agreed. The following statement has been added at the beginning of the fourth paragraph: "In 1995, SEDA was designated for closure under the Department of Defense's (DoD's) Base Realignment and Closure (BRAC) process."

Comment 17: Page 4-1, Community Participation: The last statement is incorrect, RAB meetings are held on more of a quarterly or bi-monthly basis, not monthly as indicated.

Response 17: Agreed. The text has been revised.

Comment 18: Page 5-1, Scope and Role: The statement that this alternative was selected because it "eliminates sediments that contribute to human health risk," is misleading because not all contaminated sediments (i.e., the sediments in the ditch to the southeast), are proposed to be removed. The Army should revise this statement. (Also, as a side note, the Army should name the ditch to the southeast for future reference.)

Response 18: Disagree. The post-remediation risk calculations performed in the FS (Table G-32) demonstrate that once the sediment in the northwest ditch is removed, there is no risk from exposure to sediment at SEAD-25. The pre-remediation cancer risk HI for ingestion of sediment for a future resident is 10^{-3}, while the post-remediation HI is 2×10^{-6}. Even though the proposed alternative does not remove all sediment from the site, it does include the removal of all sediment that contributes to unacceptable human health risk.

Comment 19: Page 5-2, Scope and Role: The first sentence on this page states that, "…the groundwater is impacted by relatively low concentrations of volatile organics in the one well on site.." and should be changed to read "in only one well on site." It is stated that SEAD-26 ranked

higher for, among other criteria, long-term effectiveness. This statement should include a discussion on institutional controls and how it relates to long-term effectiveness.

Response 19: Agreed. The text has been revised. As described above, under the selected remedies, there are no permanent land use controls at SEAD-25 or SEAD-26. Once groundwater ARARs are achieved and the temporary groundwater restrictions are removed from both sites, the selected remedies will become more effective and permanent.

Comment 20: Page 6-3, SEAD-26: The last sentence in Section 6.2 stating "(H)owever, the constituents that exceed NYSDEC GA Standards in the groundwater are no longer found in the soil of SEAD-26," should be further explained as to why there are no longer soil contaminants at SEAD-26.

Response 20: Agreed. The statement has been revised to clarify that the levels of COCs have already attenuated in the soil.

Comment 21: Page 7-3, SEAD-25: The statement that the "risk analysis for a future on-site resident showed that the excess cancer risk under this exposure scenario is 1×10^{-3}," is contrary to that which was stated in the Final Proposed Plan, in that the "…excess cancer risk under this exposure scenario is 1×10^{-4} (revised from 1×10^{-3} in RI/FS)." Please reconcile.

Response 21: In order to be consistent with backup material presented in previous reports, values cited in the text (and their source tables) correspond to calculations presented in the RI/FS. A footnote has been added to Table 7-3, which has been revised to clarify that the risk values presented in this section correspond to calculations from the RI/FS, and the risk values presented in the Proposed Plan will be noted, as well. It should also be noted that the cancer risk calculated for a future on-site resident using the revised EPC is 3×10^{-4}, and not 1×10^{-4}.

Comment 22: Page 7-4, SEAD-26: In the first sentence of the second paragraph, it states that "…the HI for a child slightly exceeds 1…" The Army should state what the HI is for a child resident.

Response 22: Agreed. The HI for a child resident is approximately 1.3. This detail has been added to the text.

Comment 23: Page 7-4, Additional Information on SEAD-25 and SEAD-26 Human Health Risk Assessment: In the third paragraph of this section, the Army provides reasons for considering a residential scenario in the analysis of alternatives, but fails to mention that it is NYS regulation to restore inactive hazardous waste disposal sites to predisposal conditions, to the extent feasible and authorized by law as well as CERCLA's requirement to analyze a range of alternatives.

Response 23: Agreed. A statement has been added that a residential scenario was also included due to NYSDEC requirement that the site be restored to pre-disposal conditions.

