128-06

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October 6, 2008

Mr. John Hill
U. S. Air Force Center for Engineering and the Environment
HQ AFCEE/IWA-COR
3300 Sidney Brooks, Building 532
Brooks City-Base, TX 78235-5112

SUBJECT: **Signed Record of Decision for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) at Seneca Army Depot Activity; Contract FA8903-04-D-8675, Delivery Order 0031, CDRL A001C**

Dear Mr. Hill:

Parsons Infrastructure & Technology Group Inc. (Parsons) is pleased to submit the signed copy of the Record of Decision for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York. An electronic copy of the complete Record of Decision is enclosed with this submittal.

This work was performed in accordance with the Scope of Work (SOW) for Contract No. FA8903-04-D-8675, Task Order No. 0031.

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

Sincerely,

Todd Heino, P.E.
Project Manager

Enclosures

cc: S. Absolom, SEDA (3 paper copies, 1 electronic copy)
K. Hoddinott, USACHPPM (2 paper copies, 1 electronic copy)
R. Walton, USAEC (1 copy, paper and electronic)
R. Battaglia, USACE, NY District (1 copy, paper and electronic)
T. Battaglia, USACE, NY District (1 copy, paper and electronic)
Air Force CDL (letter only)

PARSONS

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October 6, 2008

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

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

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

SUBJECT: **Signed Record of Decision for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) at Seneca Army Depot Activity; Contract FA8903-04-D-8675, EPA Site ID# NY0213820830 and NY Site ID# 8-50-006**

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

Parsons Infrastructure & Technology Group Inc. (Parsons) is pleased to submit the signed copy of the Record of Decision for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York (EPA Site ID# NY0213820830 and NY Site ID# 8-50-006).

An electronic copy of the complete Record of Decision is enclosed with this submittal.

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

Sincerely,

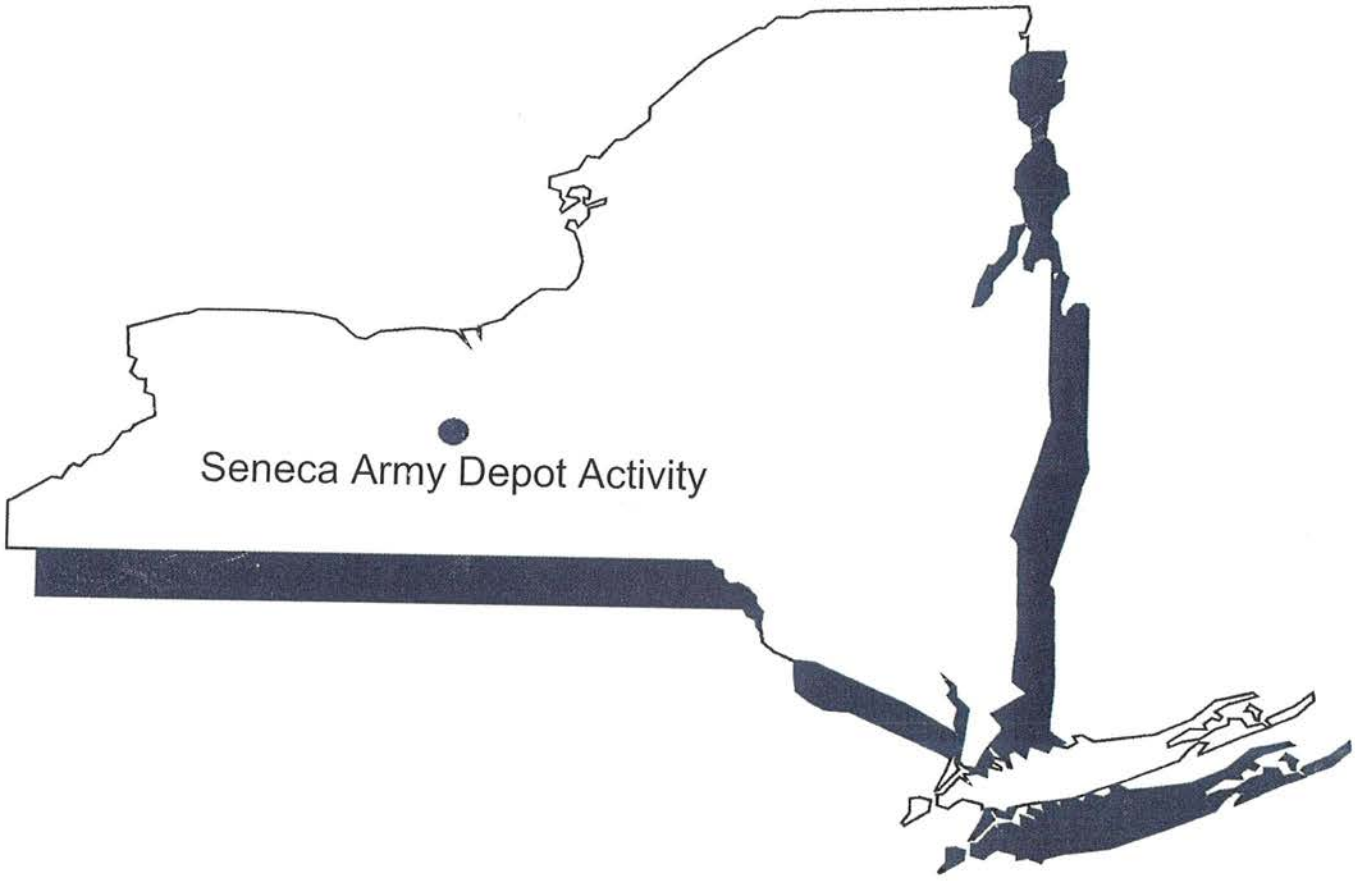
Todd Heino, P.E.
Program Manager

Enclosures
cc: M. Heaney, TechLaw
S. Absolom, SEDA
R. Battaglia, USACE, NY
J. Hill, AFCEE
K. Hoddinott, USACHPPM
T. Battaglia, USACE, NY
Air Force CDL
R. Walton, USAEC

US Army Corps of Engineers

Air Force Center for Engineering and the Environment

Seneca Army Depot Activity
Romulus, New York



RECORD OF DECISION

FOR THE MUNITIONS WASHOUT FACILITY (SEAD-4) AND
THE BUILDING 2079 BOILER BLOWDOWN PIT (SEAD-38)
SENECA ARMY DEPOT ACTIVITY

AFCEE CONTRACT NO. FA8903-04-D-8675
TASK ORDER NO. 0031
CDRL A001C

EPA SITE ID# NY0213820830
NY SITE ID# 8-50-006

PARSONS
August 2008

RECORD OF DECISION

FOR

THE MUNITIONS WASHOUT FACILITY (SEAD-4) AND THE BUILDING 2079 BOILER BLOWDOWN PIT (SEAD-38)

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared for:

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

and

AIR FORCE CENTER FOR ENGINEERING AND THE ENVIRONMENT
3300 SIDNEY BROOKS, BUILDING 532
BROOKS CITY-BASE, TX 78235-5122

Prepared By:

PARSONS
150 Federal St., 4th Floor
Boston, Massachusetts 02110

Contract Number: FA8903-04-D-8675
Task Order: 0031
CDRL: A001C
EPA Site ID: NY0213820830
NY Site ID: 8-50-006

August 2008

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ACRONYMS AND ABBREVIATIONS

AOC(s)	Area(s) of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
AWQS	Ambient Water Quality Standard
BCT	Base Clean-up Team
bgs	below ground surface or below grade surface
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
COPC	Contaminants of Potential Concern
DoD	Department of Defense
EBS	Environmental Baseline Survey
ECL	Environmental Conservation Law
EPA	U.S. Environmental Protection Agency
ESI	Expanded Site Investigation
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft.	foot or feet (dependent on context)
GA	NYSDEC groundwater classification for a source that is suitable for drinking water
HI(s)	Hazard Index (Indices)
LUC(s)	Land Use Control(s)
LRA	Local Redevelopment Authority
MCL	Maximum Contaminant Level
mg	milligrams
mg/kg	milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (continued)

NCP	National Contingency Plan or National Oil and Hazardous Substances Pollution Contingency Plan
NGVD	National Geodetic Vertical Data
NPL	National Priorities List
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation, Maintenance, and Monitoring
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PRG	Preliminary Remediation Goal
PVC	Polyvinyl Chloride
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SCIDA	Seneca County Industrial Development Agency
SCO	Soil Cleanup Objective
SEAD	Acronym for the Seneca Army Depot used to designate SWMU numbers
SEDA	Seneca Army Depot Activity
SLERA	Screening Level Ecological Risk Assessment
SVOC(s)	Semivolatile Organic Compound(s)
SWMU	Solid Waste Management Unit
TBC	To Be Considered
TCLP	Toxic Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TRC	Technical Review Committee
TSDF	Treatment, Storage and Disposal Facility
UCL	Upper Confidence Limit
µg/L	micrograms per liter
VOC(s)	Volatile Organic Compound(s)

REFERENCES

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Title 40 Code of Federal Regulations, Part 300, National Oil and Hazardous Substances Pollution Contingency Plan.

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REFERENCES (continued)

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1.0 DECLARATION OF THE RECORD OF DECISION

Name and Location of Areas of Concern (AOCs)

The Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38)
Seneca Army Depot Activity
5786 State Route 96
Romulus, New York 14541
EPA Site ID: NY0213820830; NY Site ID: 8-50-006

Statement of Basis and Purpose

This Record of Decision (ROD) documents the U.S. Army's (Army's) and the U.S. Environmental Protection Agency's (EPA's) selection of a remedy for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) located in the Seneca Army Depot Activity (SEDA), Romulus, New York. The remedies selected for the two Areas of Concern were chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. Section 9601, *et seq*. and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. The Base Realignment and Closure (BRAC) Environmental Coordinator, the Chief of the Consolidations Branch, BRAC Division, and the Director of Emergency and Remedial Response Division of EPA Region II have been delegated the authority to approve this ROD.

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, 5786 State Route 96, Building 123, Romulus, NY 14541. The Administrative Record Index identifies each of the items considered during the selection of the remedial actions. This index is included in **Appendix A**.

The New York State Department of Environmental Conservation (NYSDEC) was consulted on the planned remedies in accordance with CERCLA Section 121(f), 42 U.S.C. Section 9621(f) and concurred with the selected remedial action. The NYSDEC concurrence letter is included in **Appendix B**.

AOC Assessment

The response actions selected in this ROD are necessary to protect human health and the environment from actual or threatened releases of hazardous substances into the environment from SEAD-4 and SEAD-38 (hereafter referred to as SEAD-4/38), or from actual or threatened releases of pollutants or contaminants, which may present an imminent and substantial endangerment to public health or welfare.

Description of the Selected Remedy

The selected remedy for SEAD-4 addresses contaminated soil, ditch soil, and lagoon soil. The selected remedy would result in the elimination of soil, ditch soil, and lagoon soil as media of concern for potential receptors. The selected remedy for SEAD-4 includes the following components:

- Excavating ditch soil until the cleanup goal (60 mg/kg) for total chromium (hereafter referred to as chromium) is reached;
- Excavating surface and subsurface soils until the cleanup goals for lead and chromium (167 mg/kg and 60 mg/kg, respectively) are achieved;
- Dewatering the man-made lagoon and allowing water to drain into the existing drainage ditches outside the excavation areas;
- Once the lagoon is empty, excavating soil from the man-made lagoon until the chromium cleanup goal of 60 mg/kg is achieved;
- Removing the temporary berm at the end of the lagoon and allowing the man-made lagoon to return to its natural condition;
- Stabilizing soils, ditch soil, and lagoon soil exceeding the waste characterization criteria listed in 40CFR261.21 through 40CFR261.24;
- Disposing the excavated soils in an off-site licensed landfill;
- Backfilling excavation areas that cannot be graded to promote positive drainage and excavation areas deeper than 4 feet near the road or buildings as necessary with clean backfill that meets the cleanup goals for chromium and lead, the residual metal concentrations at SEAD-4 for other metals, and the NYSDEC Unrestricted Use Soil Cleanup Objectives (SCOs) for SVOCs; and
- Submitting a Completion Report once the remedial action is completed.

The following actions were previously identified as part of the proposed remedy in the Proposed Plan, but have now been completed as a result of interim actions that have already been undertaken at SEAD-4:

- Removing, characterizing, and disposing of debris located in vacant Buildings 2073, 2076, 2078, 2084, and 2085, and sweeping and vacuuming building floors; and
- Demolishing Building 2079.

These above-referenced actions have been successfully completed at SEAD-4 and the detailed discussion of what was done and the results of the interim actions are presented in Section 3 and Section 6, respectively.

The selected remedy for SEAD-38 is excavation of the hot spot soil SD4-28 with vanadium concentrations greater than 150 mg/kg.

At the completion of the selected remedies for SEAD-4 and SEAD-38, the AOCs would be suitable for unrestricted uses and unlimited exposures.

State Concurrence

NYSDEC forwarded to EPA a letter of concurrence regarding the selected remedies for SEAD-4 and SEAD-38. This letter of concurrence has been placed in **Appendix B**.

Declaration

CERCLA and the NCP require each selected remedy to be protective of human health, public welfare, and the environment; be cost-effective; comply with Federal and State applicable or relevant and appropriate requirements (ARARs); and use permanent solutions, alternative treatment technologies, and resource recovery options to the maximum extent practicable. 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 remedies for SEAD-4 and SEAD-38 are consistent with CERCLA and the NCP requirements and would result in hazardous substances and pollutants or contaminants remaining on-site consistent with levels that allow for unlimited use and unrestricted exposure.

The estimated capital costs for the selected remedies are $1,600,000 and $8,000, respectively, for SEAD-4 and SEAD-38 and no operation, maintenance, and monitoring (O&M) cost is expected after the remedial action.

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 8/19/08

STEPHEN M. ABSOLOM
BRAC Environmental Coordinator

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:

4 Sep 08

JOSEPH F. VIGNALI
Chief, Consolidations Branch
BRAC Division

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:

9/22/08

GEORGE PAVLOU
Date
Acting Director, Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region II

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2.0 AOC NAME, LOCATION, AND DESCRIPTION

The Seneca Army Depot previously occupied approximately 10,600 acres of land in Seneca County in the Towns of Romulus and Varick, New York. The property was acquired by the United States Government in 1941, and was operated by the Department of the Army from that time until approximately September 2000 when the installation closed. Prior to the acquisition of the land and the construction of the Depot, the land was used for agriculture, farming, and residential purposes.

A location map for SEDA is provided as **Figure 1**. **Figure 1** shows that SEDA is bordered by New York State Highway 96 on the east and New York State Highway 96A on the west. SEDA is located in an uplands area, which forms a divide that separates two of New York's Finger Lakes; Cayuga Lake on the east and Seneca Lake on the west. Ground surface elevations are generally higher along the eastern and southern borders of the Depot, and lower along the northern and western borders. The approximate elevation at the southeastern corner of SEDA is 740 feet (ft., National Geodetic Vertical Datum [NGVD] 1929), while the approximate elevation at the southwestern and northeastern corners is 650 ft. (NGVD, 1929). The approximate elevation at the southwestern corner of the Depot is 590 ft. (NGVD, 1929).

The former Munitions Washout Facility (SEAD-4) and the former Building 2079 Boiler Blowdown Pit (SEAD-38) are located in the southwestern portion of the former Seneca Army Depot Activity. The future land use of this portion of the former Depot is defined by the Seneca County Industrial Development Agency, the owner of all non-Army retained property in this portion of the Depot, as Training. The focus of the training is further described as training for Homeland Security, training for first-responders, and special warfare training.

SEAD-4 is characterized by developed and undeveloped areas that occupy approximately 47.5 acres of land. The AOC is split between two land parcels that are separated by Seneca Road. The southwestern parcel is generally lower in elevation than the northeastern portion of the AOC. **Figure 2** presents a map of SEAD-4 and the predominant features. Several man-made drainage ditches are present at SEAD-4 and most of them are approximately three feet deep. Railroad tracks lead into the area and terminate in the vicinity of Building 2085. Eleven buildings/structures previously existed at SEAD-4 but nine of the buildings/structures listed below have been demolished:

- Munitions Washout Building, which was used in the washout process;
- Decontamination Building, which was used in the washout process;
- Unnamed Building, which was used in the washout process;
- Building T30, which was used to prepare the packing material;
- Building 2074;
- Building 2075;
- Stack 2077;
- Building 2079, the former Boiler House; and
- Water Tank 2081.

Buildings 2074, 2075, and 2079 and structures identified as 2077 (stack) and 2081 (water tank) were demolished in 2007 and the other four buildings were demolished before the RI was conducted at SEAD-

4 (i.e., prior to 1998). The historic presence of many of these structures is marked by abandoned concrete slabs on grade. The remaining buildings at SEAD-4 are not currently in use.

The southwestern portion of SEAD-4 historically has remained mostly undeveloped and characterized by intermixed areas of open grass-covered fields and zones that are vegetated with varying densities of low brush. The undeveloped land is interrupted by man-made drainage ditches and dirt roads that lead off of Seneca Road into the western portion of the AOC. Many of the drainage ditches are interconnected and feed a lagoon that lies approximately 500 feet to the west of Seneca Road. Three buildings have also occupied portion of the southwestern parcel of SEAD-4. Two of these buildings resided immediately adjacent to the west edge of Seneca Road; Building 2084 still is present, Building T30 no longer exists. Building 2084 was used to process or condition ammunition that was being dismantled at the facility; no information is known about the activities conducted at Building T30. The third historic building was located roughly halfway between the former location of Building T30 and the lagoon.

The northeastern portion of SEAD-4 is more developed, and rises in elevation from Seneca Road towards the east. Paved and unpaved roadways and walkways lead eastwards from Seneca Road towards the historic structures that exist in this portion of the AOC. Railroad tracks also enter this portion of the AOC from the south and terminate in the vicinity of Building 2085. Most of the roads, walkways, and railroad tracks are bordered by man-made drainage culverts that direct stormwater away from the structures and roads to locations to the south, north, and west. This portion of the AOC also shows evidence of historic earthen berms between building locations, and is reported to have included a suspected leach field at the northern end of the area. North of the suspected leach field a drainage pipe embedded in a concrete berm is believed to have discharged to the drainage swale that surrounds the AOC; the orientation of the pipe indicates that it most likely originated at the leach field.

The Munitions Washout Facility and Leach Field (SEAD-4) was active between 1948 and 1963. Operations at this facility included dismantling and removing explosives from munitions by steam cleaning. The washout process at SEAD-4 involved the use of steam or hot water to remove the solid explosives from munitions. The heated water dissolved the solid explosives from the shells. The explosives would re-solidify into pellets and were sent to weapons manufacturing plants to be re-used. The wastewater was then disposed of on-site. The exact location where the wastewater from the washout operation was discharged is unknown. The areas where wastewater is suspected to have been discharged is a man-made 150-foot diameter lagoon located west of the Seneca Road within the AOC. The man-made lagoon was constructed for the purpose of containing wastewater. This operation produced recyclable and non-recyclable explosive solids and wastewater. The details of the operation and the wastewater discharge locations are not well understood. Solid wastes containing explosives were most likely open burned at the OB facility (SEAD-23) or the old powder burning pit (SEAD-24). Interviews with former SEDA employees indicate that the wastewater was processed through sawdust to remove any solid explosive residues prior to being discharged to an area where it leached into the ground or flowed into a nearby ditch. Some wastewater may have been discharged into the lagoon area located in the western portion of the AOC.

SEAD-38, the former Building 2079 Boiler Blowdown Leach Pit, is located in, and is completely surrounded by the northeastern portion of SEAD-4. Building 2079 is the location of the former boiler house within SEAD-4 that was used for the generation of steam that was used in the ammunition washout process and for heat within the buildings that are located within SEAD-4. SEAD-38, as shown in **Figure 2**, is located to the north of, and exterior of, former Building 2079 and includes land where blowdown solutions from the boiler house were discharged to the ground. This area encompasses a total area of no more than one acre of land that included vacant ground and portions of two man-made drainage ditches that are located to the northwest of the former Building 2079.

Boiler blowdown is a liquid periodically discharged as waste from a boiler operation to purge impurities such as dissolved and suspended solids that have accumulated in the boiler plant. All feed water used for steam contains some level of dissolved or suspended solids upon entry into the boiler. As the water is heated and flashed to steam, these impurities become concentrated and form scale and sludge that remains in the boiler after the steam is carried off for use. As the scale becomes thicker, the heating of the boiler operation becomes less efficient, and this scale is removed by "flushing" the boiler or by using chemical additives that help scour off the scale and sludge; the combined liquid waste is then discharged. The boilers discharged a total of 400 to 800 gallons of liquid per day. It is presumed that the boiler blowdown contained water, tannins, caustic soda (sodium hydroxide), and sodium phosphate. It is suspected that some of the discharged liquid flowed into the adjacent drainage ditch, while some may have infiltrated into the ground.

As noted above, SEAD-38 is physically located within, and is fully surrounded by, the footprint of the area that is defined as SEAD-4. As a result, the characterization of contaminants within SEAD-38 was conducted along with that conducted for the larger AOC SEAD-4, during the SEAD-4 Expanded Site Inspection (ESI), Remedial Investigation (RI), and Feasibility Study (FS). Although the titles of the SEAD-4 ESI, RI, and FS reports suggest that the documents pertain specifically to SEAD-4; the information, results, analysis, and conclusions provided in these documents also relate to conditions found at SEAD-38. Similarly, the remedial action proposed for SEAD-4 incorporates consideration of needed action at SEAD-38. Therefore, unless otherwise specified, the following discussion summarizing investigations and results for each media will address SEAD-4 and SEAD-38 together.

Habitat and Ecological Community Characterization

SEAD-4/38 is characterized by developed and undeveloped areas. It is surrounded by open grassland and low, thick brush on all sides. Seneca Road bisects the AOCs running in a southeast-northwest direction. There is also a network of minor paved driveways in the eastern half of the AOCs. Railroad tracks lead into the AOCs from the southeast and terminate in the vicinity of Building 2085. The highest ground elevation at SEAD-4/38 is roughly 708 feet (National Geodetic Vertical Data [NGVD], 1929) and is located in the vicinity of Buildings 2073, 2078, and 2085, which are located in the eastern portion of the AOCs. From this point, ground surface slopes off in all directions, with the largest elevation drop off being towards the southwest, west and northwest where ground's surface elevation is closer to 670 feet (NGVD 1929).