Comment 24: Page 7-5, Section 7.2, Ecological Risk Assessment: In the third sentence of the second paragraph in this section, it states that "(I)n general, guidelines suggest that…" This sentence --should be expanded to explain whose guidelines are being referenced. In the third sentence of the third paragraph, the phrase "initially suggested" should be replaced with "determined." In the second sentence of the fourth paragraph, "between 10 and 100," should be replaced with "greater than 1."

Response 24: The guidelines referenced are from Step 2 in the screening-level exposure estimate and risk calculation in Ecological risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting ecological Risk Assessments (USEPA 1997). The text has been revised.

Comment 25: Page 8-1, Remedial Action Objectives: In the second paragraph, "guidance documents" should be included in the list of available information that the remedial action objectives are based upon. Also, in the bulleted list, "constituents" should be replaced with "contaminants."

Response 25: Agreed. The text has been revised.

Comment 26: 9-2, Description of Alternatives: Please include a construction time for Alternative RA25-2. Also, under this alternative description, it states that the "cost of this alternative is relatively high since it includes quarterly groundwater monitoring…" However, under the Selected Remedy section for SEAD-26, it calls for conducting annual groundwater monitoring for 20 years. This discrepancy is noted several times in this document, and needs correction.

Response 26: No construction time is required for RA25-2, Institutional Controls and Natural Attenuation of the Plume.

The Army proposed annual monitoring at SEAD-26 since there was no distinguishable plume, and annual monitoring was sufficient to determine if cleanup goals had been achieved. Quarterly monitoring was proposed at SEAD-25 since there was a plume and more frequent monitoring was required to determine if natural attenuation was occurring. The Army agrees that it is more practical to conduct monitoring at similar intervals. Semi-annual monitoring meets requirements at both sites and is now proposed for SEAD-25 and SEAD-26.

Comment 27: Page 9-3, Description of Alternatives: Each alternative should include a specific description of the institutional controls required for that alternative. Since these alternatives call for varying degrees of institutional control requirements, it is inappropriate for each alternative description to refer to a general paragraph at the beginning of this section.

Response 27: Agreed. The type of land use controls included as an element of each alternative will be detailed within the description of that alternative. The details regarding implementation and enforcement of the land use controls will be specified in and implementation and enforcement plan, which will be part of the remedial design plan.

Comment 28: Page 9-5, Alternative RA25-4: The second paragraph does not belong in this document as it pertains to remedial design. Please remove.

Response 28: Agreed. The paragraph has been removed.

Comment 29: Page 9-6, Description of Alternatives: "SPDES" should be defined first.

Response 29: Agreed. SPDES has been defined as "State Pollution Discharge Elimination System" in the text and in the list of acronyms in the Table of Contents.

Comment 30: Page 9-7, Description of Alternatives: Under the Descriptions of Alternative RA25-3R and RA25-3AR, the volume, depth, width, and horizontal extent of contamination proposed to be remediated should be provided.

Response 30: Agreed. The dimensions of the remedial area have been added to the text for Alternative RA25-3R and RA25-3AR. All alternatives have a remedial area in the center of the site that covers approximately 6000 square feet (sf) to a depth of 6 feet and a volume of 1350 cubic yard (CY). For all residential alternatives, an additional remedial area is defined in the northwest ditch, covering approximately 2360 sf, to a depth of 2 feet and with a volume of 175 CY (roughly 787 linear and a width of 3 feet).

Comment 31: Page 9-8, Alternative RA25-3R: It should be phrased that "the air sparging system is estimated to run for about 10 years." The same with the following sentence, where "groundwater is estimated to be monitored for 10 years."

Response 31: Agreed. The text has been revised.

Comment 32: Page 9-8, Alternative RA25-3AR: It should be clarified that "groundwater will be monitored for approximately 15 years."

Response 32: Agreed. The text has been revised.

Comment 33: Page 9-9, Alternative RA26-2: The State is unaware of any "(C)urrent monitoring activities," that "include quarterly monitoring of a number of wells in place at the site." Please reconcile.