Lesser elevation changes (i.e. approximately 10 feet) occur to the north, east, and south of the three buildings.

Terrestrial communities identified at SEAD-4/38 include successional old field, successional scrub, and successional southern hardwoods. Wildlife in the vicinity of SEAD-4/38 is primarily upland species, particularly those favoring old fields and shrublands, since these are abundant habitats in the AOCs. The mixture of these habitats with small woodlots and tree rows provides ideal habitat for white-tailed deer, which are common throughout the SEDA. Commonly occurring small game mammals in the SEDA include eastern cottontail, gray squirrel, raccoon, snowshoe hare, muskrat, beaver, eastern coyote, red fox, and gray fox. Ruffed grouse, ring-necked pheasant, and wild turkey also inhabit the depot. Waterfowl are attracted to wetlands on and around the depot. Many non-game species also are present in the depot and potentially utilize available habitat. Tracks of raccoon and rabbit were observed adjacent to the SEAD-4/38.

A small (0.72 acres) lagoon is located in the western region of SEAD-4/38. The man-made lagoon is the only sustained water body at SEAD-4/38. Air photos from 1968 show that from an outlet on the western edge of the lagoon, water in the lagoon flowed to the west and eventually to the south through small drainage swales and drainage ditches alongside the SEDA railroad tracks and roads. This natural outlet no longer exists and overflow is piped immediately to the west of the lagoon by a polyvinyl chloride (PVC) overflow pipe located on the western bank of the lagoon. Currently, the static water level of the lagoon is low enough that overflow is unusual and the lagoon is stagnant. The lagoon provides little habitat, and seining the lagoon produced one small bass fingerling. The side slopes have a sparse cover of upland forb species and there are no emergent, floating, or submerged aquatic vegetative species, with the exception of green algae mats. This lagoon offers marginal wildlife habitat due to the lack of vegetation and the low water volume. There are, however, numerous tracks of wading birds, raccoons, deer, and other wildlife around the lagoon, likely due to the fact that the lagoon is one of the few water sources on SEDA.

Several channelized streams and excavated drainage ditches are found throughout the AOCs. Only the largest of the ditches had standing water present, and no flow was observed. These large ditches were vegetated with cattail, purple loosestrife, cardinal flower, goldenrod, and other herbaceous species. Many of the ditches support common upland ruderal species and likely only function as conveyance systems during severe storms. No wildlife was observed in the ditches within the AOCs, although muskrat and beaver were observed in ditches in the northern portion of the SEDA. In order to evaluate the ecological receptors of the drainage ditch system at the AOCs, an ecological investigation was conducted by a Parsons expert on November 29, 2001 to characterize drainage ditch soils. The observations at SEAD-4/38 suggest that the drainage ditch system does not support aquatic life.

The NYSDEC Natural Heritage Program Biological and Conservation Data System identifies no known occurrences of federal- or state-designated threatened or endangered plant or animal species within a 2-mile radius of the SEDA. No species of special concern are documented within the Depot property. No rare or endangered species have been observed during the SEAD-4/38 investigations.

Hydrology

Regionally, four distinct hydrologic units have been identified within Seneca County. These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift. The geologic material that comprises the overburden is generally Pleistocene till.

The predominant surficial geologic unit present at SEAD-4/38 is dense till. The till is distributed across the AOCs and ranges in thickness from 0.5 feet to 4.6 feet. A zone of weathered gray shale of variable thickness was encountered below the till at many of the locations drilled at the AOCs. The thickness of the weathered shale ranges between 0.3 feet to 1.3 feet at SEAD-4/38. The bedrock underlying the SEDA is composed of the Moscow Formation of the Devonian age Hamilton Group. The geologic cross-sections suggest that a groundwater divide exists approximately half way between the two Finger Lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be primarily westward towards Seneca Lake. The groundwater flow direction in the till/weathered shale aquifer at SEAD-4/38 is generally toward the west. The distribution of groundwater in the till aquifer is characterized by moist soil with coarse-grained lenses of water-saturated soil, and in most instances the deeper weathered shale horizons are saturated.

The primary direction of surface water flow throughout the SEDA is to the west towards Seneca Lake. Isolated portions of the Depot drain to the northeast (Seneca-Cayuga Canal) and east (Cayuga Lake). Primary surface water flow conduits to Seneca Lake are Reeder, Kendaia, Indian, and Silver Creeks, while Kendig Creek flows to the northeast and an unnamed creek flows away from the southeast corner of the Depot towards the east. Runoff toward the east and north of SEAD-4/38 generally flows into the eastern drainage ditch. Surface water in this ditch flows west into Indian Creek just north of the AOCs. Runoff toward the west of SEAD-4/38 flows into the western ditch which drains to the north into the man-made lagoon. While the majority of the surface water runoff flows into either of the two main drainage ditches described above, a minor amount of runoff is directed either into the drainage ditches flowing north along Seneca Road or into the drainage ditches flowing south along the SEDA railroad tracks.

3.0 AOC HISTORY AND ENFORCEMENT ACTIVITIES

3.1 CURRENT AND POTENTIAL FUTURE LAND USES

SEDA is located approximately 40 miles south of Lake Ontario between Cayuga Lake to the east and Seneca Lake to the west. The area immediately surrounding SEDA is predominantly sparsely populated farmland. Population centers in the immediate vicinity of SEDA consist of the Towns of Romulus and Varick. Land use in the region surrounding SEDA is mainly agricultural with some minor forestry and public recreational components. Agricultural land use consists of active use, including cropland and cropland pasture, and inactive use including land devoted to forest regeneration and land presently being developed. Public and semi-public land use includes Sampson State Park, Willard Psychiatric Center, and the Central School in the Town of Romulus.

Prior to the acquisition of the land and construction of SEDA in 1941, the property was privately owned and was used principally as homesteads and for agriculture. Between 1941 and 2000, SEDA was owned by the United States Government and operated by the Department of the Army. The Depot began its primary mission of receipt, maintenance and supply of ammunition in 1943. After the end of World War II, the Depot's mission shifted from supply to storage, maintenance and disposal of ammunition. SEDA was selected for closure by the Department of Defense (DoD) in 1995, and SEDA's military mission terminated in September 1999 and the installation was closed in September 2000.

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. In 2005, the Seneca County Industrial Development Authority (SCIDA) changed the planned use of land in many portions of the Depot. **Figure 3** depicts the intended future land uses for SEDA, as modified by the SCIDA in 2005. As a result of this change, the planned future use for SEAD-4/38 was modified from Conservation/Recreation to Training, which is considered to be consistent with commercial use. SEAD-4/38 is currently unoccupied and unused. Groundwater at SEAD-4/38 is not used for drinking water purposes.

3.2 RESPONSE AND ENFORCEMENT HISTORY

SEDA Response and Enforcement History

SEDA was proposed for the National Priorities List (NPL) in July 1989. In August 1990, the listing of SEDA as a NPL Site was finalized in Group 14 on the Federal Section. After SEDA was listed on the NPL, the Army, EPA, and NYSDEC identified 57 Solid Waste Management Unit (SWMUs) where data or information suggested, or evidence existed to support, that hazardous substances or hazardous wastes had been handled and where releases to the environment may have occurred. Additionally, the EPA,

NYSDEC, and the Army negotiated and finalized a Federal Facilities Agreement (FFA) for the Site in 1993. The general purposes of the FFA were to:

- *"Ensure that the environmental impacts associated with past and present activities at the Site are thoroughly investigated and that appropriate remedial action is taken as necessary to protect human health and the environment;*
- *Establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at the Site in accordance with CERCLA, the NCP, Superfund guidance and policy, RCRA, RCRA guidance and policy and applicable State law; and*
- *Facilitate cooperation, exchange of information and participation of the Parties in such actions."*[1]

The number of SWMUs was subsequently expanded to include 72 AOCs once the Army finalized the SWMU Classification Report (Parsons, 1994) for the Depot in 1994.

The SEDA was a generator and treatment, storage and disposal facility (TSDF) for hazardous wastes and thus, subject to regulation under the Resource Conservation and Recovery Act (RCRA). Under the RCRA permit system, corrective action is required at all SWMUs, as needed. Remedial goals are the same for CERCLA and RCRA; thus, once the 72 SWMUs were listed, the Army recommended that they be identified as either areas requiring No Action or as AOCs, where additional investigation, study, or actions were needed. SWMUs listed as AOCs were then scheduled for investigations based upon data and potential risks to the environment. When the SWMU Classification Report was issued, SEAD-4 and SEAD-38 were classified as High Priority and Low Priority AOCs, respectively.

In October 1995, the SEDA was designated for closure under the DoD's 1995 BRAC process. In accordance with requirements of BRAC, the Army performed and summarized the findings of an Environmental Baseline Survey (EBS) for SEDA. Under the EBS, all areas at the Depot were evaluated and subdivided into one of seven standard environmental categories consistent with the Community Environmental Response Facilitation Act (CERFA – Public Law 102-426) guidance and the DoD's BRAC Cleanup Plan Guidebook (DoD, 1995). Based on the findings and conclusions of the EBS, SEAD-4 and SEAD-38 were both designated as AOCs where additional information and data were required before the land could be offered for transfer and reuse.

Once SEDA was added to the 1995 BRAC list, the Army's primary objective expanded from performing remedial investigations and completing necessary remedial actions to include the release of non-affected portions of the Depot to the surrounding community for their reuse for other, non-military purposes (i.e., industrial, municipal, and residential).

SEAD-4/38 Response and Enforcement History

Work performed at the SEAD-4 and SEAD-38 includes a limited soil sampling program conducted at SEAD-38 from December 1993 to January 1994, the ESI conducted in 1993 and 1994, the RI performed

[1] Federal Facility Agreement under CERCLA Section 120 in the Matter of Seneca Army Depot, Romulus, New York, Docket Number: II-CERCLA-FFA-00202, Section 3, Page 4, January 1993.

in 1998, the test pitting and groundwater investigations conducted in 2004, buildings demolition, and sweeping and vacuuming of Buildings 2073, 2076, 2078, 2084, and 2085 in 2008.

The soil sampling program conducted at SEAD-38 included the advancement of a soil boring and collection of one subsurface sample from 2-4 ft below ground surface (bgs.) and four surface soil samples from 0-2 inches bgs. The soil samples were analyzed for total petroleum hydrocarbons (TPH).

The ESI included the performance of geophysics surveys, monitoring well installation and development, and soil, ditch soil, groundwater, surface water, and lagoon soil sampling and analyses for SEAD-4/38.

The RI conducted in 1998 consisted of surveys, interior building investigations, surface and subsurface soil sampling, ditch soil sampling, overburden groundwater investigations (well installation, development, aquifer testing, and sampling), surface water and lagoon soil investigations, and an ecological investigation at SEAD-4/38. The RI also included performing risk assessments to characterize potential residual risks to human health and the environment at SEAD-4/38. A detailed discussion of risk assessment results is presented in Section 7.

At the conclusion of the RI, elevated risks were identified for future indoor training officer due to the presence of Aroclor-1254 found in debris within several of the abandoned buildings (e.g., Buildings 2073, 2079, and 2085). Elevated risks were also identified for future residents due to the identification of Aroclor-1260 in groundwater at MW4-10.

The additional 2004 test pitting and groundwater investigations were conducted in and immediately around the area of MW4-10 and the results indicate that soil and groundwater in the area was not impacted by polychlorinated biphenyls (PCBs)[2]. Therefore, Aroclor-1260 is no longer considered a human health COC in groundwater.

In 2007, Building 2079 was demolished to slab on grade. In 2008, floors and trenches of Buildings 2073, 2076, 2078, 2084, and 2085 were vacuumed and broomed cleaned to remove accumulated dust, dirt, and debris. Wipe samples were collected and analyzed for PCBs and all total PCB results were less than the EPA limit of 10 µg/wipe (or 10 µg/100 cm^2), which is defined in 40 C.F.R. § 761.120 - 761.135 as the requirement for decontamination of PCB contaminated solid surfaces to achieve unrestricted use.

The interim action of cleaning the remaining buildings (2073, 2076, 2078, 2084 and 2085) to eliminate dust, dirt, and debris, followed by the collection and analysis of PCB wipe samples demonstrates and documents the successful completion of one of the components of the SEAD-4 remedy that was presented in the Proposed Plan (Parsons, 2007). Therefore, the referenced buildings are suitable for unrestricted use.

[2] PCBs is a class of organic compounds with 1 to 10 chlorine atoms attached to biphenyl which is a molecule composed of two benzene rings each containing six carbon atoms. Before being banned in the 1970s, PCBs were generally used as coolants and insulating fluids for transformers and capacitors, cutting oils, hydraulic fluids, sealants, adhesives, and paints. Aroclors are commercial mixtures of PCB compounds.

The determination that PCBs were not present in the groundwater or soil in the vicinity of Building 2084 in 2004, and the cleaning and removal of the PCB-contaminated debris within the remaining buildings, eliminates all documented COCs that were previously suspected to pose potential risks to human health. Therefore, the conditions remaining at SEAD-4 and SEAD-38 are now suitable for unrestricted use and unlimited exposures by human receptors, as all previously documented COCs affecting human health have been addressed.

Based on the screening level ecological risk assessment (SLERA) results, chromium and lead were identified as the COCs for surface and subsurface soil and chromium was identified as a COC for the ditch soils and lagoon soil at SEAD-4. In addition, an elevated vanadium concentration at SD4-28 within SEAD-38's bounds raised a concern for the terrestrial ecological receptors. As a result of the SLERA documented in the RI Report, and summarized subsequently in this ROD, the Army originally calculated cleanup goals for soil (324 mg/Kg for chromium and 167 mg/Kg for lead) that would be protective of the sensitive ecological receptors (mourning dove and short-tailed shrew) at SEAD-4. The cleanup goal for vanadium in ditch soil within SEAD-38's bounds is 150 mg/kg.

Based on comments received from the State of New York, the cleanup goals for chromium and lead were re-evaluated within a cost/benefit analysis and more stringent cleanup goals (i.e., 60 mg/kg for chromium and 167 mg/kg for lead) are now proposed for the selected SEAD-4 remedial action. Soil and ditch soil located within SEAD-38 are not contaminated with chromium or lead at levels in excess of the proposed cleanup goals, and therefore no lead or chromium action is required for ecological receptors within SEAD-38.

The previous work is described in detail in the following reports:

- Final Feasibility Study at the Munitions Washout Facility (SEAD-4) (Parsons, 2005);
- Soil Cleanup Goal Sensitivity Analysis, as presented in the Feasibility Study (Appendix D) (Parsons, 2005);
- Final Remedial Investigation Report at the Munitions Washout Facility (SEAD-4) (Parsons, 2002a);
- Final Action Memorandum and Decision Document, Time-Critical Removal Actions, Three VOC Sites (SEADs 38, 39, & 40) (Parsons, 2002b); and
- Final Expanded Site Inspection, Seven High Priority SWMU's, SEAD 4, 16, 17, 24, 25, 26, and 45 (Parsons, 1995).

4.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Army, EPA, and NYSDEC rely 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 Demolition Report, the Proposed Plan, and the supporting documentation have been made available to the public for a public comment period, which began on November 21, 2007 and concluded on December 20, 2007. All findings of the previously conducted investigations at SEAD-4/38 are presented in the above-referenced documents. The Army, EPA, and NYSDEC's preferred remedy and the basis for that preference was identified in a Proposed Plan. These documents were made available to the public at the SEDA repository (location provided below).

Seneca Army Depot Activity
Building 123
5786 State Route 96
Romulus, New York 14541-0009
(607) 869-1309
Hours: Mon – Thurs. 8:30 a.m. – 4:30 p.m.

A public meeting was held during the public comment period at the Seneca County Office Building on December 12, 2007 at 7 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedial options, 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 ROD, **Appendix D**.

The LRA's primary responsibility was the preparation of a plan for the redevelopment of the Depot. During the BRAC process, monthly presentations were given to the LRA to advise them as to the status and the findings of the ongoing environmental investigations and remedial actions within the Depot. 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, EPA, NYSDEC, New York State Department of Health (NYSDOH), 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. The planned uses for portions of the SEDA, including the land occupied by SEAD-4/38, were modified by the SCIDA in 2005. The identified use for the land including SEAD-4/38 changed from conservation/recreation to training.

During the BRAC process there have been, and continue to be, periodic presentations to the RAB regarding the progress of SEAD-4/38 and other investigations related to the closure of SEDA.

5.0 SCOPE AND ROLE

The Army's ultimate goal for SEDA is to transfer the entire Site to other private or public parties for beneficial reuse. Prior to the transfer of any property at the Depot, the Army is required to ensure that the property is suitable for release and reuse. If information or evidence exists to indicate that hazardous substances may be present at any location slated for transfer, the Army is obligated to conduct investigations needed to verify the presence/absence of hazardous substances, and assess the potential risks that may exist due to the presence of hazardous substances at the location. These investigations and assessments are conducted under the oversight of, and subject to the review and approval of the EPA and the NYSDEC. The findings, results, and the conclusions of the investigations and assessments, and the subsequent land use decisions that are made based on the Army's investigations and assessments are also made available to the public for review and comment.

If the results and conclusions of the investigations and assessments of property at the SEDA indicate that risks to human health or the environment exist due to the continuing presence of hazardous substances, the Army is obligated to propose, design, implement, monitor, inspect and report on the remedial actions used to eliminate, mitigate, or control the threat. The remedial actions are also subject to review and approval by all parties.

Once the Army is able to demonstrate and gain oversight agency concurrence that an AOC is suitable for transfer, such transfer may be approved and allowed.

SEAD-4 and SEAD-38 are designated AOCs that are located in the Training Area at the former SEDA. It is the Army's goal to demonstrate that SEAD-4 and SEAD-38 are available for reuse, via transfer to other public or private parties for training purposes.

The human health risk assessment conducted during the RI identified the following contaminants that contributed to the elevated cancer risk and/or non-cancer hazard indices for potential receptors at SEAD-4:

- Aroclor-1254 in building dust/dirt, which resulted in elevated total cancer risk and hazard index (i.e., above the EPA limits of 10^{-4} and 1 for cancer risk and hazard index, respectively) for the indoor training officer;
- Aroclor-1260 in groundwater, which contributed to the elevated non-cancer hazard indices for future child and adult residents.

Although benzo(a)pyrene in surface water contributed to the elevated total cancer risk for the future resident, a review of the detection frequency, detected concentration, and AOC conditions ruled out benzo(a)pyrene as a COC in surface water at SEAD-4. Detailed discussion of risk assessment results is presented in the RI report and summarized in Section 7 of this ROD.

After the completion of the RI, additional investigation and building cleaning and demolition have been conducted at SEAD-4. The additional investigation and building cleaning actions are discussed in detail in Section 6 and summarized below:

- Due to the risks posed by the one time detection of Aroclor-1260 in monitoring well MW4-10, an additional sampling round for PCBs was performed at MW4-10 in June 2004 to verify the presence of PCBs in groundwater. Two samples were collected from MW4-10 and the results indicated that PCBs were not present in groundwater. Further, Aroclor-1260 was not detected in any of the 11 soil samples collected from the test pits in the vicinity of MW4-10. Therefore, Aroclor-1260 is not considered a contaminant of concern (COC) in groundwater at SEAD-4.
- In 2007, Buildings 2074, 2075, and 2079 and structures identified as 2077 (stack) and 2081 (water tank) were demolished to the slab on grade. In 2008, floors and trenches of Buildings 2073, 2076, 2078, 2084, and 2085 were vacuumed and broomed clean. Wipe samples were collected from building trench/floor drains and analyzed for PCBs. The total PCB concentrations for all wipe samples were below the EPA limit of 10 µg/wipe (or 10 µg/100 cm^2), which is provided in 40 C.F.R. § 761.120 - 761.135 as the requirement for decontamination of PCB contaminated solid surfaces to achieve unrestricted use. As a result, the referenced buildings are suitable for unrestricted use.

As a result of these actions, the contaminants that originally contributed to the elevated cancer risks and/or hazard indices (i.e., Aroclor-1254 in building dust/dirt and Aroclor-1260 in groundwater) no longer exist in the respective mediums at SEAD-4. Therefore, the current SEAD-4 conditions do not pose significant risks to potential receptors (including residents); SEAD-4 is suitable for unrestricted use and unlimited exposure for human receptors. Furthermore, contaminants associated with human health risks or hazards were never identified in land that constitutes SEAD-38; thus, the land associated with this AOC is also suitable for unrestricted use and unlimited exposures for human receptors.

The results of the ecological risk assessment indicate that soil, ditch soil, and lagoon soil at SEAD-4 potentially pose unacceptable risks to selected ecological receptors. Chromium and lead were identified as the COCs for surface and subsurface soil (i.e., soil 0-4 ft bgs.) and chromium was identified as a COC for the ditch soils and lagoon soil. For SEAD-38, an elevated vanadium concentration at SD4-28 raised concern for the terrestrial ecological receptors.

In summary, the following contaminants have been identified as COCs for SEAD-4 based on the screening level ecological risk assessment (SLERA):

- Chromium and lead in soil; and
- Chromium in ditch soil and lagoon soil.

As a result of the SLERA, the Army originally calculated cleanup goals (324 mg/Kg for chromium and 167 mg/Kg for lead) that would be protective of the sensitive ecological receptors (mourning dove and short-tailed shrew) at SEAD-4. The cleanup goals were subsequently modified at the request of the State of New York after a cost/benefit analysis was performed to lower, more stringent cleanup goals (i.e., 60 mg/kg for chromium and 167 mg/kg for lead).

For SEAD-38, no COCs were identified for potential human receptors (including residents). The following contaminant was identified as the COC based on the SLERA:

- Vanadium at one location (i.e., SD4-28).

The cleanup goal for vanadium in ditch soil within the SEAD-38 bounds is 150 mg/kg.

Based on these facts, it is the Army's and the EPA's determination that a remedial action needs to be performed at SEAD-4/38 so that the AOCs will be suitable for transfer and reuse. Should the preferred remedies be performed at SEAD-4/38 and the cleanup goals be met, the risks to all potential receptors for the unrestricted use scenario would be within an acceptable risk range.

6.0 SUMMARY OF AOC CHARACTERISTICS

Previous field investigation activities conducted at SEAD-4/38 included the collection of building debris, soil, ditch soil, lagoon soil, groundwater, and surface water samples. Associated activities included geophysical investigations, a building survey, location surveys (including base map preparation), and a ecological investigation. A cultural resources survey has been conducted for the SEDA. All previously collected data from SEAD-4 and SEAD-38 are evaluated and are summarized in this ROD. These data represent the current SEAD-4/38 conditions. The summarized results are discussed below and **Figure 4** illustrates the sample locations.

The COCs identified for SEAD-4 include chromium and lead in soil and chromium in ditch soil and lagoon soil. For SEAD-38, vanadium was identified as a COC for ditch soil at sample location SD4-28.

Summarized below are the sample results for the various media at SEAD-4/38.

Building Debris

Six soil/debris samples were collected from the inside of Buildings 2073, 2076, 2078, 2079, 2084, and 2085; one from each building during the RI. Aroclor-1254 was detected in five of the six samples and the maximum concentration (91,000 µg/kg) was detected in the sample from Building 2073. A summary of the building debris sample results is presented in **Table 1**.

In 2007, building demolition was performed for various structures (Buildings 2074, 2075, 2079, and structures identified as 2077 [stack] and 2081 [water tank]) at SEDA to address safety concerns. Each building/structure was demolished either to slab on grade (i.e., Buildings 2074, 2075, 2077, and 2079) or to grade. All generated material was recycled and/or disposed of in an approved construction and demolition landfill.

In January 2008, floors and trenches of Buildings 2073, 2076, 2078, 2084, and 2085 were vacuumed and broomed clean. The debris collected during the building cleaning process was drummed separately for each building. A debris sample was collected from each building and analyzed for PCBs, Toxic Characteristic Leaching Procedure (TCLP) metals, flash point, corrosivity, and reactivity. In addition, wipe samples were collected from Buildings 2073, 2076, and 2084 trench/floor drains and analyzed for Aroclors-1016, -1221, -1232, -1242, -1248, -1254, -1260, and total PCBs. The results are presented in **Appendix E.**

The TCLP lead concentration for the debris sample collected from Building 2078 was at the regulatory limit of 5 mg/L. The TCLP lead concentration for the debris sample collected from Building 2076 was slightly below the regulatory limit at 4.5 mg/L. The debris from Buildings 2076 and 2078 were stabilized with cement and the TCLP lead concentration for the stabilized debris was below the regulatory limit (1 mg/L vs. 5 mg/L). The waste characterization results of all the debris samples indicate the building debris is not hazardous waste. Therefore, the debris from all the buildings was disposed at an approved Subtitle D landfill.

The total PCB concentrations for all wipe samples were below the EPA limit of 10 µg/wipe (or 10 µg/100 cm^2). As a result, according to 40 C.F.R. §§ 761.120-761.135, the referenced buildings are suitable for unrestricted use. No COCs are currently identified for debris within the SEAD-4/38 buildings.

Soil

Soil Sampling Program at SEAD-38 (1993-1994)

TPH was detected in surface soil samples (0-2 inches bgs.) and subsurface soil samples (2-4 ft bgs.) collected from SEAD-38. The TPH concentrations ranged from 85 mg/kg to 1,940 mg/kg. The TPH results indicate that the TPH impacts diminish with depth. A summary of the SEAD-38 TPH results is presented in **Table 2**.

Soil - ESI (1993-1994) and RI (1998-1999) Results

The Army compared soil data to several types of federal and state guidance values during its assessment and evaluation of contaminants within soil at SEAD-4/38. The guidance values used for soil include: Soil Cleanup Objectives for Unrestricted Use presented under the New York Code of Rules and Regulations (6NYCRR) Subpart 375-6.8(b) and EPA Region IX Preliminary Remediation Goals (PRGs) for residential soils.

Surface soil samples were collected from a depth range of 0-2 or 0-6 inches bgs. from 80 locations and were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, explosives, and metals. Seven surface soil samples were also analyzed for herbicides. Subsurface soil samples were collected from depths beyond 6 inches bgs. from 72 locations during the ESI and RI investigations. Each of the soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs, explosives, and metals. Thirty-nine subsurface soil samples were also analyzed for herbicides.

A comparison of the soil concentrations found at SEAD-4/38 and the identified guidance values is summarized in **Tables 3** and **4** for surface soil and total soil, respectively. Unless otherwise specified, the tables presented in this document list compounds with individual sample concentrations exceeding one or both of the listed criteria and the compounds that contribute to elevated risks to human health. The 95% upper confidence limit concentrations of the arithmetic means[3] (hereafter referred to as 95% UCLs) are presented in the tables for each contaminant to represent the SEAD-4/38 conditions.

As shown in **Table 3**, the 95% UCLs for 4,4'-DDD, 4,4'-DDE, benzo(a)pyrene, dibenz(a,h)anthracene, chromium, hexavalent chromium, copper, lead, nickel, and zinc are elevated compared with the NYSDEC Unrestricted Use SCOs or the EPA Region IX Residential PRGs. The 95% UCLs computed for all the other compounds in SEAD-4/38 surface soil are lower than both the NYSDEC Unrestricted Use SCOs and the Region IX Residential PRGs. The 4,4'-DDD and 4,4'-DDE exceedances are caused by the relatively elevated laboratory reporting limits compared with the NYSDEC Unrestricted Use SCO of 3.3

[3] Confidence limits for the mean (Snedecor and Cochran, 1989) are an interval estimate for the mean. Interval estimates are often desirable because the estimate of the mean varies from sample to sample. Instead of a single estimate for the mean, a confidence interval generates a lower and upper limit for the mean. The interval estimate gives an indication of how much uncertainty there is in our estimate of the true mean. The narrower the interval, the more precise is our estimate. The 95% upper confidence limit should approximately provide the 95% coverage for the unknown population mean (EPA, 2007).

µg/kg. The 95% UCLs for benzo(a)pyrene and dibenz(a,h)anthracene are above the Region IX Residential PRGs but are below the NYSDEC Unrestricted Use SCOs. The above compounds with NYSDEC Unrestricted Use SCO exceedances or EPA Region IX Residential PRG exceedances do not pose significant risks to either human health (including potential residents) or the environment.

Subsurface soil is generally less contaminated compared with surface soil. As shown in **Table 4**, with the exception of the polycyclic aromatic hydrocarbons (PAHs), the 95% UCLs for total soil are generally less than the 95% UCLs for surface soil. The 95% UCLs of PAHs in total soil are all below the NYSDEC Unrestricted SCOs.

2004 SEAD-4 Test Pitting Results

A total of 11 samples were collected from SEAD-4 during the 2004 test pitting activity to verify the presence/absence of a PCB source area around MW4-10. All samples were analyzed for PCBs and one sample (TP4-4-04) was also analyzed for VOCs, SVOCs, pesticides, and metals.

PCBs were not detected in any of the samples collected. Several PAHs were detected above the NYSDEC Unrestricted Use SCOs or/and EPA Region IX Residential PRGs; the observed concentrations were generally consistent with the concentrations observed in soil at other SEAD-4 locations.

Drainage Ditch Soil Investigation

The ditch soil results are summarized in **Table 5**. A total of 50 ditch soil samples were collected at the depth intervals of 0-2 or 0-6 inches bgs. from the drainage ditches at SEAD-4/38. Each of the ditch soil samples was analyzed for VOCs, SVOCs, pesticides, PCBs, explosives, and metals. Six ditch soil samples were also analyzed for herbicides. The 95% UCLs for limited compounds were above the NYSDEC Unrestricted SCOs or/and the EPA Region IX Residential PRGs; with the exception of chromium, none of these compounds pose significant risks to human health or the environment.

The highest ditch soil concentrations of PAHs and metals such as iron and vanadium were detected in the samples collected from locations within the drainage ditch at the northern edge of the AOCs. The maximum chromium concentration (4,800 mg/kg) was detected in the drainage ditch located to the southwest of Building T30.

Groundwater

Groundwater samples were collected from thirteen monitoring wells during the ESI, RI, and 2004 sampling events at SEAD-4. The maximum concentrations were compared to federal and state criteria including New York State Class GA Groundwater Standards and federal Maximum Contaminant Levels (MCLs). The groundwater results from the ESI (1994) and RI (1999) investigations at SEAD-4 are presented in **Tables 6A** and **6B**, respectively.

The extent of SEAD-38 is comparatively small, and it is fully surrounded by land and activities that comprise SEAD-4. There are no groundwater wells located within the bounds of SEAD-38; the closest upgradient and downgradient wells are roughly 200 to 400 feet beyond the bounds of SEAD-38 and within the bounds of SEAD-4. Based on the soil data collected within SEAD-38 bounds, the nature of the

SEAD-38 operations (boiler blowdown), and the groundwater results from the adjacent wells, it is concluded that SEAD-38 groundwater is not impacted.

SEAD-4 groundwater results are discussed in detail below.

ESI and RI Results

Nine metals (i.e., antimony, beryllium, cadmium, chromium, iron, manganese, selenium, sodium and thallium) were detected in at least one groundwater sample at concentrations that exceeded their respective NYSDEC Class GA Ambient Water Quality Standards (AWQSs) or federal MCL values. Antimony results from three samples, collected from three different wells exceeded the State's GA standard, but none of these exceedances were repeated during subsequent sampling events at the same well. Similarly, vanadium results for three samples collected during the March/April RI sampling event exceeded the State's GA vanadium standard, but these exceedances were not confirmed during the July 1999 RI sampling event. For beryllium and cadmium, there was only one exceedance, which was observed at MW4-3 during the ESI; beryllium or cadmium was not detected in this same well (i.e., MW4-3) during the two rounds conducted in 1999. The maximum chromium concentration (260 µg/L) was observed at MW4-9 in March 1999; the chromium concentration detected at this same well in July 1999 was below the NYSDEC GA Standard (21.8 µg/L vs. 50 µg/L). The chromium concentrations detected in all the other wells at SEAD-4 were below the GA Standard.

Concentrations of benzene, ethylbenzene, 4-nitrotoluene, and nitrobenzene exceeded their respective NYSDEC GA Standards during the RI sampling event. However, these compounds were only detected in one monitoring well (i.e., MW4-10) during one round of sampling (March 1999). None of these SVOCs were detected in MW4-10 or any other groundwater monitoring wells during the second round of groundwater sampling in July 1999 or during the ESI sampling event. Further, the concentrations of these compounds in SEAD-4 groundwater do not pose significant risk to potential receptors.

Aroclor-1260 was detected in July 1999 at 0.079 µg/L in MW4-10. The detected concentration was lower than the NYSDEC GA Standard, which is 0.09 µg/L for the sum of PCBs.

2004 Additional Investigation Groundwater Results

The 2004 analytical results indicated that PCBs were not present in the well MW4-10, where Aroclor-1260 was detected in July 1999 at 0.079 µg/L. Based on these results, Aroclor-1260 is not considered present in groundwater at SEAD-4/38.

Surface Water

Table 7A and **Table 7B** summarize comparison of the SEAD-4/38 surface water concentrations and the NYSDEC AWQSs values for Class C surface water for the 1993 ESI sampling event and 1998 RI sampling event, respectively.

Benzo(a)pyrene was detected during the RI in a single surface water sample collected from location SW4-13, which was within the east-west trending drainage ditch located near the northern boundary of SEAD-4/38. The detected concentration was above the NYSDEC guidance value of 0.0012 µg/L, which is based

on the risk for human consumption of fish.

Aluminum, cadmium, cobalt, copper, iron, lead, silver, vanadium, and zinc were each detected at concentrations exceeding their respective NYSDEC AWQS Class C surface water standards in at least one surface water sample. In general, the highest metal concentrations in surface water were found at locations in the east-west trending drainage ditch at the northern edge of SEAD-4.

Lagoon Soil

Three samples were collected from the top 6 inches of the soil in the man-made lagoon. **Table 8** summarizes comparison of the SEAD-4 lagoon soil concentrations and the NYSDEC guidance values for sediment.

4-methylphenol, 4,4'-DDE, Aroclor-1254, and nine metals (antimony, arsenic, chromium, copper, iron, manganese, mercury, nickel, and zinc) were found at concentrations above the NYSDEC guidance values for sediment.

7.0 SUMMARY OF SEAD-4/38 RISKS

A Superfund baseline risk assessment (BRA) was conducted for SEAD-4/38 during the RI to estimate potential human health and ecological risks. A baseline risk assessment is an analysis of the potential adverse human health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and anticipated future land uses. A SLERA was conducted to assess the risk posed to ecological receptors due to AOC-related contamination. The risk assessment for SEAD-4/38 is presented in the RI report, which is available in the Administrative Record file.

Human Health Risk Assessment

A four-step process is utilized for assessing SEAD-4/38 human health risks for reasonable maximum exposure scenarios.

Hazard Identification: This step identifies the contaminants of potential concern (COPCs) at the AOCs in the primary concern media (i.e., indoor dust, soils, lagoon soil/ditch soils, groundwater, and surface water).

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Exposure pathways evaluated in the SEAD-4/38 risk assessment include inhalation of groundwater vapor, intake of soil, ambient/indoor dust, ditch and lagoon soil, and groundwater, dermal contact with soil, indoor dust, groundwater, surface water, and ditch and lagoon soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations to which people may be exposed and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects are determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or other noncancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some contaminants are capable of causing both cancer and noncancer health effects.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk", or one additional cancer may be seen in a population of 10,000 people as a result of exposure to contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-6} to 10^{-4} (corresponding to a one-in-a-million to a one-in-ten-thousand excess cancer risk) with 10^{-6} being the point of departure. For noncancer health effects, a hazard index (HI) is calculated. An HI

represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists lower than which noncancer health effects are not expected to occur.

The results of the four-step process are summarized below. The human-health estimates are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to the COPCs in the various media that would be representative of SEAD-4/38 risks, as well as the toxicity of these contaminants.

The Hazard Identification step identified the COPCs for each of the media. The Exposure Assessment step evaluated the current and future land use, the potential receptor populations, and the potential routes of exposure. SEAD-4 and SEAD-38 are currently vacant properties. The future land use designated for the AOCs is training. At the time when the BRAs were conducted, the planned future use of the area including SEAD-4/38 was conservation/recreation. Based on the then planned future land use of the AOCs, five human receptors were identified for the BRA (i.e., current on-site worker, future outdoor park worker, future indoor park worker, future construction worker, and future child recreational visitor). In addition, a future resident was included to evaluate potential risks to receptors under the unrestricted use scenario. In 2005, after the completion of the RI, the planned future use of the AOCs changed (i.e., from conservation/ recreation to training). As a result of this change, the park worker and recreational visitor are no longer considered potential receptors; rather, the training officer and child trespasser are considered potential receptors at SEAD-4/38 for this ROD. The exposure assumptions for the park worker and recreational visitor have been used to represent exposure assumptions for training officer and child trespasser. The Army believes this change is appropriate because the body weight and body surface area are similar for the park worker and the training officer and for the recreational visitor and child trespasser. The exposure (e.g., exposure duration, frequency, and intensity) are also similar for the park worker and the training officer and for the recreational visitor and child trespasser. Therefore, the risk results presented in the RI report for the park worker and recreational visitor are used to assess risks to potential training officer and child trespasser receptors. The area is served by municipal water and it is not likely that the groundwater underlying the property will be used by individuals for potable purposes in the foreseeable future. Nonetheless, to evaluate potential risk posed by groundwater, it was assumed that wells would be installed on-site for potable water at the AOCs and therefore, groundwater intake exposure was evaluated for all receptors at the AOCs.

The noncancer toxicity data and the carcinogenic toxicity data from the Toxicity Assessment step were used in conjunction with the results of the first two steps (i.e., Hazard Identification and Exposure Assessment) to complete the Risk Characterization step. The results of the Risk Characterization step are presented in **Table 9**. Based on the fact that the impacted buildings at SEAD-4 have either been demolished or cleaned, exposure to indoor dust/debris is considered minimal. Therefore, risk results from the RI have been revised so that risks associated with indoor dust/debris exposure would be zero. As shown in **Table 9**, the cancer risks and the noncancer hazard indices for all receptors under the planned future use scenario (i.e., training) are within the EPA acceptable limits (i.e., $1x10^{-4}$ for cancer risks and 1

for noncancer hazard indices). The total cancer risk and non-cancer hazard indices for the residents are above the EPA acceptable limits due to exposure to Aroclor-1260 detected in SEAD-4 groundwater and benzo(a)pyrene in surface water. As discussed below, Aroclor-1260 is not identified as a COC in SEAD-4 groundwater, nor is benzo(a)pyrene identified as a COC in surface water; therefore, it is concluded that SEAD-4/38 does not pose unacceptable risks to potential residents.

- Due to the risks posed by the one time detection of Aroclor-1260 in monitoring well MW4-10, an additional sampling round for PCBs was performed at MW4-10 in June 2004 to verify the presence of PCBs in groundwater. Two samples were collected from MW4-10 and the results indicated that PCBs were not present in groundwater. Further, Aroclor-1260 was not detected in any of the 11 soil samples collected from the test pits in the vicinity of MW4-10. Therefore, Aroclor-1260 is not considered a COC in groundwater at SEAD-4.

- Dermal contact with surface water was calculated to cause elevated cancer risk to potential residents due to the one time detection of benzo(a)pyrene in surface water. However, benzo(a)pyrene is only detected in one out of 13 surface water samples and the detected concentration was lower than the reporting limit, which means the detected concentration has to be considered an estimated concentration. As a result, benzo(a)pyrene is ruled out as a COC in surface water at SEAD-4/38.

In summary, no COCs have been identified for SEAD-4/38 and the AOCs are suitable for unrestricted use and unlimited exposure based on the baseline human health risk assessment.

Human Health Risk Assessment Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources, including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Fate and transport modeling is also associated with a certain level of uncertainty. Factors such as the concentrations in the primary medium, rates of transport, ease of transport, and environmental fate all contribute to the inherent uncertainty in fate and transport modeling.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of potential concern, the period of time over which such

exposure would occur, and in the models used to estimate the concentrations of the chemicals of potential concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the AOCs, and is highly unlikely to underestimate actual risks related to the AOCs.

More specific information concerning public health and environmental risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the RI report.

The primary site-specific uncertainties associated with the exposure assessment for the AOCs include physical setting. While the future use of the AOCs is expected to be training, future land use is often hard to identify with certainty as short-term planning and land use in the near term (i.e., 1-10 years) may change substantially overtime (i.e., 20-30 years). However, since the current conditions at SEAD-4/38 do not pose significant risks to potential human receptors (including potential residents), uncertainty associated with future land use is minimal.

Ecological Risk Assessment

As part of the RI, a SLERA was conducted. The results of the SLERA indicate that soil, ditch soil, and lagoon soil at SEAD-4/38 pose unacceptable ecological risks. Chromium and lead were identified as the COCs for SEAD-4 surface and subsurface soil (i.e., soil 0-4 ft bgs.) and chromium was identified as a COC for the SEAD-4 ditch soils and lagoon soil. For SEAD-38, an elevated vanadium concentration at SD4-28 raised a concern for the terrestrial ecological receptors. As a result of the SLERA, the Army originally calculated cleanup goals (324 mg/Kg for chromium and 167 mg/Kg for lead) that would be protective of the sensitive ecological receptors (mourning dove and short-tailed shrew) at SEAD-4. These cleanup goals are presented in the Final FS Report (Parsons, 2005). After the FS, the cleanup goals were re-calculated for chromium and lead based on the cost effectiveness sensitivity analysis (**Appendix C**) and these cleanup goals (i.e., 60 mg/kg for chromium and 167 mg/kg for lead) are proposed for SEAD-4 remedial action. Detailed discussion of sensitivity analysis is presented in the FS Report (Appendix D).

The cleanup goal for vanadium in ditch soil within SEAD-38 bounds is 150 mg/kg.

Summary of Human Health and Ecological Risks

SEAD-4/38 do not pose unacceptable risks to human receptors under the unrestricted use scenario. Soil, ditch soil, and lagoon soil at SEAD-4 pose unacceptable ecological risks. Chromium and lead were identified as the COCs for surface and subsurface soil and chromium was identified as a COC for the ditch soils and lagoon soil at SEAD-4. For SEAD-38, an elevated vanadium concentration at SD4-28 raised a concern for the terrestrial ecological receptors. Cleanup goals were calculated for chromium and lead based on the cost effectiveness sensitivity analysis. These cleanup goals (i.e., 60 mg/kg for chromium and 167 mg/kg for lead) are protective of human health and ecological receptors and are

proposed for SEAD-4 remedial action. The cleanup goal for vanadium in ditch soil within SEAD-38 bounds is 150 mg/kg.

Basis for Action

Based upon the quantitative human-health risk assessment and ecological evaluation, it is concluded that actual or threatened releases of hazardous substances from the AOCs, if not addressed by the response action selected in the ROD, may present a current or potential threat to the environment.

8.0 REMEDY SELECTION

8.1 REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information, standards, site-specific risk-based levels, and cost effectiveness sensitivity evaluation.

The following remedial action objectives were established for SEAD-4/38:

- Minimize exposure of wildlife to contaminated soils, ditch soils, and lagoon soils;
- Eliminate or minimize the migration of contaminants from soil to groundwater and downgradient surface water;
- Prevent off-site migration of constituents above levels protective of the environment; and
- Restore soil, ditch soil, and lagoon soil to levels that are protective of the environment.

Remediation goals were developed for soil, ditch soil, and lagoon soil at SEAD-4 based on the cost effectiveness sensitivity analysis and these goals are summarized in **Table 10**. The cleanup goal for chromium in soil, ditch soil, and lagoon soil is 60 mg/kg. The cleanup goal for lead in soil is 167 mg/kg. These cleanup goals are cost effective concentrations based on the sensitivity analysis and are protective of human health and the environment.

For SEAD-38, the cleanup goal of 150 mg/kg is proposed for vanadium in ditch soil at location SD4-28.

The risks to all human receptors (including the residential receptors) and ecological receptors at SEAD-4/38 would be acceptable should the cleanup goals be met. The 95% UCL of post remediation soil concentrations at SEAD-4 will be compared to the cleanup goals to determine whether or not the soil remedy is complete. All results for soil representative of material remaining at the AOC will be used to calculate the 95% UCL and the 95% UCL will then be compared with the soil cleanup objectives. The vertical limit of excavation will be based on the collection and analysis of confirmatory soil samples from the base of the excavation, and on an evaluation of the resulting data versus the cleanup objectives for the AOCs.