Response 33: Agreed. Currently, there are no monitoring activities at SEAD-26. This statement has been removed from the text.

Comment 34: Page 9-11, Alternative RA26-4: In the first paragraph it states that "groundwater would pass through a liquid phase carbon unit," then in the next paragraph it states that "…if carbon is used…" Please reconcile.

Response 34: Agreed. The two references to the carbon unit have been clarified to state that, if necessary, the carbon would be used to polish the liquid phase.

Comment 35: Page 9-10, Description of Alternatives: The statement that "(T)he administrative feasibility of this alternative is good," not only needs further discussion, but should discuss administrative feasibility as it relates to the institutional control requirements required for this alternative.

Response 35: Agreed. The statement has been modified to include that the implementation of this alternative (RA26-3) may be complicated by the presence of permanent land use controls as an element of the alternative.

Comment 36: Page 10-5, Reduction of Toxicity, Mobility or Volume: The statement regarding RA25-3R and RA25-3AR states that they "received the highest ranking rating because they would permanently destroy all the constituents of concern." This statement is incorrect, for the COCs would be transferred to the atmosphere, not destroyed. Please revise.

Response 36: Agreed. The statement has been revised to state that RA25-3R and RA25-3AR received the highest ranking because they would remove all the COCs from the media of concern.

Comment 37: Page 10-7, Cost: A sentence should precede the discussion explaining that the highest ranking alternative relates to the lower cost.

Response 37: Agreed. A sentence has been added to the text that states that the highest ranking alternative corresponds to the lowest cost.

Comment 38: Page 10-9, State Acceptance: This section should be replaced with the following: "(S)tate acceptance addresses technical and administrative concerns of the State with regard to

remediation. The NYSDEC has provided input during the preparation of the Proposed Plan and ROD and their concurrence with the selected remedy is given in Appendix B."

Response 38: Agreed. The text has been revised.

Comment 39: Page 10-9, Community Acceptance: This section should be replaced with the following: "(C)ommunity acceptance addresses public comments received on the Administrative Record and the Proposed Plan. Community comments to the selected remedy were evaluated following the public comment period and are discussed in the Responsiveness Summary (Appendix C)."

Response 39: Agreed. The text has been revised.

Comment 40: Page 10-9, Section 10.2.2 SEAD-26, Overall Protectiveness of Human Health and the Environment: The last sentences of this section, "…ecological risk at this site is negligible," followed by "the No-action alternative scored poorly for protection of the environment," are contradictory. Please reconcile.

Response 40: Agreed. The last statement of the section has been removed from the text.

Comment 41: Page 10-11, Implementability: The implementation of institutional controls should be discussed in this section.

Response 41: Agreed. Discussion has been added to the text that states that Alternative RA26-2 is rated favorably since there would be no permanent land use controls to enforce.

Comment 42: Page 10-11, Cost: The first sentence is incorrect, and should be removed from the text. State and community acceptance should be the last two criteria.

Response 42: Agreed. The sentence has been removed from the text.

Comment 43: Page 11-1, Selected Remedy:

a) In the Final Proposed Plan under "Preferred Alternative" it states that for SEAD-25, "(T)he goal of the remedial action is to have no residual contamination in soil above TAGM levels and to remove the risk to human health." However, this statement was not carried over to this ROD. Please include.

b) The sentence preceding the first bulleted item for SEAD-25 should read "(T)he elements that compose the remedy include." The first bulleted item for SEAD-25 should read that

"(E)xcavate soil at the source in an area approximately 60 feet by 100 feet to a depth of 6 feet, as depicted in Figure 6-2, (approximately 1,350 cubic yards (CY)." The second bulleted item should read "(E)xcavate a volume of sediment approximately 780 feet long, 3 feet wide, and 2 feet deep, as depicted in Figure 6-2, (approximately 175 CY) from the northwest ditch." Also, an additional bullet should be added to the elements of the remedy that states that the excavated soils will be disposed of at an off-site facility legally allowed to handle such wastes.

c) Under the second set of bulleted items, the second bulleted item should add a clause to read that the deed restriction will prohibit human or ecological exposure of groundwater from the site "without proper treatment."