8.2 SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121 (b)(1), 42 U.S.C. Section 9621 (b)(1) mandates that remedial actions be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which 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 Section 121(d), 42 U.S.C. Section 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 Section 121(d)(4), 42 U.S.C. Section 9621 (d)(4).

The Army developed three alternatives for SEAD-4/38 based on the EPA and NYSDEC policies and the AOC conditions:

- Alternative 1: No Action,
- Alternative 2: On-Site Containment (Engineering Controls/Capping), and
- Alternative 3: Off-Site Disposal (Excavation/Off-Site Disposal).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the AOCs can be found in the Feasibility Study. To facilitate the presentation and evaluation of the alternatives, the alternatives were reorganized in this ROD to formulate the remedial alternatives discussed below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy or procure contracts for design and construction.

The remedial alternatives are:

Alternative 1: No Action

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison with the other alternatives. The no action remedial alternative does not include any physical remedial measures that address the contamination at SEAD-4/38.

CERCLA requires that the AOCs be reviewed at least once every five years. If justified by the periodic reviews, subsequent remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Alternative 2: On-Site Containment (Engineering Controls/Capping)

SEAD-4:

Capital Cost:	$809,000
Annual O&M Cost:	$44,400
Present-Worth Cost for 30 Year O&M:	$551,000
Total Cost	$1,360,000
Construction Time:	3 months

SEAD-38:

Capital Cost:	$8,000
Annual O&M Cost:	$0
Present-Worth Cost for 30 Year O&M:	$0
Total Cost	$8,000
Construction Time:	1 month

For SEAD-38, Alternative 2 is to excavate ditch soil in the immediate area of SD4-28 until the vanadium cleanup goal is met. The estimated cost would be $8,000.

For SEAD-4, Alternative 2 consists of installing engineering controls (permanent fence), consolidating ditch soil and lagoon soil, and placing a RCRA cap and clean soil cover over contaminated surface and subsurface soils. The intent of this alternative is to isolate the waste from ecological receptors and to prevent migration of contaminants from the surface soil to surface water via soil erosion. This alternative does little to prevent potential groundwater deterioration due to the leaching of contaminants from the covered soil into the underlying aquifer.

Ditch soil in the designated SEAD-4 areas (**Figure 5**) would be excavated until the cleanup goal for chromium is met and consolidated at the lagoon area. Soil from the lagoon would be capped. The man-made lagoon would first be dewatered by draining the water to the existing drainage ditches outside the excavation areas. Once the lagoon is empty, soil from the man-made lagoon would be capped. The temporary berm at the end of the lagoon would be removed after the lagoon remediation and the lagoon would be allowed to return to its natural condition.

Alternative 2 also specifies that a RCRA cap and soil cover would be placed over SEAD-4 areas where concentrations of chromium and lead in surface and subsurface soil are above 60 mg/kg or 167 mg/kg, respectively.

Soil cover would be tested and approved prior to use. Specifically, analytical data for the soil cover must meet the cleanup goals for chromium, lead, and vanadium, must be less than the maximum metal concentrations in soils remaining at SEAD-4 for other metals, and must meet the NYSDEC Unrestricted Use SCOs for VOCs and SVOCs. All excavated and covered areas would then be regraded to promote proper stormwater drainage at the AOC, and all areas would be revegetated to prevent erosion.

Land use controls (LUCs) would be established as part of this remedial alternative after the on-site excavation and capping are performed. The goals of the land use controls are to prevent the capping material that has been installed on top of the contaminated areas during the remedial action from being removed. Types of land use controls to be applied may include deed restrictions and physical controls such as signs and fences. The Army would prepare an environmental easement for SEAD-4, consistent with Section 27-1318(b) and Article 71, Title 36 of Environmental Conservation Law (ECL), in favor of the State of New York and the Army, which would be recorded at the time of transfer of the AOC from federal ownership. Inspection and maintenance requirements of the cap would be established and documented in the environmental easement.

Alternative 3: Off-Site Disposal (Excavation/Off-Site Disposal)

SEAD-4:

Capital Cost:	$1,600,000
Annual O&M Cost:	$0
Present-Worth Cost for 30 Year O&M:	$0
Total Cost	$1,600,000
Construction Time:	6 months

SEAD-38:

Capital Cost:	$8,000
Annual O&M Cost:	$0
Present-Worth Cost for 30 Year O&M:	$0
Total Cost	$8,000
Construction Time:	1 month

For SEAD-38, Alternative 3 is to excavate ditch soil in the immediate area of SD4-28 until the vanadium cleanup goal is met. The estimated cost would be $8,000.

For SEAD-4, Alternative 3 involves soil excavation and the same remediation of ditch soil and lagoon soil as discussed in Alternative 2. The intent of this remedial alternative is to remove the contaminated soil from SEAD-4 to prevent receptors from contacting it in the future and eliminate migration of contaminants to surface water and groundwater. Ditch soil and lagoon soil in the designated areas (**Figure 5**) at SEAD-4 would be excavated until the cleanup goal for chromium is met. The temporary berm at the downgradient end of the lagoon would be removed after the lagoon excavation and the lagoon would be allowed to return to its natural condition.

For the surface and subsurface soil, Alternative 3 involves excavating soils until the cleanup goals (i.e., 60 mg/kg for chromium and 167 mg/kg for lead) are achieved. The excavation area is shown in **Figure 5**. Final depth of soil, ditch soil, and lagoon soil excavation would be determined based on the results of confirmatory samples.

Soil, ditch soil, and lagoon soil excavated from SEAD-4 and SEAD-38 would be stockpiled and tested for toxicity characteristic prior to being disposed. Materials that meet the waste characterization test would be transported and disposed of in a Subtitle D landfill. Materials that fail the waste characterization criteria would be treated on-site to render it non-hazardous prior to off-site disposal.

Excavation areas that cannot be graded to promote positive drainage would be backfilled. Excavation areas deeper than 4 feet near the road or buildings may be backfilled if necessary. Soil from off-site borrow source, upon analytical tests and approval, would be used as fill material. Specifically, analytical data from the borrow source must meet the cleanup goals for chromium, lead, and vanadium, must be less than the maximum metal concentrations in soils remaining at SEAD-4 for other metals, and must meet the NYSDEC Unrestricted Use SCOs for VOCs and SVOCs. All backfilled areas would be graded, and/or

revegetated, as necessary to provide proper stormwater control. The man-made lagoon would be allowed to return to its natural condition.

8.3 COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance. The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment or engineering controls.
- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment overtime, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- 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 cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and OM&M costs, and net present-worth costs.
- State acceptance indicates if, based on its review of the RI/FS and Proposed Plan, the state concurs with the preferred remedy at the present time.
- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above follows.

Overall Protectiveness of Human Health and the Environment

Alternatives 2 and 3 provide protection of human health and the environment. Soil with concentrations above the cleanup goals would either be covered or excavated from the AOCs. Removing or covering

these materials would prevent dermal contact and ingestion, which have been identified by the BRA as the major exposure pathways for the affected mediums at SEAD-4/38. Alternatives 2 and 3 would each reduce risk to acceptable levels. Alternative 1 does not provide protection of human health and the environment.

Removal of soils found in the drainage ditches would protect environmental receptors by preventing downgradient migration of contaminants in ditch soils to Indian Creek or Silver Creek. Alternative 3 ranks higher than Alternative 2 as contaminated surface and subsurface soil would be removed, not only to reduce direct human and ecological receptors exposure, but also to decrease any potential for migration to groundwater or surface water. Alternative 2 would decrease the potential for surface erosion and migration to nearby areas by placing a cover over contaminated soil. Alternative 2 is not efficient in preventing migration of contaminants to groundwater.

Compliance with ARARs

There are currently no promulgated federal standards for hazardous substance levels in soils, and cost effectiveness sensitivity analysis and risk-based decisions are used to determine if cleanup is warranted or necessary. NYSDEC recently issued cleanup objectives for five categories of future land use (i.e., unrestricted, residential, restricted-residential, commercial, and industrial), as well as procedures for proposing alternative cleanup objectives, for waste sites located within its bounds. These requirements were considered in connection with the selection of the remedy in this Record of Decision. There are limited compounds with 95% UCLs exceeding the NYSDEC Residential SCOs; however, with the exception of chromium and lead, these compounds do not pose significant risks to either human health (including potential residents) or the environment.

There are currently no chemical specific ARARs for sediment in the State of New York; NYSDEC guidelines for sediment are considered To Be Considered (TBCs) for lagoon soil.

For surface water at SEAD-4/38, the NYSDEC Ambient Water Quality Standards (TOGS, 1.1.1, Class C Standards) are used as TBCs. Surface water is found in the man-made drainage ditches and the man-made lagoon at SEAD-4/38. The surface water in the ditches and the lagoon are not classified by NYSDEC because they are intermittent and/or not recognized as an established stream or creek. However, because the drainage ditches form the headwaters for Indian Creek or Silver Creek, the lower portion of which is designated as Class C surface water by NYSDEC, the Class C standards were used to provide a basis of comparison for the on-site chemical data. The Class C standards are not strictly applicable to the surface water in the drainage ditches and the lagoon, and thus are treated as TBCs.

New York designates all groundwater as a possible source of drinking water. Further, New York has promulgated standards for groundwater that is designated as GA levels. The groundwater at SEDA is designated as GA, and thus the groundwater standards would be ARARs. In addition, the drinking water standards issued by EPA are considered relevant and appropriate for the SEAD-4 groundwater.

Several VOCs have been identified exceeding the EPA or/and NYSDEC standards in the groundwater at SEAD-4. However, the concentrations were observed only in a single round of sampling (i.e., not confirmed by another round of sampling at the same location).

Antimony, beryllium, cadmium, chromium, selenium, and thallium exceedances were observed in individual rounds of sampling, but all noted exceedances occurred only during the first sampling round at each well affected, and no groundwater quality exceedance were observed for metal contaminants in any of the wells sampled during the last RI sampling event at SEAD-4. Iron, manganese, and sodium were also detected at concentrations that exceeded their respective NYSDEC GA standards. As shown in **Tables 6A** and **6B**, the iron, manganese, and sodium concentrations observed at SEAD-4 were generally consistent with the background levels detected at SEDA. Iron and manganese exceedances were also observed at MW4-13, a monitoring well considered sidegradient of the operations that occurred at SEAD-4/38. The SEDA background data set is discussed in detail in Section 6 of the RI report and is presented in Appendix F of the RI report, which is available in the Administrative Record file. Based on the above discussions, the metal exceedances for iron, manganese, and sodium observed in SEAD-4 groundwater are not associated with any release.

The concentrations of the above-referenced VOCs and metals do not pose significant risks to potential receptors at SEAD-4/38 based on the baseline risk assessment. Therefore, the current proposed remedies do not consider any form of groundwater treatment.

Off-site disposal would fall under RCRA requirements, which must be complied with in the remedial action. Other federal ARARs, with which the selected remedy must comply, TBCs and other guidance are provided in **Appendix F**. After an alternative is chosen, the remedial design must incorporate compliance with ARARs. The concepts of each alternative evaluated in the FS do not preclude compliance with ARARs. All alternatives have potential to fully comply with ARARs.

Long-Term Effectiveness and Permanence

Alternatives 2 and 3 demonstrate long-term effectiveness because they rely on containment, excavation, and disposal to reduce the contaminants in soil, ditch soil, and lagoon soil at the AOCs. Alternative 3 is the most effective in eliminating the long-term threats since excavation and removal of contaminants in soil, ditch soil, and lagoon soil would be performed. Alternative 2 is the next most effective due to the involvement of excavation and off-site disposal of ditch soil, and lagoon soil, as well as a cover for the affected surface and subsurface soil. The cover would prevent contact with the underlying soil by human and ecological receptors and reduce risk to acceptable levels. Alternative 2 has little effect in preventing groundwater deterioration by potential contaminant leaching from soil. Alternative 2 would also require future land use restrictions including prohibiting excavation and disturbance of the cover. Both Alternative 2 and Alternative 3 are considered to be technically feasible and provide effective long-term protection. Alternative 1, the no action alternative, does not provide long-term protection of human health or the environment.

The goal of Alternative 3 is to have no residual contamination in soils above 167 mg/kg for lead or above 60 mg/kg for chromium. The goal of Alternatives 2 and 3 for ditch soil and lagoon soil is to have no

residual contamination above the cleanup goal of 60 mg/kg for chromium and 150 mg/kg for vanadium. These cleanup goals are considered to be protective of human health and the environment under the unrestricted use scenario.

The relative rankings of the alternatives based on permanence are the same as the rankings for long-term protectiveness. Since Alternative 3 reduces the volume of contaminated soil on-site, it is more permanent than Alternative 2, which requires soil to remain on-site. Alternative 1, the no action alternative, is not permanent because no remedial action is performed.

Reduction in Toxicity, Mobility, or Volume Through Treatment

The no action alternative (Alternative 1) ranks the lowest in this category because the alternative does not reduce the volume, toxicity, or mobility of the contaminants at the AOCs.

Alternatives 2 and 3 ranked higher than Alternative 1 as contaminated material would be removed and landfilled. Once the material is landfilled, the contaminants are essentially immobile. Alternative 3 renders more reduction of mobility compared to Alternative 2 as soil, along with ditch soil and lagoon soil, would be excavated and disposed. Alternative 2, on the other hand, decreases the mobility of the surface and subsurface soils through the placement of the cover, which would contain the soil and prevent migration to surface water via erosion. Further, some of the excavated/removed material from the AOCs may be treated in order to meet the waste characterization criteria prior to disposal. The treated material would be rendered non-hazardous and as a result, exhibit lower toxicity and mobility than the untreated waste.

Alternatives 2 and 3 would increase contaminated material in volume as a result of the excavation process. Alternatives 3 would have more volume increase than Alternative 2. Depending on the treatment method prior to disposal, the treated material may represent a larger volume of material than the untreated material, but the larger volume is offset by the reduction in toxicity and mobility of the treated soil.

Short-Term Effectiveness

Alternative 1 (no action) ranks lowest for short-term protection of human health and the environment since the alternative does not mitigate any potential short-term risks to human health or the environment.

Alternative 2 does not involve a large amount of excavation and can be implemented relatively quickly, because it does not require specialized equipment or vendors. Off-site transportation of materials is limited and includes transportation of soil excavated from the drainage ditches to the man-made lagoon, and materials for the cap (topsoil, common fill, and filter fabric). The latter factor can be decreased through the use of on-site borrow soils. Alternative 3 does not require additional handling for treatment or specialized equipment, but it does require more extensive excavation and off-site disposal compared with Alternative 2. The excavation and disposal can be performed efficiently and quickly.

Implementability

All of the alternatives have sufficient implementability at SEAD-4/38.

Alternative 1 is readily available. However, the administrative feasibility of the alternative is not considered favorable since extensive coordination with local, state, and regional agencies would be required in the attempt to support and justify no remedial actions at the AOCs.

Alternative 2 can be readily constructed; it involves construction of a RCRA cap and soil cover. Numerous contractors are available and qualified to perform these tasks.

Alternative 3 can be constructed easily, though it involves more excavation, stockpiling, testing, and transportation.

For Alternatives 2 and 3, on-site stabilization may be necessary prior to disposal. In addition, a licensed off-site landfill capable of accepting the material from the AOCs would be needed.

Cost

Capital costs, operating costs, and administrative costs were estimated for Alternatives 1, 2, and 3. Capital costs include those costs for professional labor, construction and equipment, field work, monitoring and testing, and treatment and disposal. Operating costs include costs for administrative and professional labor, monitoring, and utilities. Administrative costs include the costs for land use restrictions.

The present worth cost associated with Alternatives 2 is calculated using a discount rate of seven percent (7%) and an assumption of 30-year time interval. The estimated capital, operation, maintenance, and monitoring, and the present-worth costs are presented in **Table 11** and summarized below.

Alternative	Capital Cost	Annual OM&M Costs	Total Present-Worth Costs
SEAD-4			
1. No Action	$0	$0	$0
2. On-Site Containment	$809,000	$44,400	$1,360,000
3. Off-Site Disposal	$1,600,000	$0	$1,600,000
SEAD-38			
1. No Action	$0	$0	$0
2. On-Site Containment	$8,000	$0	$8,000
3. Off-Site Disposal	$8,000	$0	$8,000

Alternative 1 (no action) is the least costly alternative at $0 for SEAD-4 and SEAD-38. Alternative 3 costs $1,600,000 for SEAD-4 and $8,000 for SEAD-38, and Alternative 2 costs $1,360,000 for SEAD-4 and $8,000 for SEAD-38.

State Acceptance

NYSDEC concurs with the preferred remedial soil and groundwater alternatives.

Community Acceptance

Appendix D "Responsiveness Summary and Public Comments," addresses community involvement during the remedy selection process. No formal comments were received at the public meeting. During the public comment period, one letter, supportive of the preferred alternative, was received from a local resident and a copy of that letter in included in Appendix D of the ROD.

9.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives and public comments, the Army has determined that Alternative 3 (Off-Site Disposal) best satisfies the requirements of CERCLA Section 121,42 U.S.C. Section 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR Section 300.430(e)(9).

The preferred remedies for SEAD-4/38 are believed to provide the greatest protection of human health and the environment, is most effective in eliminating the long-term threats, renders more, or the same, reduction in toxicity, mobility, or volume through treatment, and is cost-effective. Therefore, the preferred remedies would provide the best balance of tradeoffs among alternatives with respect to the evaluation criteria. The preferred remedies would treat principal threats, be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The preferred remedies also would meet the statutory preference for the use of treatment as a principal element.

Description of the Selected Remedy

The selected remedy for SEAD-4 includes the following components:

- Excavating ditch soil until the cleanup goal for chromium (60 mg/kg) is reached;
- Excavating soils until the cleanup goals for lead 167 mg/kg and chromium 60 mg/kg are achieved;
- Dewater the man-made lagoon and allow water to drain into the existing drainage ditches outside the excavation areas;
- Once the lagoon is empty, excavating soil from the man-made lagoon until the chromium cleanup goal of 60 mg/kg is achieved;
- Removing the temporary berm at the end of the lagoon and allowing the man-made lagoon to return to its natural condition;
- Stabilizing soils, ditch soil, and lagoon soil exceeding the waste characterization criteria;
- Disposing of the excavated materials in an off-site landfill;
- Backfilling excavation areas that cannot be graded to promote positive drainage and excavation areas deeper than 4 feet near the road or buildings if necessary with clean backfill; and
- Submitting a Completion Report after completion of the remedial action.

The selected remedy for SEAD-38 is excavation of ditch soil at location SD4-28 with vanadium concentrations greater than 150 mg/kg.

The approximate boundaries of the soil excavations are shown in **Figure 5**. The boundaries of the soil excavations will be defined in a remedial design sampling program. The actual boundaries will be

defined based on the results of a remedial design sampling program. **Figure 6** illustrates the process flow schematic for the selected remedies. Treatability studies will be required to determine and to optimize the stabilization agents, if stabilization is warranted.

This alternative would result in contaminants remaining on-site consistent with levels that allow for unrestricted use and unlimited exposure at SEAD-4 and SEAD-38.

Summary of the Estimated Remedy Costs

The estimated capital cost for the selected soil remedy is $1,600,000 for SEAD-4 and $8,000 for SEAD-38, and no O&M cost is expected after the remedial action. It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedies. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedies.

Expected Outcomes of the Selected Remedy

As discussed in Section 7, the current conditions at SEAD-4/38 do not pose significant risks to potential human receptors (including potential residents).

The SLERA indicate that there are unacceptable hazards to the ecological receptors from exposure to SEAD-4/38 soils, ditch soil, and lagoon soil from ingestion. The selected remedies will allow the following potential land and groundwater uses.

Land Use

The AOCs, which have been used for military purposes, are currently unoccupied and unused. The planned future use of the AOCs is training. Achieving the cleanup goals would help restore the AOCs for their planned future use.

As previously discussed in Section 7, the current conditions at SEAD-4/38 do not pose significant risks to potential human receptors (including potential residents). In addition, the cleanup goals are protective of the environment. Therefore, the remedies would help restore the AOCs planned future use. In addition, achieving the cleanup goals would allow the AOCs for unrestricted use after the preferred remedies are completed.

It is estimated that it will take 6 months to achieve the cleanup objectives.

Groundwater Use

Aroclor-1260 is the only COPC in groundwater that contributes to unacceptable risks to potential human receptors. However, Aroclor-1260 was only detected once in SEAD-4 groundwater and the additional groundwater sampling conducted in 2004 did not confirm the presence of Aroclor-1260 in SEAD-4 groundwater. Therefore, Aroclor-1260 is not considered a COC in groundwater at SEAD-4. Ecological receptors are not expected to be exposed to SEAD-4 groundwater.

Although VOCs and metals including antimony, beryllium, cadmium, chromium, selenium, and thallium were detected at concentrations that exceeded their respective NYSDEC Class GA AWQS or federal MCL values, none of the exceedances were verified during subsequent round(s) of sampling in the same locations. Iron, manganese, and sodium were also detected at concentrations that exceeded their respective NYSDEC GA standards; however, the iron, manganese, and sodium concentrations observed at SEAD-4 were generally consistent with the SEDA background levels and the SEAD-4 sidegradient levels. Further, the concentrations of these compounds in SEAD-4 groundwater do not pose significant risk to potential receptors. Based upon the data, the Army has concluded that groundwater at SEAD-4/38 is not impacted by VOCs and metals above Site background and allows for unrestricted use.

There is no observed impact to groundwater due to the historic boiler blowdown operations that occurred at SEAD-38; concentrations observed in wells that are immediately downgradient of SEAD-38 were consistent with those observed in other SEAD-4 monitoring wells.

In summary, groundwater at SEAD-4/38 does not pose unacceptable risks to human health or the environment. The groundwater conditions at SEAD-4/38 would allow unrestricted use.

Statutory Determinations

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are 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 which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site.

For the reasons discussed below, the Army has determined that the selected remedies meet these statutory requirements.

Protection of Human Health and the Environment

As discussed in Section 7 of the ROD, the current conditions at SEAD-4/38 do not pose significant risks to potential human receptors (including potential residents).

The SLERA results indicate that there are unacceptable hazards to the ecological receptors from exposure to SEAD-4/38 soils, ditch soil, and lagoon soil from ingestion. The selected remedies would be protective of human health and the environment in that the excavation/dredging of contaminated soils, ditch soils, and lagoon soils, followed by their stabilization and/or off-site disposal, would eliminate unacceptable ecological risks.

The implementation of the selected remedies would not pose unacceptable short-term risks or cross-media impacts. The selected remedies would also provide overall protection by reducing the toxicity, mobility, and volume of contamination through the treatment of the contaminated soils, ditch soils, and lagoon soils, if warranted.

Compliance with ARARs and Other Environmental Criteria

A summary of the ARARs and "Other Criteria, Advisories, or Guidance TBCs" which would be complied with during implementation of the selected remedies, is presented in **Appendix F**.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness (discussed above) to cost, the selected remedies meet the statutory requirement that Superfund remedies be cost-effective in that it is the least-cost action alternative and will achieve the remediation goals in a reasonable time frame.

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital and annual O&M costs have been estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated using a 30-year time interval at a 7% discount rate. There is no O&M costs associated with the selected alternative.

While the selected alternative is the most-costly action alternative, this alternative would result in unrestricted use for SEAD-4/38 and no O&M would be required. Therefore, the Army believes that the cost of this alternative is proportional to its overall effectiveness.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedies provide the best balance of tradeoffs among the alternatives with respect to the balancing criteria set forth in NCP Section 300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the AOCs. In addition, the selected remedies provide the greatest protection of human health and the environment, provides the greatest long-term effectiveness, is able to achieve the ARARs more quickly, and is cost-effective.

If warranted, the selected remedies would employ an alternative treatment technology (stabilization) to reduce the toxicity, mobility, and volume of the contaminants. The selected remedies would permanently address this soil, ditch soil, and lagoon soil contamination.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied under the selected remedies in that contaminated soils, ditch soils, lagoon soils would be treated if warranted. Treatment would be used to reduce the toxicity, mobility, and volume of contamination and achieve cleanup levels.

Five-Year Review Requirements

Because the selected remedies for SEAD-4 and SEAD-38 would result in hazardous substances, pollutants, or contaminants remaining on-site above established cleanup levels, a statutory five-year review is not required.

10.0 DOCUMENTATION OF SIGNIFICANT CHANGES

The following actions were previously identified as part of the proposed remedy for SEAD-4 in the Proposed Plan, but have now been completed as a result of interim actions that have been undertaken and completed at SEAD-4:

- Removing, characterizing, and disposing of debris located in vacant Buildings 2073, 2076, 2078, 2084, and 2085, and sweeping and vacuuming building floors; and
- Demolishing Building 2079.

11.0 STATE ROLE

The State of New York, through the New York State Department of Environmental Conservation (NYSDEC), has concurred with the selected remedy. The NYSDEC Declaration of Concurrence is provided in **Appendix B** of this ROD.

Table 1
Summary Statistics for Building Debris Samples
SEAD-4/38
Seneca Army Depot Activity

Analyte	No. of Valid Analyses	No. of Hits	Frequency (%)	Max Hit (mg/kg)
Volatile Organics				
Acetone	6	6	100%	0.04
Semivolatile Organics				
2,4-Dinitrotoluene	5	2	40%	0.36
2-Methylnaphthalene	6	2	33%	1.5
Acenaphthene	6	4	67%	1.4
Anthracene	6	5	83%	0.69
Benzo(a)anthracene	6	5	83%	5.2
Benzo(a)pyrene	6	6	100%	8.5
Benzo(b)fluoranthene	6	6	100%	11
Benzo(ghi)perylene	6	6	100%	8.7
Benzo(k)fluoranthene	6	3	50%	8.3
Bis(2-Ethylhexyl)phthalate	6	6	100%	890
Butylbenzylphthalate	5	3	60%	1.6
Carbazole	6	4	67%	5.8
Chrysene	6	6	100%	13
Di-n-butylphthalate	6	6	100%	32
Dibenz(a,h)anthracene	6	4	67%	3
Dibenzofuran	6	2	33%	1.5
Diethyl phthalate	5	2	40%	0.13
Fluoranthene	6	6	100%	25
Fluorene	6	3	50%	0.76
Indeno(1,2,3-cd)pyrene	6	5	83%	7.5
N-Nitrosodiphenylamine	5	1	20%	0.066
Naphthalene	6	3	50%	1.3
Pentachlorophenol	5	2	40%	4.9
Phenanthrene	6	6	100%	23
Pyrene	6	6	100%	25
Pesticides/PCBs				
4,4'-DDD	6	4	67%	0.035
4,4'-DDE	6	6	100%	1.2
4,4'-DDT	6	6	100%	5.6
Alpha-Chlordane	6	4	67%	0.78
Aroclor-1254	6	5	83%	91
Aroclor-1260	6	4	67%	3.1
Beta-BHC	6	1	17%	0.031
Dieldrin	6	5	83%	1.1
Endosulfan I	6	2	33%	0.16
Endosulfan II	6	2	33%	0.03
Endosulfan sulfate	6	2	33%	0.2
Endrin	6	3	50%	0.32
Endrin aldehyde	6	5	83%	0.39
Endrin ketone	5	3	60%	0.37
Gamma-Chlordane	6	5	83%	0.095
Heptachlor	6	1	17%	0.034
Heptachlor epoxide	6	5	83%	0.36
Methoxychlor	6	3	50%	0.39

Table 1
Summary Statistics for Building Debris Samples
SEAD-4/38
Seneca Army Depot Activity

Analyte	No. of Valid Analyses	No. of Hits	Frequency (%)	Max Hit (mg/kg)
Nitroaromatics				
1,3-Dinitrobenzene	6	2	33%	0.18
2,4,6-Trinitrotoluene	6	1	17%	0.26
2,4-Dinitrotoluene	6	3	50%	1.9
2-amino-4,6-Dinitrotoluene	6	2	33%	0.32
4-amino-2,6-Dinitrotoluene	6	1	17%	0.3
RDX	6	1	17%	0.2
Tetryl	6	1	17%	0.82
Metals				
Aluminum	6	6	100%	6110
Antimony	6	6	100%	26.1
Arsenic	6	6	100%	33.6
Barium	6	6	100%	3560
Beryllium	6	2	33%	0.46
Cadmium	6	5	83%	132
Calcium	6	6	100%	253000
Chromium	6	6	100%	1840
Cobalt	6	6	100%	37.1
Copper	6	6	100%	1220
Cyanide	6	4	67%	28.7
Iron	6	6	100%	362000
Lead	6	6	100%	12000
Magnesium	6	6	100%	17600
Manganese	6	6	100%	1630
Mercury	6	6	100%	62.8
Nickel	6	6	100%	1330
Potassium	6	6	100%	3750
Silver	6	6	100%	0.57
Sodium	6	6	100%	1530
Thallium	6	5	83%	7
Vanadium	6	6	100%	948
Zinc	6	6	100%	6100

Table 2
SEAD-38 Surface and Subsurface Soil TPH Analysis Results
SEAD-4/38
Seneca Army Depot Activity

Analyte	Matrix Location Depth (ft) Sample Date Sample ID Units	Maximum Result	Soil SEAD-38 0-0.2 12/17/1993 SS38-1	Soil SEAD-38 0-0.2 12/17/1993 SS38-2	Soil SEAD-38 0-0.2 12/17/1993 SS38-3	Soil SEAD-38 0-0.2 12/17/1993 SS38-4	Soil SEAD-38 2-4 1/9/1994 SB38-1
Total Petroleum Hydrocarbons	mg/Kg	1940	1840	104	1940	110	85
pH	standard units	8.93	7.36	7.46	7.47	7.4	8.93
Total Solids	% W/W	88.8	60.2	79.8	80.1	86	88.8

Table 3
Summary Statistics for Surface Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits	Frequency (%)	Maximum Detected Value (mg/kg)	NYSDEC Unrestricted SCOs [4] (mg/kg)	Region IX Residential PRGs [5] (mg/kg)
Acetone	0.014	79	26	33%	0.14	0.05	61000
4,4'-DDD	0.0045	80	19	24%	0.19	0.0033	2
4,4'-DDE	0.0057	80	26	32%	0.16	0.0033	1.4
4,4'-DDT	0.0071	80	27	34%	0.76	0.0033	1.7
Aroclor-1254	0.040	80	20	25%	0.31	0.1 [6]	0.22
Aroclor-1260	0.027	80	3	4%	0.11	0.1 [6]	0.22
Dieldrin	0.0028	80	5	6%	0.0074	0.005	0.03
Endrin	0.0028	80	3	4%	0.027	0.014	18
Benzo(a)anthracene	0.084	80	67	84%	0.56	1	0.15
Benzo(a)pyrene	0.086	80	65	81%	0.44	1	0.015
Benzo(b)fluoranthene	0.115	80	65	81%	0.83	1	0.15
Dibenz(a,h)anthracene	0.08	80	17	21	0.125	0.33	0.015
Indeno(1,2,3-cd)pyrene	0.0863	80	44	55%	0.27	0.5	0.15
Antimony	9.11	80	31	39%	148	NA	31
Arsenic	5.25	80	80	100%	14.6	13	0.39
Chromium	1189	80	80	100%	18600	30	120000 [7]
Chromium, hexavalent	10.15	15	4	27%	14.7	1	230
Copper	387	80	80	100%	7330	50	3100
Iron	24791	80	80	100%	64600	NA	55000
Lead	68.5	73	73	100%	9280 [3]	63	NA

Table 3
Summary Statistics for Surface Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits	Frequency (%)	Maximum Detected Value (mg/kg)	NYSDEC Unrestricted SCOs [4] (mg/kg)	Region IX Residential PRGs [5] (mg/kg)
Mercury	0.1	80	42	52%	1.2	0.18	23
Nickel	31	80	80	100%	228	30	14000 [8]
Thallium	1.4	80	17	21%	5.4	NA	5.1 [9]
Vanadium	28.5	80	80	100%	1250	NA	390
Zinc	244	80	80	100%	2020	109	23000

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed.
2. From RI report Table 6-3. If the dataset was normal the t-statistic for normal distribution was used; if the dataset was not normal the H-statistic for lognormal distribution was used.
3. Sample duplicate pair results were averaged and presented as a discreet sample.
4. New York State 6NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, Revised Public Review Draft June 14, 2006.
5. USEPA Region 3, 6, and 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites. July, 2008.
6. The NYSDEC Soil Cleanup Objectives for polychlorinated biphenyls.
7. The Region IX value for chromium (III) (Insoluble Salts).
8. Nickel refinery dust.
9. Soluble thallium salts.

NA = Not Available

Table 4
Summary Statistics for Total Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits	Frequency (%)	Maximum Detected Value (mg/kg)	NYSDEC Unrestricted SCOs [4] (mg/kg)	Region IX Residential PRGs [5] (mg/kg)
Acetone	0.0095	152	33	22%	0.14	0.05	61000
4,4'-DDD	0.003	152	19	13%	0.19	0.0033	2
4,4'-DDE	0.0036	152	29	19%	0.16	0.0033	1.4
4,4'-DDT	0.0039	152	28	18%	0.76	0.0033	1.7
Aroclor-1254	0.031	152	24	16%	1.6	0.1 [6]	0.22
Aroclor-1260	0.022	152	3	2%	0.11	0.1 [6]	0.22
Dieldrin	0.0023	152	5	3%	0.0074	0.005	0.03
Endrin	0.0023	152	4	3%	0.034	0.014	18
Benzo(a)anthracene	0.13	152	72	47%	1.1	1	0.15
Benzo(a)pyrene	0.12	152	71	47%	0.88	1	0.015
Benzo(b)fluoranthene	0.125	152	72	47%	0.83	1	0.15
Dibenz(a,h)anthracene	0.10	152	18	12%	0.125	0.33	0.015
Indeno(1,2,3-cd)pyrene	0.11	152	46	30%	0.27	0.5	0.15
Antimony	5.95	152	52	34%	148	NA	31
Arsenic	5.49	152	152	100%	21.5	13	0.39
Chromium	378	152	138	91%	18600	30	120000 [7]
Chromium, hexavalent	10.15	15	4	27%	14.7	1	230
Copper	167	152	152	100%	7330	50	3100
Iron	26346	152	152	100%	64600	NA	55000
Lead	37	152	145	95%	9280 [3]	63	NA
Mercury	0.06	152	74	49%	1.2	0.18	23

Table 4
Summary Statistics for Total Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits	Frequency (%)	Maximum Detected Value (mg/kg)	NYSDEC Unrestricted SCOs[4] (mg/kg)	Region IX Residential PRGs [5] (mg/kg)
Nickel	33	152	152	100%	228	30	14000 [8]
Thallium	1.27	152	17	11%	5.4	NA	5.1 [9]
Vanadium	24.5	152	152	100%	1250	NA	390
Zinc	166	152	152	100%	2020	109	23000

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed.
2. From RI report Table 6-2. If the dataset was normal the t-statistic for normal distribution was used; if the dataset was not normal the H-statistic for lognormal distribution was used.
3. Sample duplicate pair results were averaged and presented as a discreet sample.
4. New York State 6NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, Revised Public Review Draft June 14, 2006.
5. USEPA Region 3, 6, and 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites. July, 2008.
6. The NYSDEC Soil Cleanup Objectives for polychlorinated biphenyls.
7. The Region IX value for chromium (III) (Insoluble Salts).
8. Nickel refinery dust.
9. Soluble thallium salts.

NA = Not Available

Table 5
Summary Statistics for Drainage Ditch Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits [3]	Frequency [3] (%)	Maximum Detected Value [3] (mg/kg)	NYSDEC Unrestricted SCOs [4] (mg/kg(	Region IX Residential PRGs [5] (mg/kg)
Acetone	0.021	50	12	24%	0.18	0.05	61000
4,4'-DDD	0.0089	50	13	26%	0.09	0.0033	2
4,4'-DDE	0.0086	50	18	36%	0.086	0.0033	1.4
4,4'-DDT	0.0069	50	16	32%	0.045	0.0033	1.7
Aroclor-1254	0.097	50	24	48%	0.58	0.1 [6]	0.22
Aroclor-1260	0.056	50	9	18%	0.25	0.1 [6]	0.22
Dieldrin	0.0042	50	4	8%	0.018	0.005	0.03
Benzo(a)anthracene	0.591	50	44	88%	5.9	1	0.15
Benzo(a)pyrene	0.580	50	44	88%	5.1	1	0.015
Benzo(b)fluoranthene	0.611	50	46	92%	4.8	1	0.15
Benzo(k)fluoranthene	1.284	50	20	40%	5.7	0.8	1.5
Chrysene	0.598	50	47	94%	6.2	1	15
Dibenz(ah)anthracene	0.384	50	26	52%	1.2	0.33	0.015
Hexachlorobenzene	0.284	50	2	4%	0.84	0.33	0.3
Indeno(1,2,3-cd)pyrene	0.355	50	38	76%	3.1	0.5	0.15
Arsenic	7.53	50	49	98%	37.7	13	0.39
Barium	127	50	50	100%	488	350	15000
Cadmium	8.97	50	27	54%	34.1	2.5	70
Chromium	272	50	50	100%	4800	30	120000 [7]
Copper	132	50	50	100%	988	50	3100

Table 5
Summary Statistics for Drainage Ditch Soil Samples
SEAD-4/38

Compound [1]	95% UCL Concentration [2] (mg/kg)	No. of Analyses [3]	No of Hits [3]	Frequency [3] (%)	Maximum Detected Value [3] (mg/kg)	NYSDEC Unrestricted SCOs [4] (mg/kg(	Region IX Residential PRGs [5] (mg/kg)
Lead	115	50	47	94%	374	63	NA
Iron	32047	50	50	100%	87900	NA	55000
Manganese	909	50	50	100%	5480	1600	1800
Mercury	0.28	50	30	60%	2.4	0.18	23
Nickel	50	50	50	100%	453	228	14000 [8]
Selenium	1.26	50	24	48%	6.1	3.9	390
Vanadium	45	50	50	100	1140	NA	390
Zinc	346	50	50	100%	1150	109	23000

Notes:
1. Only compounds with sample concentrations exceeding one or more criteria are listed.
2. Calculated using USEPA ProUCL Version 3.0. Half reporting limits were used for nondetects. If the dataset was normal the t-statistic for normal distribution was used; if the dataset was not normal the H-statistic for lognormal distribution was used.
3. From FS report Table A-5. Field duplicates were treated as discrete samples.
4. New York State 6NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives, Revised Public Review Draft June 14, 2006.
5. USEPA Region 3, 6, and 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites. July, 2008.
6. The NYSDEC Soil Cleanup Objectives for polychlorinated biphenyls.
7. The Region IX value for chromium (III) (Insoluble Salts).
8. Nickel refinery dust.
NA = Not Available

Table 6A
Summary Statistics for ESI (1994) Groundwater Samples
SEAD-4/38

Compound [1]	ESI Maximum Detected Groundwater Concentration (µg/L)	No. of Analyses	No of Hits	Frequency (%)	NYSDEC GA Groundwater and Federal MCL Standard (µg/L)	Maximum SEDA Background (µg/L)
Aroclor-1260	ND	5	0	0%	0.09	NA
Antimony	39.3	5	2	40%	3	52.7
Beryllium	6.3	5	1	20%	4	2.2
Cadmium	5.6	5	1	20%	5	1.45
Iron	2270	5	5	100%	300	69400
Iron+Manganese	2533	5	5	100%	500	70520
Manganese	477	5	5	100%	300	1120
Sodium	31100	5	5	100%	20000	59400

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed. Aroclor-1260 was listed as it was the elevated risk contributor.
ND = Not Detected; NA = Not Available.

Table 6B
Summary Statistics for RI (1999) Groundwater Samples
SEAD-4/38

Compound [1]	RI Maximum Detected Groundwater Concentration (µg/L)	No. of Analyses	No of Hits	Frequency (%)	NYSDEC GA Groundwater Standard and Federal MCL Standard (µg/L)	Maximum SEDA Background (µg/L)
Aroclor-1260	0.079	25	1	4%	0.09	NA
Benzene	2	25	1	4%	1	NA
Ethyl benzene	6	25	1	4%	5	NA
4-Nitrotoluene	10	27	1	4%	5	NA
Nitrobenzene	0.89	27	1	4%	0.4	NA
Antimony	13.8	25	5	20%	3	52.7
Chromium	260	25	16	64%	50	69.4
Iron	6900	25	22	88%	300	69400
Iron+Manganese	7087	25	23	92%	500	70520
Manganese	855	25	23	92%	300	1120
Selenium	24	25	8	32%	10	3.6
Sodium	82600	25	25	100%	20000	59400
Thallium	4.9	25	3	12%	2	4.7

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed. The table includes two 1999 rounds of sample data -March and April round and July round.
2. NA – Not Available.

Table 7A
Summary Statistics for ESI (1993) Surface Water Samples
SEAD-4/38

Compound [1]	ESI Maximum Detected Surface Water Concentration (µg/L)	No. of Analyses	No of Hits	Frequency (%)	NYSDEC AWQS Class C Surface Water (µg/L)	EPA National Recommended Water Quality Criteria (µg/L)
Benzo(a)pyrene	ND	4	0	0%	0.0012	NA
Aluminum	314	4	4	100%	100	NA
Copper	66.9	4	4	100%	20.29	9
Iron	657	4	4	100%	300	1000
Lead	10.7	4	3	75%	7.16	2.5

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria or elevated risk contributors are listed.

NA = Not Available.

Table 7B
Summary Statistics for RI (1998) Surface Water Samples
SEAD-4/38

Compound [1]	RI Maximum Detected Surface Water Concentration (µg/L)	No. of Analyses	No of Hits	Frequency (%)	NYSDEC AWQS Class C Surface Water (µg/L)	EPA National Recommended Water Quality Criteria (µg/L)
Benzo(a)pyrene	0.15	9	1	11%	0.0012	NA
Aluminum	7350	9	9	100%	100	NA
Cadmium	11.6	9	6	66%	1.86	0.25
Cobalt	19.6	9	1	11%	5	NA
Copper	97	9	6	66%	20.29	9
Iron	16600	9	9	100%	300	1000
Lead	117	9	1	11%	7.16	2.5
Silver	1.7	9	2	22%	0.1	NA
Vanadium	22.5	9	4	44%	14	NA
Zinc	492	9	9	100%	141	120

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed.

NA = Not Available.

Table 8
Summary Statistics for Lagoon Soil Samples
SEAD-4/38

Compound [1]	SEAD-4/38 Maximum Detected Sediment Concentration (mg/kg)	No. of Analyses	No of Hits	Frequency (%)	NYSDEC Sediment Criteria (mg/kg)
4-methylphenol	0.14	3	1	33%	0.020
4,4'-DDE	0.0041	3	1	33%	0.001
Aroclor-1254	0.28	3	2	66%	0.00005
Antimony	50.4	3	2	66%	2
Arsenic	8.1	3	3	100%	6
Chromium	3310	3	3	100%	26
Copper	2640	3	3	100%	16
Iron	29200	3	3	100%	20000
Manganese	569	3	3	100%	460
Mercury	0.16	3	3	100%	0.15
Nickel	33.4	3	3	100%	16
Zinc	630	3	3	100%	120

Notes:

1. Only compounds with sample concentrations exceeding one or more criteria are listed.
2. Criteria calculated using a Seneca Site-wide TOC of 3.91%.