Response 43:

a) Agreed. The statement has been added to the ROD.
b) Agreed. The text has been revised.
c) Acknowledged. This section has been revised to incorporate more appropriate language on land use controls.

Comment 44: Section 11.0, Selected Remedy, SEADS 25 and 26: Please revise statements "…the deed may prohibit…" to "…the deed will prohibit…"

Response 44: Acknowledged. The section has been revised to incorporate more appropriate language on land use controls and deed restrictions.

Comment 45: Section 11.0, Selected Remedy, SEAD 26: The last sentence should read that "it is estimated" to take longer than other remedies to achieve clean up goals.

Response 45: Agreed. The text has been revised.

Comment 46: Page 12-3, Section 12.2.2, The Selected Remedy Attains ARARs: The statement regarding SEAD-26 that "(O)nce ARARs are achieved from groundwater, land use controls would no longer be required," is misleading. Although groundwater use restrictions may be lifted, the restriction regarding residential and daycare use will remain in place.

Response 46: As previously noted, the selected remedy for SEAD-26, RA26-2, has been modified; consequently, once the excavation of soils is completed, permanent land use controls would not be required. Therefore, the statement is correct.

Comment 47: Page 12-3, Section 12.2.3, The Selected Remedy is Cost Effective: This section does not discuss the costs of institutional controls to restrict the property from daycare and residential use. Please include.

Response 47: Acknowledged. As mentioned, the remedy has been modified, and permanent land use controls, such as restricting the property from daycare or residential use, are not part of the remedy.

Comment 48: Page 12-4, Section 12.2.5: In the last sentence, it is unclear who the land use controls will be protecting.

Response 48: Agreed. The land use controls would protect potential future receptors from contact with the groundwater.

Comment 49: Figure 6-1: The groundwater flow direction in this figure does not correlate well with the plume sketches on Figure 6-2.

Response 49: Agreed. Figure 6-1 has been modified to more clearly illustrate the direction of groundwater flow. In addition, the following discussion on groundwater flow has been added to the text in Section 6.1.2, *Impacts to Groundwater*:

> "The groundwater flow direction is shown in Figure 6-1. Results of groundwater contour mapping indicate that groundwater flow is radial below the pad, with a strong horizontal gradient to the south and west. The radial groundwater flow that has developed below the pad at SEAD-25 is believed to be a local phenomenon that is present because of the influence of the anthropomorphic bedrock topographic mound located below the pad. The mapping also indicated that the groundwater flow in the deeper portion of the aquifer located in the competent shale zone is to the west and southwest."

Comment 50: Figure 3-2: It would be helpful if this figure included the locations of SEADs 25 and 26.

Response 50: Assuming that the reference is to Figure 3-1, agreed. The location of SEAD-25/26 has been indicated on the map.

Comment 51: Tables: There should be a table indicating the results of the baseline risk assessment performed, in addition to indicating the post remedy human health and ecological calculated risks.

Response 51: Agreed. Table 7-2, which presents the results of the baseline risk assessment (BRA) for human health at SEAD-25 was included in the ROD. In addition, a Table 7-4 presenting the BRA

for human health for SEAD-26 has been added to the document. The post remedy human health risk for both sites is included in Tables 10-1 and 10-2 for SEAD-25 and SEAD-26, respectively.

The Army does not feel that it is appropriate to include tables for ecological risk, since it was determined that ecological risk was negligible. The conclusion that there is no significant ecological risk was resolved by assessing both the numerical values presented in risk tables and by incorporating risk management decisions.