Table 9
Summary of Total Noncarcinogenic and Carcinogenic Risks
Reasonable Maximum Exposure (RME) - SEAD-4/38
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	HAZARD INDEX	CANCER RISK
CURRENT SITE WORKER	Inhalation of Dust in Ambient Air	5E-05	2E-08
	Ingestion of Soil	5E-03	5E-08
	Dermal Contact to Soil	1E-03	1E-08
	TOTAL RECEPTOR RISK (Nc & Car)	*6E-03*	*8E-08*
FUTURE OUTDOOR TRAINING OFFICER	Inhalation of Dust in Ambient Air	3E-04	1E-07
	Ingestion of Soil	4E-02	4E-07
	Dermal Contact to Soil	9E-03	1E-07
	Ingestion of Ground Water	5E-02	8E-07
	Dermal Contact to Surface Water	4E-03	9E-06
	Dermal Contact to Sediment	3E-03	2E-08
	TOTAL RECEPTOR RISK (Nc & Car)	*1E-01*	*1E-05*
FUTURE INDOOR TRAINING OFFICER	Inhalation of Dust in Indoor Air [1]		
	Ingestion of Indoor Dust/Dirt [1]		
	Dermal Contact to Indoor Dust/Dirt [1]		
	Ingestion of Ground Water	5E-02	8E-07
	TOTAL RECEPTOR RISK (Nc & Car)	*5E-02*	*8E-07*
FUTURE CHILD TRESPASSER	Inhalation of Dust Ambient Air	1E-04	1E-08
	Ingestion of Soil	3E-02	6E-08
	Dermal Contact to Soil	1E-03	4E-09
	Inhalation of Ground Water	6E-04	2E-09
	Ingestion of Ground Water	2E-02	6E-08
	Dermal Contact to Ground Water	2E-01	6E-07
	Dermal Contact to Surface Water	2E-02	6E-06
	Dermal Contact to Sediment	1E-02	1E-08
	Ingestion of Sediment	6E-02	4E-07
	TOTAL RECEPTOR RISK (Nc & Car)	*4E-01*	*7E-06*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	6E-03	1E-07
	Ingestion of Soil	2E-01	1E-07
	Dermal Contact to Soil	1E-02	6E-09
	TOTAL RECEPTOR RISK (Nc & Car)	*2E-01*	*3E-07*

Note:

The impacted buildings have been demolished or cleaned after the RI. The risks associated with indoor dust exposure are expected to be minimal based on the current SEAD-4/38 conditions. The original risk results presented in the RI report were replaced with 0.

Table 9
Summary of Total Noncarcinogenic and Carcinogenic Risks
Reasonable Maximum Exposure (RME) - SEAD-4/38
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	ADULT HAZARD INDEX	CHILD HAZARD INDEX	LIFETIME CANCER RISK
FUTURE RESIDENT	Inhalation of Dust in Ambient Air	2E-03	3E-03	1E-06
	Ingestion of Soil	8E-02	8E-01	3E-06
	Dermal Contact to Soil	2E-02	3E-02	4E-07
	Inhalation of Ground Water	5E-03	2E-02	2E-07
	Ingestion of Ground Water	2E-01	5E-01	5E-06
	Dermal Contact to Ground Water	3E+00 *	6E+00 *	6E-05
	Dermal Contact to Surface Water	4E-02	5E-02	1E-04 **
	Ingestion of Sediment	4E-02	4E-01	4E-06
	Dermal Contact to Sediment	3E-02	3E-02	2E-07
	TOTAL RECEPTOR RISK (Nc & Car)	*3E+00*	*7E+00*	*2E-04*

Notes:

* Risk via this route are driven by Aroclor-1260. 2004 test pitting and groundwater investigation indicated that soil and groundwater in the area was not impacted by PCBs. See text for discussion

**Risk via this route are driven by benzo(a)pyrene. Uncertainty associated with benzo(a)pyrene detection is discussed in the text.

Table 10
Cleanup Goals for SEAD-4 and SEAD-38
Soil, Ditch Soil, and Lagoon Soil

Compounds	SEAD-4		SEAD-38
	Soil Cleanup Goal [1] (mg/kg)	Drainage Ditch and Man-Made Lagoon Cleanup Goal (mg/kg)	Cleanup Goal for Drainage Ditch Hot Spot SD4-28 (mg/kg)
Chromium (total)	60	60	--
Lead	167	--	--
Vanadium	--	--	150

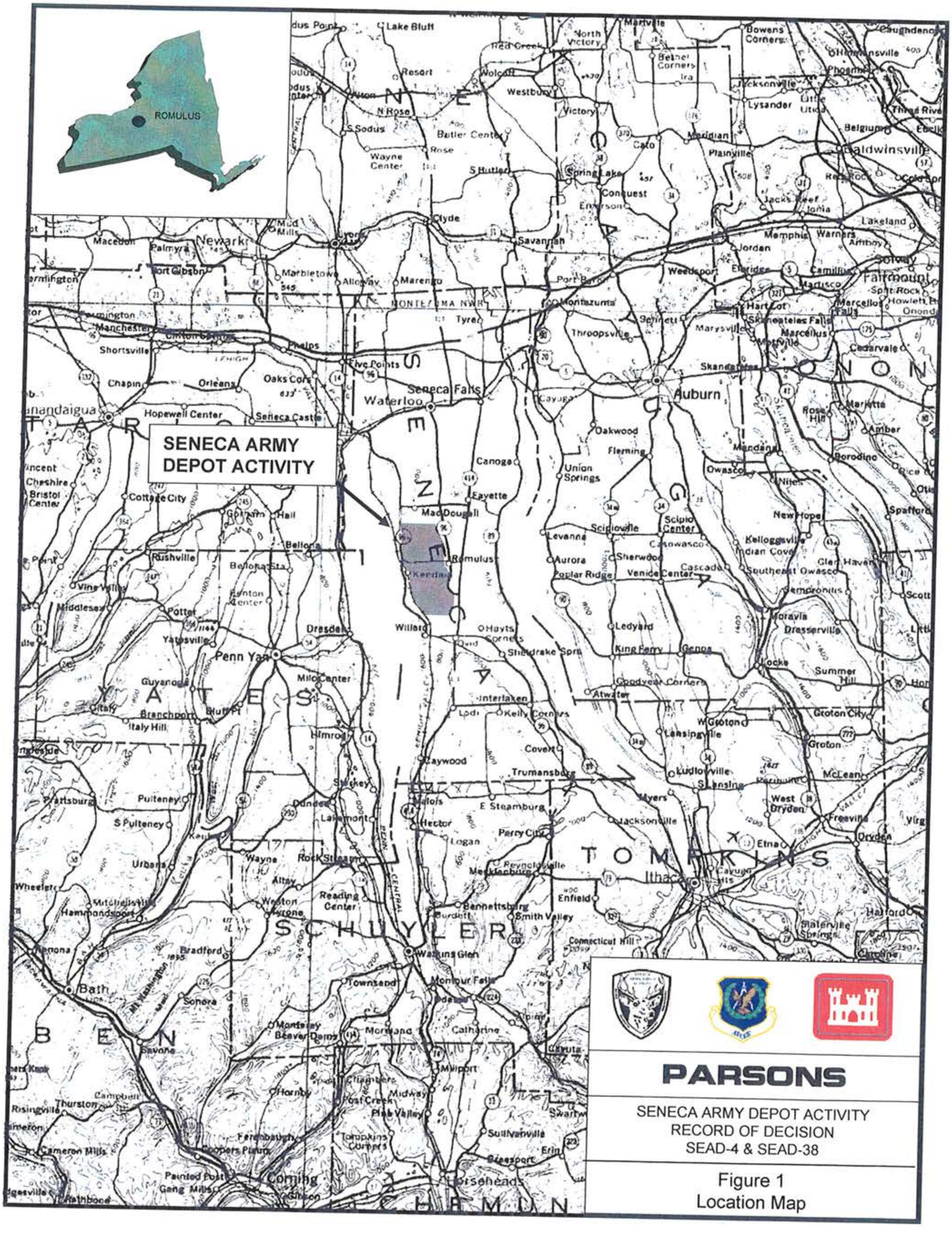
Notes:

1. The 95% UCL of post remediation soil concentrations at SEAD-4 will be compared to the cleanup goals to determine whether or not the soil remedy is complete. All results for soil representative of material remaining at the AOC will be used to calculate the 95% UCL and the 95% UCL will then be compared with the soil cleanup objectives.

Unit: mg/kg = milligrams per kilogram.

Table 11
Cost Estimate Summary

Alternative	Capital Cost	Annual OM&M Costs	Total Present-Worth Costs
SEAD-4			
1. No Action	$0	$0	$0
2. On-Site Containment	$809,000	$44,400	$1,360,000
3. Off-Site Disposal	$1,600,000	$0	$1,600,000
SEAD-38			
1. No Action	$0	$0	$0
2. On-Site Containment	$8,000	$0	$8,000
3. Off-Site Disposal	$8,000	$0	$8,000



PARSONS

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-4 & SEAD-38

Figure 1
Location Map

N

APPROXIMATE LOCATION OF OUTFALL

APPROXIMATE LOCATION OF 4" VERTICAL PIPE

4" PIPE

SUSPECTED LEACH FIELD

APPROXIMATE LOCATION OF SEAD-38

LUNCH ROOM

2076

BOILER HOUSE

FORMER DECONTAMINATION BUILDING FOUNDATION

BERM

FORMER 2079

FORMER 2081 WATER TANK

Seneca Road

APPROXIMATE LOCATION OF BURIED 6" CLAY PIPE

MAN-MADE LAGOON

APPROXIMATE LOCATION OF 6" OVERFLOW PIPE

APPROXIMATE LOCATION OF FORMER MUNITIONS WASHOUT BUILDING

APPROXIMATE LOCATION OF FORMER BUILDING

FORMER 2130

GENERAL PURPOSE STORAGE

FORMER 2075

FORMER 2074

2078

2073

DRAINAGE DITCH

ROCKET OVERHAUL SHOP

2085

AMMO RENOVATION BUILDING

AMMO RENOVATION SHOP

2084

DRAINAGE DITCH

N 988000
N 987750
N 987500
N 987250
N 987000
N 986750
N 986500

E 744250
E 744500
E 744750
E 745000
E 745250
E 745500
E 745750
E 746000

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- BRUSH LINE
- UNPAVED ROADS
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- FORMER BUILDING
- ROAD SIGN
- DECIDUOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- COORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT

100 0 100 200
(feet)

PARSONS

CLIENT/PROJECT TITLE

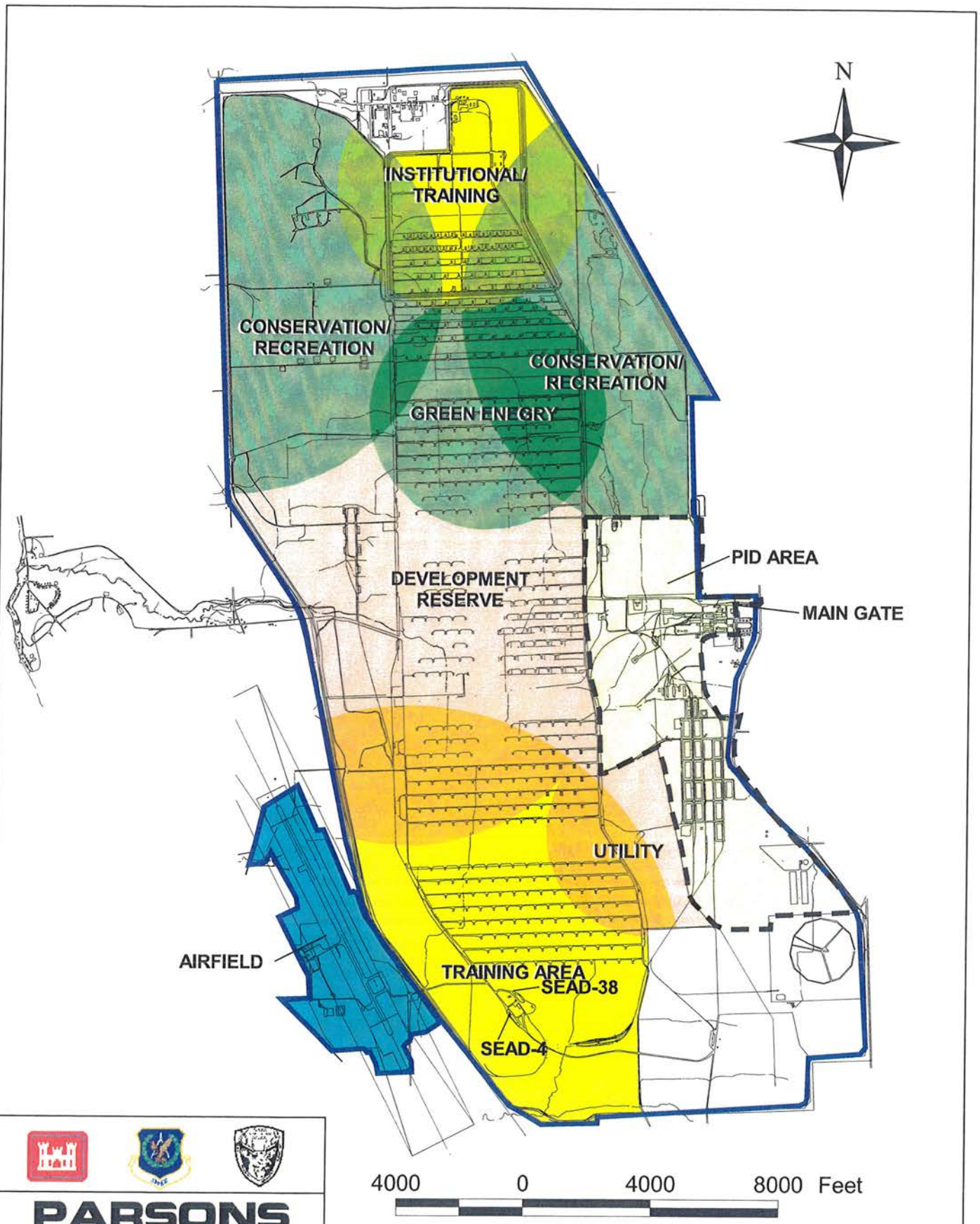
SENECA ARMY DEPOT ACTIVITY
REMEDIAL DESIGN
SEAD-4 AND SEAD-38

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No.

FIGURE 2
SEAD-4 MUNITIONS WASHOUT FACILITY & SEAD-38
THE BLDG. 2079 BOILER BLOWDOWN PIT
LOCATION MAP

SCALE 1" = 200' | DATE JULY 2008

P:\PIT\Projects\Seneca PBC II\SEAD-4\RD WP Design Report\Draft\Figures\Figure 2.dwg



PARSONS

SENECA ARMY DEPOT ACTIVITY
Record of Decision at SEAD-4 and SEAD-38

Figure 3
Land Use and Site Locations

July 2008

Seneca Army Deport Boundary

Planned Industrial /Office Development (PID) Area Boundary

O:\Seneca\Depot Survey\land_use_plan_Dec-07.apr

N

LEGEND

- SB4-24 — Soil Boring Sample Location with LOC_ID
- MW4-12 — Monitoring Well Sample Location with LOC_ID
- SS4-17 — Surface Soil Sample Location with LOC_ID
- SW/SD4-1 SD4-3 — Lagoon Soil and/or Surface Water Sample Location with LOC_ID
- SW/SD4-24 SD4-44 — Ditch Soil and/or Surface Water Sample Location with LOC_ID
- TP4-8 — Test Pit Location with LOC_ID
- Approximate Location of Sead-38
- Former Building

200 100 0 200 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-4 AND SEAD-38

FIGURE 4
SAMPLE LOCATIONS

Scale: 1" = 200' | July 2008

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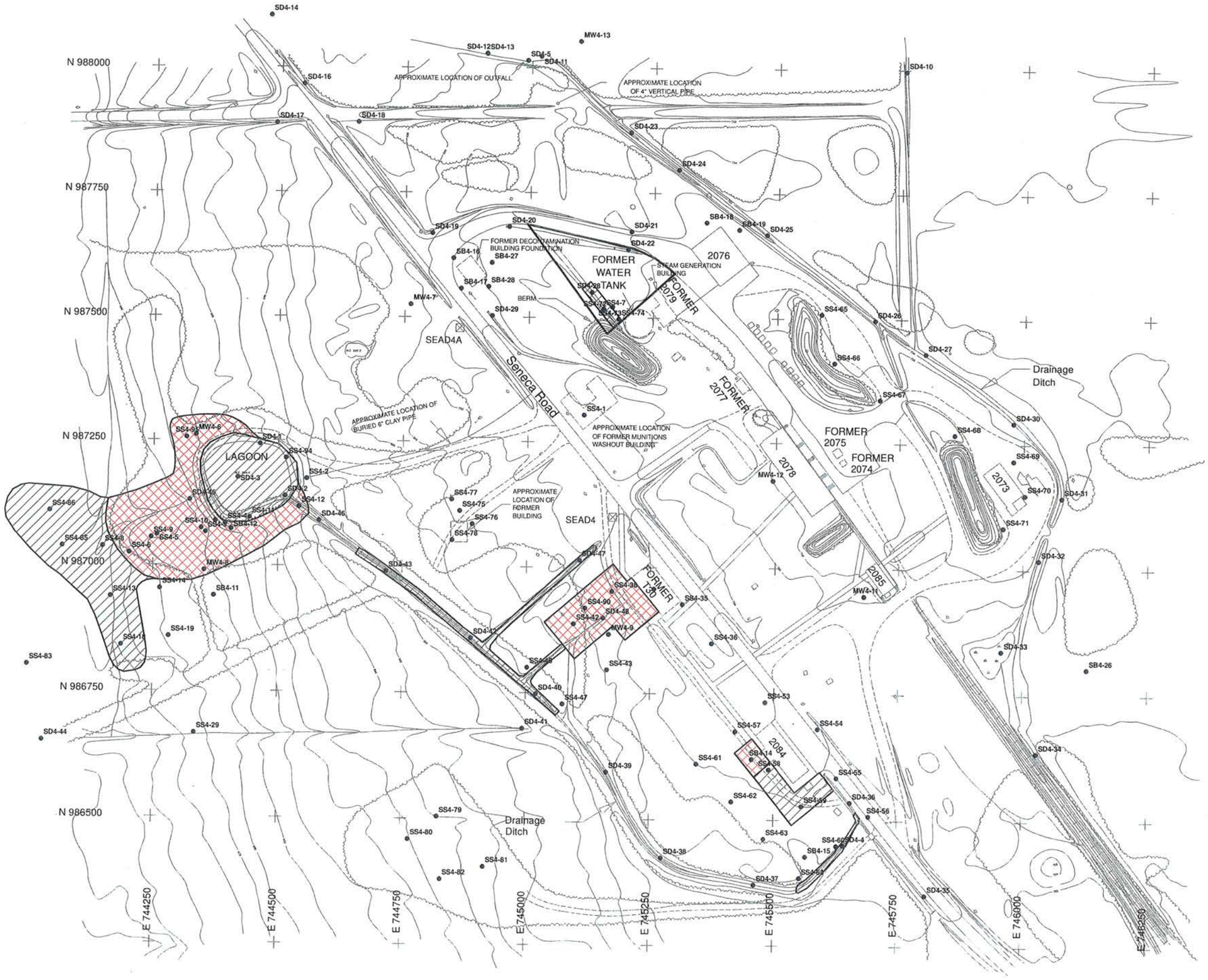

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LEGEND

- Sample Location
- EXCAVATION DEPTH TO 1 FOOT
- EXCAVATION BEYOND 1 FOOT
- APPROXIMATE LOCATION OF SEAD-38
- FORMER BUILDING

N
W E
S

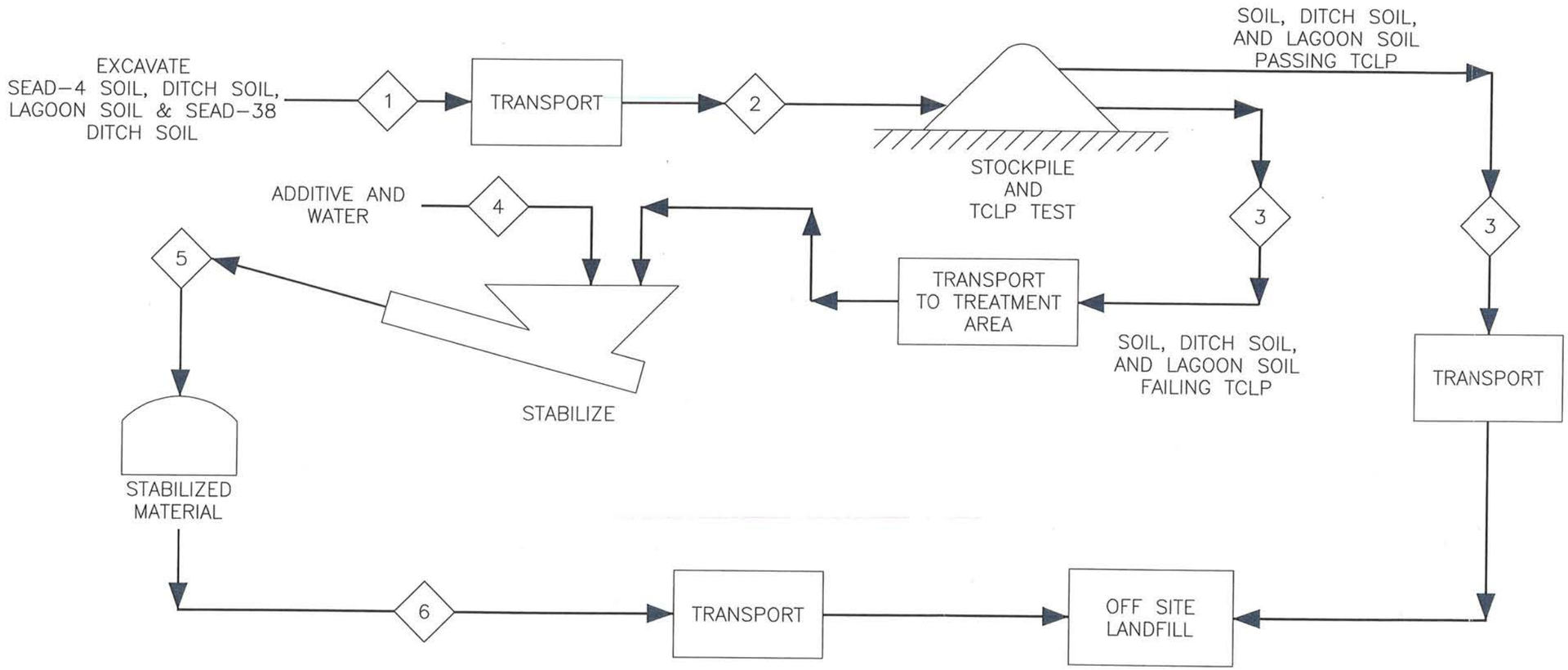
100 50 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
SEAD-4 AND SEAD-38

Figure 5
Approximate Area of Excavation for Proposed Cleanup Goals (Cr=60mg/kg , Pb=167mg/kg)

1 = 200'	July 2008



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PARSONS

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
SEAD-4 AND SEAD-38

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No.

FIGURE 6
SELECTED REMEDY
GENERALIZED PROCESS FLOW SCHEMATIC

SCALE N.T.S. | DATE JULY 2008

APPENDIX A

Administrative Record

APPENDIX A

ADMINISTRATIVE RECORD[1]

Federal Facilities Agreement under CERCLA Section 120 in the Matter of Seneca Army Depot, Romulus, New York, Docket Number: II-CERCLA-FFA-00202, United States Army, United States Environmental Protection Agency (USEPA) Region 2, New York State Department of Environmental Conservation (NYSDEC).

Seneca Army Depot Building Demolition Report, Seneca Army Depot, Romulus, NY, Parsons, Feb 2008.

WASH-01-001. Draft SEAD-4 Project Scoping Plan for Performing a CERCLA RI/FS at the Munitions Washout Facility Leach Field, Parsons Engineering Science, Inc., October 1995.

WASH-01-001. Final SEAD-4 Project Scoping Plan for Performing a CERCLA RI/FS at the Munitions Washout Facility Leach Field, Parsons Engineering Science, Inc., October 1996 and Response to Comments and revised pages, November 1996.

WASH-01-002. Pre-Draft SEAD-4 Remedial Investigation Report at the Munitions Washout Facility, (SEAD-4), Parsons Engineering Science, Inc., June 1999.

WASH-01-002. Draft SEAD-4 Remedial Investigation Report at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., November 1999.

WASH-01-002. Draft Final SEAD-4 Remedial Investigation Report at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., June 2000.

WASH-01-002. Final SEAD-4 Remedial Investigation Report at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., January 2001.

WASH-01-002. Revised Final SEAD-4 Remedial Investigation Report at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., January 2002; Additional Response to Comments, February 2003.

WASH-01-003. Draft SEAD-4 Feasibility Study at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., July 2001.

WASH-01-003. Draft Final SEAD-4 Feasibility Study at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., January 2002; Additional Response to Comments, February 2003.

WASH-01-003. Final SEAD-4 Feasibility Study at the Munitions Washout Facility (SEAD-4), Parsons Engineering Science, Inc., January 2002; Additional Response to Comments, March 2005, [CD].

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[1] SEAD-38 is physically located within, and is fully surrounded by, the footprint of the area that is defined as SEAD-4. As a result, the characterization of contaminants within SEAD-38 was conducted along with that conducted for the larger AOC SEAD-4, during the SEAD-4 Expanded Site Inspection (ESI), Remedial Investigation (RI), and Feasibility Study (FS). Although the titles of the SEAD-4 4 ESI, RI, and FS reports suggest that the documents pertain specifically to SEAD-4; the information, results, analysis, and conclusions provided in these documents also relate to conditions found at SEAD-38.

WASH-03-001. Draft Proposed Plan for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) at Seneca Army Depot Activity, Parsons, February 2007, [CD].

WASH-03-001. Draft Final Proposed Plan for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38) at Seneca Army Depot Activity, Parsons, June 2007, [CD].

WASH-05-001. Draft ROD for SEAD 4 and Building 2079, Parsons, August 2007.

WASH-05-001. Draft Final ROD for SEAD 4 and Building 2079, Parsons, May 2008.

APPENDIX B

State Letter of Concurrence

New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor
625 Broadway
Albany, New York 12233-7015
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
Website: www.dec.ny.gov

Alexander B. Grannis
Commissioner

JUN 18 2008

Mr. George Pavlou
Deputy Regional Administrator
US Environmental Protection Agency
Floor 19-#E38
290 Broadway
New York, New York 10007-1866

Re: Draft Record of Decision
Seneca Army Depot Activity, Site #850006
SEAD 4 (Former Munitions Washout Area) and SEAD 38
(Building 279 Boiler Blow Down Pit)

Dear Mr. Pavlou:

The New York State Department of Environmental Conservation and the New York State Department of Health have reviewed the above referenced Record of Decision (ROD). The State concurs with the following elements of the selected remedy as stated in the final ROD dated March 2008 which includes:

- removing the debris from vacant buildings 2073, 2076, 2078, 2084 & 2085 and sweeping and vacuuming the floors;
- demolishing Building 2079;
- excavating ditch soil until the cleanup goal for chromium (60 ppm) is reached;
- excavating the hot spot SD4-28 with vanadium greater than 150 ppm;
- excavating surface & subsurface soils until the cleanup goals for lead (167 ppm) and chromium (60 ppm) are achieved;
- dewatering the manmade lagoon and allow water to percolate into the ground at a location outside of the excavation areas;
- excavating soil from the dewatered lagoon until the chromium goal (60 ppm) is achieved;

- removing the temporary berm at the end of the stormwater control basin and allowing the man-made lagoon to return to its natural condition;
- stabilizing soils, ditch soil, lagoon soil, building debris, and building material exceeding the waste characterization criteria;
- disposing of the excavated materials in an off-site landfill;
- backfilling excavation areas that cannot be graded to promote positive drainage and excavation areas deeper than 4 feet near the road or buildings if necessary with clean backfill.

In addition, based on the post-excavation sampling results, an environmental easement may be required which would limit the future use of SEADs 4 and 38 to commercial property.

If you have any questions, please contact Dr. Chittibabu Vasudevan at (518) 402-9625.

Sincerely,

Dale A. Desnoyers
Director
Division of Environmental Remediation

cc: J. Vasquez, USEPA
S. Absolom, SEAD

APPENDIX C

Soil Cleanup Goal Sensitivity Analysis

(Excerpt from Appendix D of Feasibility Study Report)

Appendix D

SOIL CLEANUP GOAL SENSITIVITY ANALYSIS

- Sensitivity Analysis
- Table
- Figures
- NYSDEC approval letter of Sensitivity Analysis – January 26, 2005

APPENDIX D
Soil Cleanup Goal Sensitivity Analysis

Purpose

In order to come to a consensus regarding the selection of appropriate soil cleanup goals, NYSDEC proposed and the Army completed a sensitivity analysis for a range of cleanup goals for chromium and lead in soils. The sensitivity (or "knee of the curve") analysis evaluated relative remediation costs versus contaminant mass removed for an offsite disposal remedial alternative. The overall goal of the analysis was to determine the economic effectiveness of various excavation plans based on a comparison of cost to volume of soil removed associated with each cleanup goal scenario. A unit cost per volume of soil excavated, disposed, and backfilled was assumed in order to assign a total cost to each cleanup goal and associated volume. The purpose of the total cost was to serve as a basis of comparison between cleanup goal scenarios; the total cost for each scenario is not intended to be used for project cost estimating purposes. This analysis assessed the mass of contaminant in soils, namely lead (Pb) and chromium (Cr), removed for various metal cleanup goals. Five cleanup goal criteria were assessed, and volumes of excavation and associated masses of contaminant removed were determined for each criterion. This information was plotted on a graph in order to determine which criteria removed the greatest mass of contaminant most economically. Five scenarios were developed:

A: Cr > 60 mg/Kg; Pb > 167 mg/Kg
B: Cr > 30 mg/Kg; Pb > 30 mg/Kg
C: Cr > 60 mg/Kg; Pb > 400 mg/Kg
D: Cr > 324 mg/Kg; Pb > 167 mg/Kg (Case 2 in the FS)
E: Cr > 324 mg/Kg; Pb > 400 mg/Kg

It should be noted that a scenario excavating soils that exceed TAGMs for any individual metal was initially considered; however it was eliminated from further evaluation since it would involve excavating all soils at SEAD-4 and beyond.

Delineation of excavation area

For each cleanup goal scenario, the bounds of excavation of soils (surface soil, subsurface soil, ditch soil, and sediment) were delineated in one of two ways:

1. The limit of excavation extended to the nearest sample meeting the cleanup goal, or

2. If an area was not entirely bounded, the limit of excavation extended 100 feet beyond the location of the last soil sample not meeting the cleanup goal.

For each criteria, a map noting the excavation area correponding to the cleanup goal scenario was created using the GIS mapping program ArcView, and ArcView generated an excavation volume based on the map. These figures depicting the approximate area of excavation for scenarios A, B, C, D, and E are presented as **Figures A, B, C, D**, and **E**, respectively. The depth of excavation was based on the depth required to meet cleanup goals based on existing results. If a sample at depth was vertically unbounded, the excavation was extended approximately 1 foot downward from the last sample.

Determination of mass of soil and contaminants and cost of removal

Using the excavation volume, the following calculation was performed to determine the mass of soil that would be excavated and the mass of contaminant that would be excavated under each scenario:

volume (cy) x 1.5 tons/cy x 2000 lbs/ton x 0.454 kg/lb x Cr concentration (mg/Kg) = Cr mass (mg)

Average concentrations of a contaminant for each scenario were calculated by including all of the samples within the excavation area for the scenario (including perimeter samples).

The relative cost of soil removal was approximated for comparison purposes by assuming that excavation, disposal, and backfilling costs $100/cy for non-hazardous material, and $200/cy for hazardous material. It was assumed that 25% of the soil excavated under the least conservative scenario, Scenario E, would be hazardous, which accounts for 3239 cy of soil. For all other scenarios, costs were calculated by assuming 3239 cy of soil required hazardous disposal and the remainder was non-hazardous.

In order to assess the effectiveness of each excavation scenario, the cost of soil excavation and disposal was related to the percent of contaminant removed, shown in **Figure D-1** and **Figure D-2** for chromium and lead, respectively. The percent of contaminant removed was calculated by comparing the mass of lead and chromium removed under a cleanup scenario compared to the mass of lead and chromium removed under Scenario B. Accordingly, under Scenario B, 100% of the lead and chromium mass above TAGMs was excavated.

Results

In a sensitivity analysis, the most effective scenario for cost vs. mass removed is determined by a change in the slope from principally horizontal to a vertical slope. The results show that the shape of the curve changes at the data point for Scenario A (Cr > 60 ppm, Pb > 167 ppm), which would remove 94% chromium and 72.5% lead (by mass) at a relative cost of $2.8 million. Scenario B results in the removal of 100% of contaminants; however, the cost increases by 100% (from $2.8 million to $5.6 million). Since the remaining chromium from Scenario A to B is mostly due to levels of chromium and lead close to background, the additional cost of $2.6 million is not warranted. The percent mass of chromium and lead removed and their respective relative costs are presented for each cleanup goal scenario in **Table D-1**.

Based on the results of the sensitivity analysis, the Army recommended cleanup goals from Scenario A (Cr > 60 mg/Kg; Pb > 167 mg/Kg), which would remove 25,050 cy of surface soil, ditch soil, and sediment in the lagoon. The NYSDEC and USEPA have concurred with the Army's conclusions of the sensitivity analysis. The excavation area is delineated by the selected cleanup goals, and no excavation will extend beyond the horizontal limits shown for Scenario A (see **Figure A**), and no horizontal cleanup verification will be performed beyond these limits. However, in areas where the final horizontal limit is not well-defined, the Army will conduct additional sampling to determine where Scenario A cleanup goals are met. Cleanup verification testing will be performed to determine the final vertical limits, and the cleanup goals for Scenario A will be used since these goals are used to determine the horizontal limits.

The cost estimate for Alternative 3 presented in **Section 4** of the FS has been revised based on the volume of soil calculated during this sensitivity analysis for the selected cleanup goals. The updated capital cost for off-site disposal is $5,705,700. The cost backup is provided in **Appendix E**. While this cost exceeds the costs calculated in **Section 4** for the pre-disposal scenario (Case 3), this is due to the updated method for calculating the volume of soil to be excavated. For the selected cleanup goal scenario, the depth of excavation varied from 1 ft. to 8 ft., which included a greater volume of soil at depth than the volume for the pre-disposal condition (Case 3). Were the volumes for the pre-disposal condition revised according to the same guidelines outlined in this appendix, virtually the entire site would be excavated to depths greater than 2 ft., which would raise the cost for Case 3, Alternative 3 to greater than $17 million.

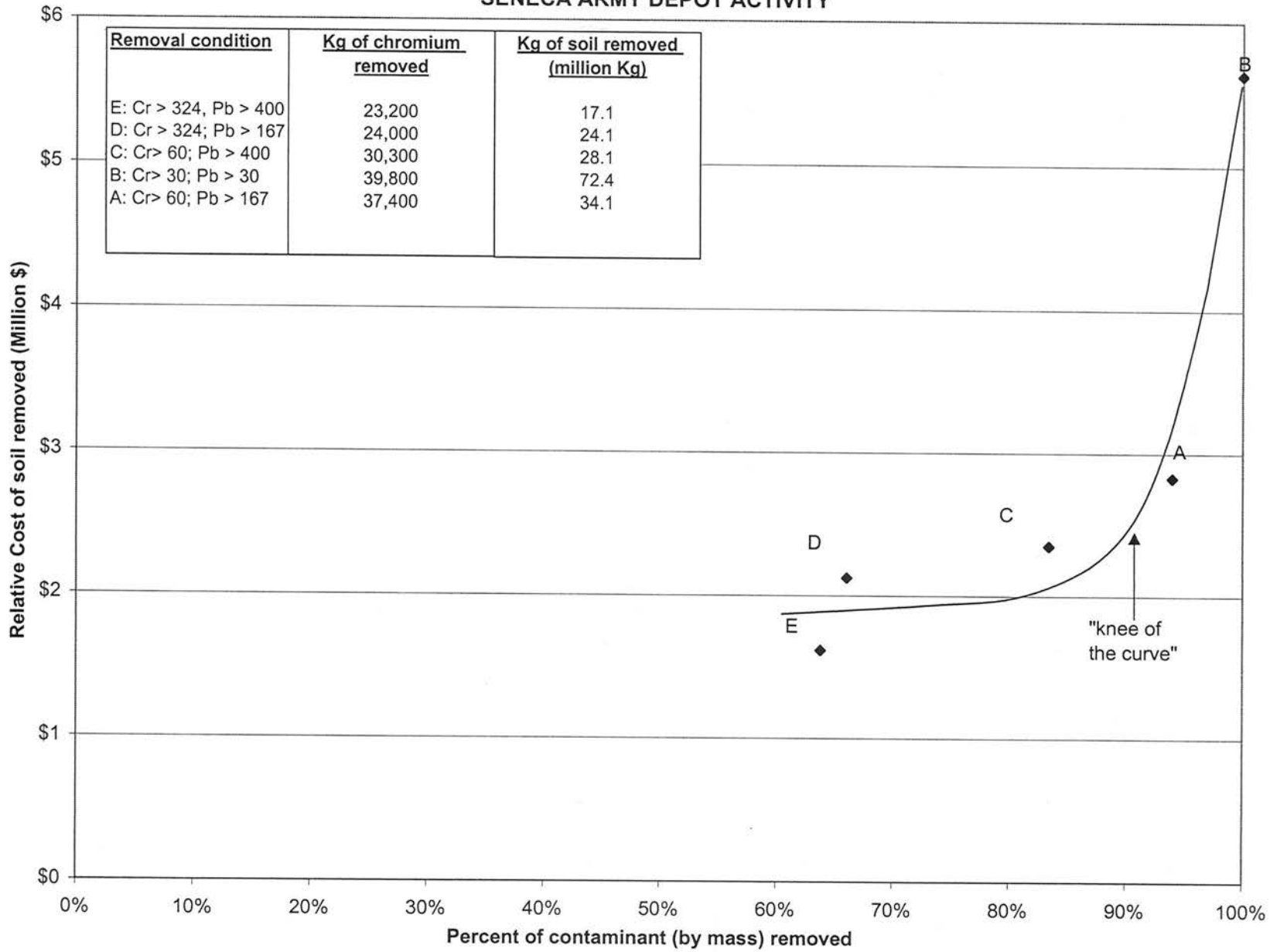
The sensitivity analysis was presented to the public on September 21, 2004, and Parsons issued a modified memorandum on October 15, 2004. NYSDEC's letter of concurrence on the sensitivity analysis approach was received by the Army on January 26, 2005, and is included at the end of this appendix.

Table D-1
Summary of Sensitivity Analysis Results
SEAD-4 Feasibility Study
Seneca Army Depot Activity

	Volume (cy)	Mass of soil (million Kg)	Relative Cost ($mill)	Mass of Cr (Kg)	% Chromium removed	Mass of Pb (Kg)	% Lead removed
Scenario E	12,955	17.1	1.6	23,200	63.8%	3,700	57.7%
Scenario D	18,020	24.5	2.1	24,000	66.0%	4,500	70.3%
Scenario C	20,276	28.1	2.4	30,300	83.4%	4,100	64.3%
Scenario B	53,128	72.4	5.6	39,800	100.0%	6,400	100.0%
Scenario A	25,049	34.1	2.8	37,400	94.0%	5,100	72.5%

Notes:
A: Cr > 60 Pb > 167
B: Cr> 30; Pb > 30
C: Cr> 60; Pb > 400
D: Cr > 324; Pb > 167
E: Cr > 324, Pb > 400

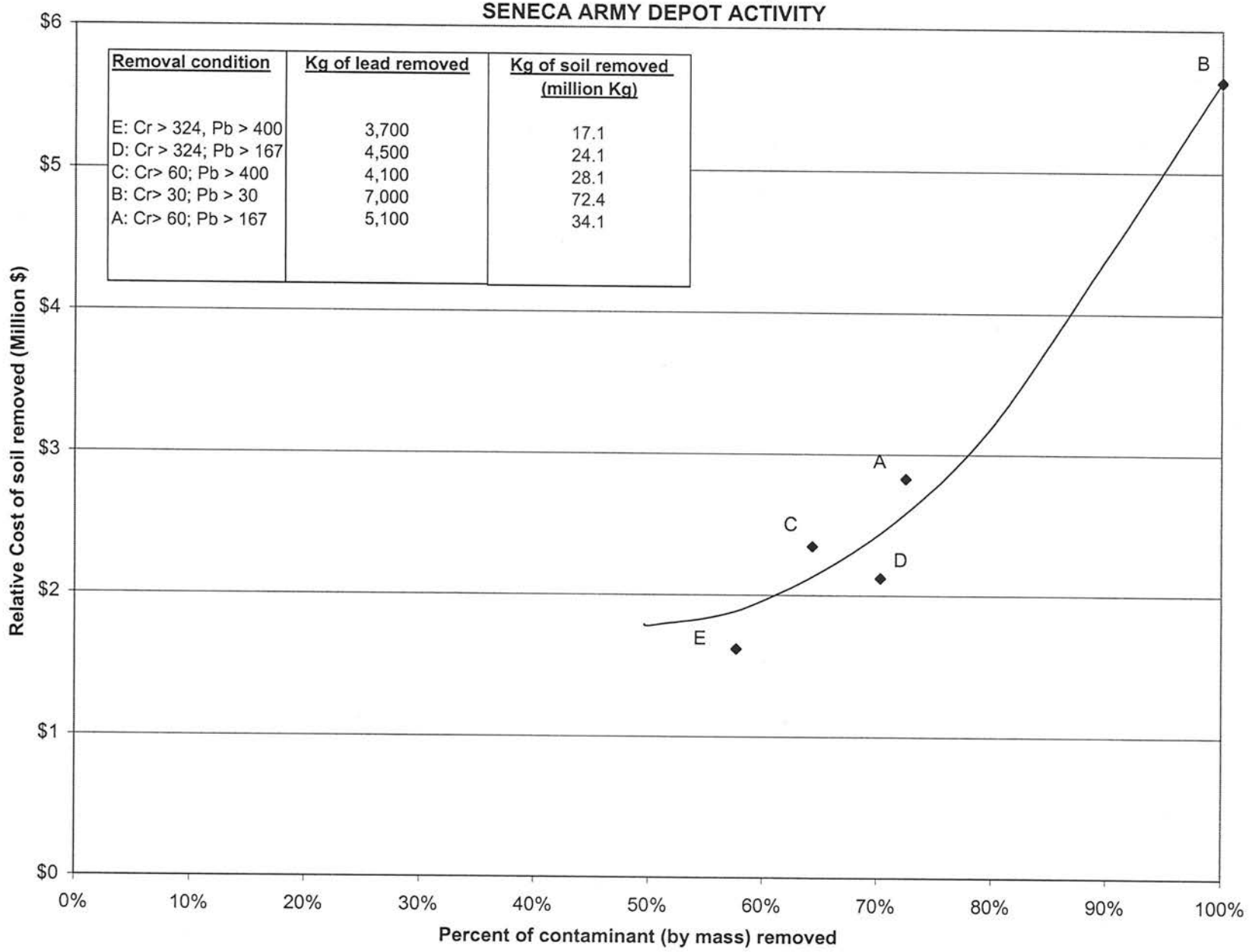
Figure D-1
Relative Cost for Chromium Mass Removal at SEAD-4
SEAD-4 Feasibility Study
SENECA ARMY DEPOT ACTIVITY



Removal condition	Kg of chromium removed	Kg of soil removed (million Kg)
E: Cr > 324, Pb > 400	23,200	17.1
D: Cr > 324; Pb > 167	24,000	24.1
C: Cr> 60; Pb > 400	30,300	28.1
B: Cr> 30; Pb > 30	39,800	72.4
A: Cr> 60; Pb > 167	37,400	34.1

P:\PIT\Projects\SENECA\SEAD4\FS\revised Exc Area_May2004\sensitivity anal Rev 2 Nov04\Knee of Curve Nov04.xls-Fig D-1

Figure D-2
Relative Cost for Lead Mass Removal at SEAD-4
SEAD-4 Feasibility Study
SENECA ARMY DEPOT ACTIVITY