Comment 52: Tables 6-1B through 6-2C: All of these tables should include the footnote that was included in the Proposed Plan denoting that "According to the statistical analysis conducted in Section 6.2.3 of the RI report, lead, selenium, and thallium are the only elements that tend to be greater than the inorganic element concentrations that were detected in the same background media."

Response 52: Agreed. All tables include that footnote.

Comment 53: Table 6-2B: Please revise the "Metals" asterisk marking to reflect three asterisks instead of the two listed. The footnote for two asterisks regards semi-volatile compounds, not metals.

Response 52: Agreed. The table has been revised.

Comment 54: 6-2C: Is there a footnote #1? If not, footnotes #2 through #4 should be re-numbered accordingly.

Response 54: Agreed. The footnotes have been renumbered.

Comment 55: Table 7-1: The footnote seems to be in error and should be revised.

Response 55: Agreed. The footnote has been revised to state "This value represents the EPC used in risk calculations in the RI/FS. In the RI/FS, the EPC may have been elevated due to the fact that the 95% UCL of the mean was always selected as the EPC, even if it was greater than the maximum concentration detected. Since the completion of the RI/FS, risk values have been recalculated using the lower of the 95% UCL of the mean and the maximum hit."

Comment 56: Table 8-1B: The first footnote has been segmented. It should read "…From 6 NYCRR Parts 701-705. TOGS 1.1.1, June 1998."

Response 56: Agreed. The footnote has been revised. It should be noted that in the Draft Final ROD, this table is first referenced in Section 1.0. Consequently, Tables 8-1A and 8-1B have been renamed Tables 1-1A and 1-1B.

Comment 57: Table 10-1: For alternative RA25-4R under Protectiveness of Human Health and the Environment, "risk" has been omitted as the last word in the description regarding exposure pathways. Under Long-term Effectiveness, the treatment criteria for Alternatives RA25-4, RA25-5, RA25-6, RA25-3R, RA25-3AR, and RA25-4R should be to attain the groundwater standards for all contaminants of concern, not just benzene. Please revise. Also, under Implementabilty and the Ability to Obtain Approvals and Coordinate with Other Agencies, the descriptions refer to requiring agency approvals for final remedy selection and monitoring plan and parathentically refers to NYSDEC and EPA. As stated in NYSDEC TAGM #4030, "(A)dministrative feasibility refers to compliance with applicable rules, regulations, and statutes and the ability to obtain approvals from other offices and agencies." It is my understanding that administrative feasibility does not include the NYSDEC, USEPA or Army. This table should be revised accordingly. Also, for state and community acceptance, the tense of "will be documented in the ROD" should be changed to reflect that this document in the ROD (this applies to Table 10-2 as well).

Response 57: Agreed. The tables have been revised.

Comment 58: Table 10-2: As stated above, the treatment criteria should be attaining groundwater standards for all contaminants of concern, not just benzene. Please revise all descriptions under permanence that refer to "<1ug/L (benzene)".

Response 58: Agreed. The table has been revised.

Comment 59: Appendix A: The administrative record is missing. Please include.

Response 59: Agreed. The administrative record has been added to Appendix A.

Comment 60: Page D-6, Section D.2.3, Soil Quality: The statement that "(S)ite Cleanup Goals (SCG) for metals have been determined as either the site background concentration or the NYSDEC TAGM value, whichever is higher," is misleading, because TAGM 4046 only incorporates background values on specific contaminants that may defer to background numbers. Also, the second sentence should refer to #HWR-92-4046, not 4045.

Response 60: Agreed. The text has been revised as follows: "Site Cleanup Goals (SCG) for metals have been determined based on the TAGM values, which, for some specific inorganics, defers to the site background values."

Comment 61: Page D-7, New York State: This section should recognize 6 NYCRR Part 375 as a location-specific ARAR.

Response 61: Agreed. The text has been revised.

Comment 62: All of the above should be addressed in all other sections of the document as appropriate. For example, there are several comments that reference the text, but are applicable to the tables as well.

Response 62: Agreed. The document has been revised in accordance with all comments.