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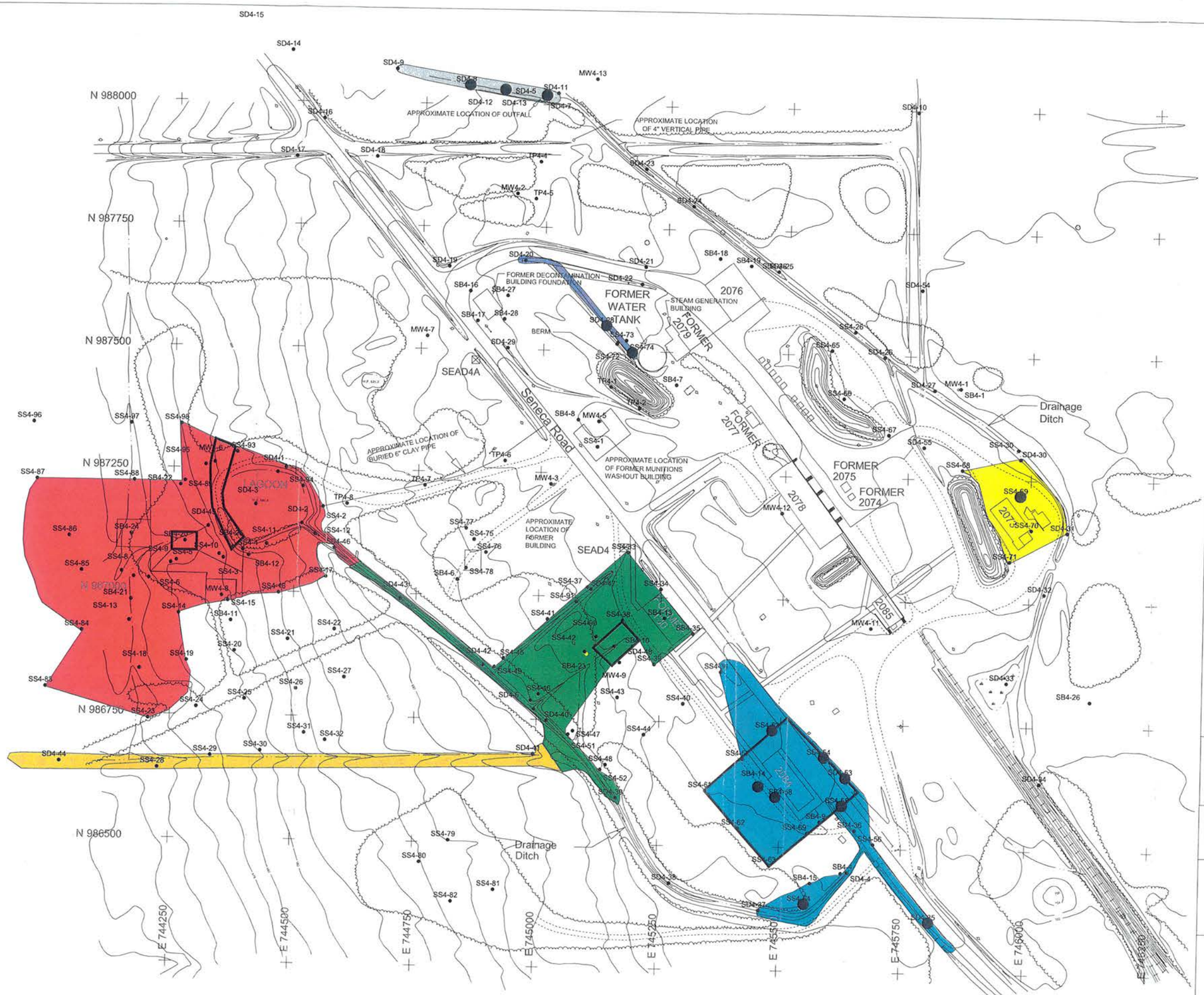

LEGEND

Cr and Pb Concentration (ppm)

- Cr < 60 and Pb < 167
- Cr > 60 or Pb > 167

- Section 1 — 1 ft cut = 4,338 cy
- Section 1B — 10 ft cut = 946 cy
- Section 2 — 1 ft cut = 3,038 cy
- Section 2B — 4 ft cut = 1,265 cy
- Section 2C — 8 ft cut = 809 cy
- Section 3 — 1 ft cut = 2760 cy
- Section 3B — 7 ft cut = 950 cy
- Section 4 — 4 ft cut = 7046 cy
- Section 4B — 1 ft cut = 1288 cy
- Section 5 — 1 ft cut = 1206 cy
- Section 6 — 1 ft cut = 148 cy
- Section 7 — 1 ft cut = 942 cy
- Section 8 — 1 ft cut = 312 cy

Total volume to be removed 25,049 cy

N

100 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure A
Approximate Area of Excavation for Criteria - A
Cr > 60, Pb > 167

1" = 200'	FEBRUARY 2005

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LEGEND

Cr and Pb Concentration (ppm)

- Cr < 30 and Pb < 30
- Cr > 30 or Pb > 30

- Section 1 — 1 ft cut = 3967 cy
- Section 1B — 10 ft cut = 7922 cy
- Section 2 — 1 ft cut = 3067 cy
- Section 2B — 7 ft cut = 468 cy
- Section 2C — 4 ft cut = 384 cy
- Section 2D — 9 ft cut = 8208 cy
- Section 3 — 1 ft cut = 4261 cy
- Section 3B — 7 ft cut = 1218 cy
- Section 4 — 1 ft cut = 5138 cy
- Section 4B — 4 ft cut = 2960 cy
- Section 5 — 1 ft cut = 1206 cy
- Section 6 — 1 ft cut = 5226 cy
- Section 6A — 7 ft cut = 2670 cy
- Section 7 — 1 ft cut = 6340 cy
- Section 8 — 1 ft cut = 93 cy

Total volume to be removed 53,129 cy

N

100 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure B
Approximate Area of Excavation for Criteria - B
Cr > 30, Pb > 30

1" = 200' | FEBRUARY 2005

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LEGEND

Cr and Pb Concentration (ppm)

- Cr < 60 and Pb < 400
- Cr > 60 or Pb > 400

- Section 1 — 1 ft cut = 3793 cy
- Section 2 — 1 ft cut = 3000 cy
- Section 2B — 4 ft cut = 1041 cy
- Section 3 — 1 ft cut = 2760 cy
- Section 3B — 7 ft cut = 950 cy
- Section 4 — 4 ft cut = 7046 cy
- Section 5 — 1 ft cut = 1206 cy
- Section 6 — 1 ft cut = 82 cy
- Section 7 — 1 ft cut = 398 cy

Total volume to be removed 20,276 cy

N

100 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure C
Approximate Area of Excavation for Criteria - C
Cr > 60, Pb > 400

1" = 200' | FEBRUARY 2005

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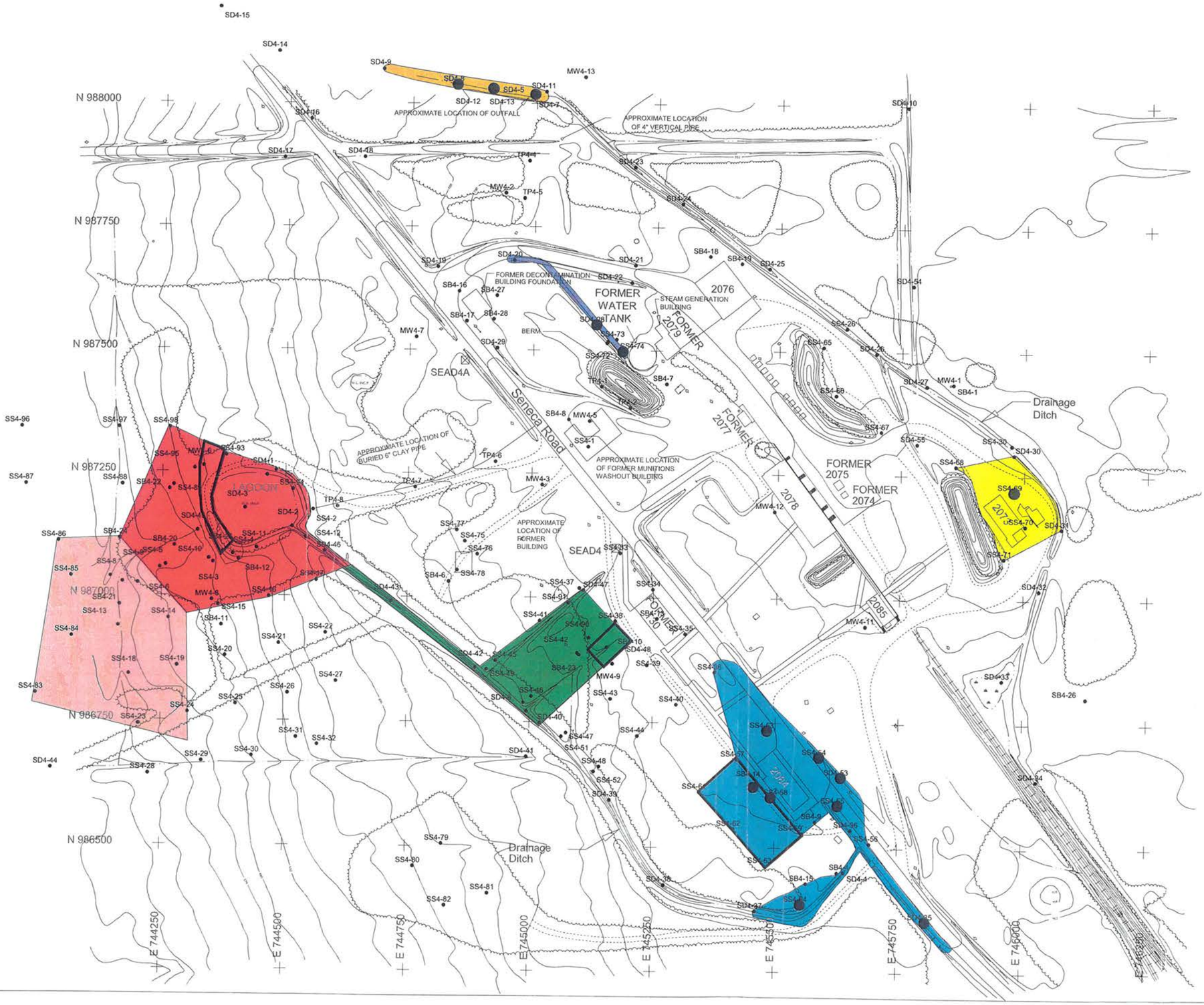

LEGEND

Cr and Pb Concentration (ppm)

- Cr < 324 and Pb < 167
- Cr > 324 or Pb > 167

- Section 1 — 1 ft cut = 3594 cy
- Section 2 — 1 ft cut = 3869 cy
- Section 2B — 4 ft cut = 1041 cy
- Section 3 — 1 ft cut = 1740 cy
- Section 3B — 7 ft cut = 950 cy
- Section 4 — 4 ft cut = 3080 cy
- Section 4B — 1 ft cut = 2344 cy
- Section 5 — 1 ft cut = 312 cy
- Section 6 — 1 ft cut = 148 cy
- Section 7 — 1 ft cut = 942 cy

Total volume to be removed 18,020 cy

N

100 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure D
Approximate Area of Excavation
for Criteria - D
Cr > 324, Pb > 167

1" = 200' | FEBRUARY 2005

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LEGEND

Cr and Pb Concentration (ppm)

- Cr < 324 and Pb < 400
- Cr > 324 or Pb > 400

- Section 1
  1 ft cut = 3594 cy
- Section 2
  1 ft cut = 3869 cy
- Section 2B
  4 ft cut = 1041 cy
- Section 3
  1 ft cut = 1740 cy
- Section 3B
  7 ft cut = 950 cy
- Section 4
  1 ft cut = 1761 cy

Total volume to be removed 12,955 cy

N

100 0 100 200 300 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure E
Approximate Area of Excavation
for Criteria - E
Cr > 324, Pb > 400

1" = 200'	FEBRUARY 2005

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LEGEND

Cr and Pb Concentration (ppm)

- Cr < 324 and Pb < 400
- Cr > 324 or Pb > 400

- Section 1: 1 ft cut = 3594 cy
- Section 2: 1 ft cut = 3869 cy
- Section 2B: 4 ft cut = 1041 cy
- Section 3: 1 ft cut = 1740 cy
- Section 3B: 7 ft cut = 950 cy
- Section 4: 1 ft cut = 1761 cy

Total volume to be removed 12,955 cy

PARSONS

SENECA ARMY DEPOT ACTIVITY

SEAD-4
FEASIBILITY STUDY

Figure E
Approximate Area of Excavation for Criteria - E
Cr > 324, Pb > 400

1" = 200' | FEBRUARY 2005

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New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, 12th Floor
625 Broadway, Albany, New York 12233-7013
Phone: (518) 402-9814 • **FAX:** (518) 402-9020
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

January 26, 2005

Mr. Stephen Absolom
Chief, Engineering and Environmental Division
Seneca Army Depot Activity (SEDA)
5786 State Route 96
Romulus, NY 14541-5001

Re: NYS Inactive Hazardous Waste Disposal Site No. 8-50-006
Sensitivity Analysis SEAD 4

Dear Mr. Absolom:

The "Knee of the Curve" sensitivity analysis for SEAD 4 outlined in Parsons Briefing Presentation of September 21, 2004 and modified by Parsons Memorandum of October 15, 2004 meets the DEC criteria of attaining the practicable cleanup of this site specific area in a cost effective approach to pre release conditions. This concept is approved for inclusion in the Feasibility Study and PRAP for this SEAD.

As part of this concept we have accepted determination of the horizontal extent of contamination by connecting sample points beyond the contaminated area which meet the cleanup criteria of 60 ppm Chromium and 167 ppm Lead. No removal will be necessary beyond this predetermined boundary. The assumed areas use to estimate cost and volume of contamination will be further delineated with sample results prior to the Remedial Action. The vertical attainment of the cleanup criteria will be verified by sampling post excavation and is not to be determined prior to excavation.

If you have questions, please call me at (518)- 402-9812.

Sincerely,

A. Joseph White, P.E.
Environmental Engineer 3

C:\A-Remedial Bureau A\a Site Specific\Region 8\Seneca Army Depot 8-50-006\OU 6- SEAD 4\approval knee of the curve.wpd

ecc: Mr. Steve Absolom, Seneca Army Depot
C. Bethoney, NYSDOH
P. Jones, SCIDA
J. Vasquez, USEPA
R. Battaglia, Seneca Army Depot

APPENDIX D

Responsiveness Summary and Public Comments

PUBLIC COMMENTS AND RESPONSIVENESS SUMMARY

The Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38)

SENECA ARMY DEPOT CERCLA SITE

1.0 INTRODUCTION

A responsiveness summary is required by CERCLA 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 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 reports, the FS report, and the Proposed Plan for SEAD-4 and SEAD-38 were 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, 14541-0009. The public comment period on these documents was held from November 21, 2007 to December 20, 2008. The notice of availability for the above-referenced documents was published in the Finger Lake Times during this time period.

On December 12, 2007, the Army, the USEPA 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 AOCs, 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, USEPA 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. There was one letter received from the public during the public comment period, which is provided on the following page. The Army's response to this letter is also provided.

Mr. Stephen M. Absolom
BRAC Environmental Coordinator
Seneca Army Depot Activity
Building 123, P.O. Box 9
5786 State Route 96
Romulus, New York 14541-0009

December 17, 2007

Dear Mr. Absolom,

This letter serves as comments on the Proposed Plan – Draft Final for the Munitions Washout Facility (SEAD-4) and the Building 2079 Boiler Blowdown Pit (SEAD-38).

Alternative 3 is clearly the desirable alternative and is indicative of the leadership and technical competence that the U.S. Army Corps of Engineers and Parson's Engineering have displayed in regards to their long-standing working relationship in regards to environmental remediation at Seneca Army Depot Activity. It is cost-effective and will ensure that the mobility of contaminants is reduced and help to limit exposure to of contaminants in these Areas of Concern.

I thank you for the ability to comment on the Proposed Plan.

Regards,

Thomas J. Klotzbach
1204 Waterport Road
Waterport, New York 14571

Response:

The U.S. Army Corps of Engineers, Seneca Army Depot, acknowledges receipt of Mr. Klotzbach's letter, dated December 17, 2007. We wish to express our thanks for his comments in appreciation of the efforts undertaken at SEAD-4 and SEAD-38.

APPENDIX E

2007-2008 Building Demolition and Cleaning Analytical Results

Table E-1
Building Debris Waste Characterization Results
SEAD-4/38
Seneca Army Depot Activity

Facility		SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4
Location ID		BLDG-2073-FL	BLDG-2076-FL	BLDG-2076	BLDG-2078-FL	BLDG-2084-FL	BLDG-2085-FL
Maxtrix		DEBRIS	DEBRIS	DCS-SOIL	DEBRIS	DEBRIS	DEBRIS
Sample ID		S4B2073-D50001	S4B2076-D50002	S4B2076-D50006	S4B2078-D50003	S4B2084-D50004	S4B2085-D50005
Sample Depth to Top of Sample		0	0	0	0	0	0
Sample Depth to Bottom of Sample		0	0	0	0	0	0
Sample Date		2/5/2008	2/5/2008	2/19/2008	2/5/2008	2/5/2008	2/5/2008
QC Code		SA	SA	SA	SA	SA	SA
Study ID		BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO
Parameter	Units						
Aroclor-1016	UG/KG	1000 U	2000 U		510 U	36 U	16 U
Aroclor-1221	UG/KG	1000 U	2000 U		510 U	36 U	16 U
Aroclor-1232	UG/KG	1000 U	2000 U		510 U	36 U	16 U
Aroclor-1242	UG/KG	1000 U	2000 U		510 U	36 U	16 U
Aroclor-1248	UG/KG	1000 U	2000 U		510 U	36 U	16 U
Aroclor-1254	UG/KG	6700	2000 U		5300	530	16 U
Aroclor-1260	UG/KG	3600	2000 U		510 U	36 U	16 U
Flashpoint	°F	>176	>176		>176	>176	>176
Reactive Cyanide	MG/KG	10 U	10 U		10 U	10 U	10 U
Reactive Sulfide	MG/KG	10 U	10 U		10 U	10 U	10 U
TCLP Arsenic	MG/L	0.028	0.042		1.5	0.022	0.01 U
TCLP Barium	MG/L	0.29	1.3		0.16	0.23	0.56
TCLP Cadmium	MG/L	0.22	0.096		0.34	0.29	0.0056
TCLP Chromium	MG/L	0.09	0.17		0.023	0.095	0.029
TCLP Lead	MG/L	0.52	4.5	1	5	0.42	0.15
TCLP Mercury	MG/L	0.0002 U	0.0038		0.00045	0.0002 U	0.0002 U
TCLP Selenium	MG/L	0.015 U	0.015 U		0.015 U	0.015 U	0.015 U
TCLP Silver	MG/L	0.003 U	0.003 U		0.003 U	0.003 U	0.003 U

Table E-2
Building Wipe Sample Results
SEAD-4/38
Seneca Army Depot

Facility		SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4
Location ID		BLDG-2073-FL-NE-DRAIN	BLDG-2073-FL-NW-DRAIN	BLDG-2073-FL-SE-DRAIN	BLDG-2073-FL-SW-DRAIN	BLDG-2076-FL-N-TRENCH	BLDG-2076-FL-S-TRENCH	BLDG-2084-FL-S-TRENCH
Maxtrix		WIPE	WIPE	WIPE	WIPE	WIPE	WIPE	WIPE
Sample ID		S4B2073-W50006	S4B2073-W50007	S4B2073-W50008	S4B2073-W50009	S4B2076-W50012	S4B2084-W50010	S4B2076-W50011
Sample Depth to Top of Sample		0	0	0	0	0	0	0
Sample Depth to Bottom of Sample		0	0	0	0	0	0	0
Sample Date		1/8/2008	1/8/2008	1/8/2008	1/8/2008	1/8/2008	1/8/2008	1/8/2008
QC Code		SA	SA	SA	SA	SA	SA	SA
Study ID		BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO	BLDG DEMO
Parameter	Units							
Aroclor-1016	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1221	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1232	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1242	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1248	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Aroclor-1254	UG/WIPE	7.2	2.8	1.1	1.7	1 U	1 U	1 U
Aroclor-1260	UG/WIPE	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total PCBs	UG/WIPE	7.2	2.8	1.1	1.7	1 U	1 U	1 U

APPENDIX F

List of ARARs, TBCs, and Other Guidance

APPENDIX F

LIST OF ARARs

New York has recently published Remedial Program Requirements, which include numeric soil cleanup objectives for five categories of future land use (i.e., Unrestricted, Residential, Restricted-Residential, Commercial, and Industrial), as well as procedures for proposing alternative cleanup objectives, for waste sites located within its bounds. As the requirements allow for the selection of varying levels of cleanup, for the development of alternative soil cleanup objective values, and for the selection of final remedies based on the consideration of alternative protocols or procedures, the requirements are designated as "To Be Considered" that have been considered as guidance values during the development of the proposed remedies presented in this Record of Decision.

Groundwater at the SEDA in general, and at the AOCs in specific is classified by NYSDEC as Class GA. As a result, the groundwater quality standards for a Class GA groundwater are ARARs for the AOCs. No groundwater samples were collected from SEAD-38. Based on the soil data collected within SEAD-38 bounds, the nature of the SEAD-38 operations (boiler blowdown), and the groundwater results from the adjacent wells, it is concluded that SEAD-38 groundwater is not impacted. Although volatile organic compounds (VOCs) and metals including antimony, beryllium, cadmium, chromium, selenium, and thallium were detected in groundwater in SEAD-4 at concentrations that exceeded their respective NYSDEC Class GA AWQS or federal MCL values, none of the exceedances were verified during subsequent round(s) of sampling in the same locations. Iron, manganese, and sodium were also detected at concentrations that exceeded their respective NYSDEC GA standards; however, the iron, manganese, and sodium concentrations observed at SEAD-4 were generally consistent with the SEDA background levels and the SEAD-4 sidegradient levels. Further, the concentrations of these compounds in SEAD-4 groundwater do not pose significant risk to potential receptors.

The intended use of groundwater that is classified as GA in New York is as drinking water. As a potential supply of drinking water, the maximum contaminant levels (MCLs) established under the Safe Drinking Water Act are ARARs for GA groundwater. Exceedance of the MCLs were observed in groundwater samples collected from SEAD-4.

Surface water is found occasionally in the man-made drainage ditches and the man-made lagoon at SEAD-4/38, and in localized puddles that evaporate into the air or infiltrate into the soil. Storm-event water falls on both AOCs and then runs off towards the abutting drainage ditches. The surface water in the ditches and the lagoon has not been classified by NYSDEC since these ditches/lagoon are not recognized as an established stream or creek. However, because the drainage ditches form the headwaters for Indian Creek or Silver Creek, the lower portion of which is designated as Class C surface water by NYSDEC, the Class C surface water ambient water quality criteria were used to provide a basis of comparison for the on-site chemical data. The Class C criteria are not strictly applicable to the surface water in the drainage ditches and the lagoon found at the AOCs and thus are treated as TBCs.

The soil found in the drainage ditches at SEDA results from overland flow and the erosion and subsequent accumulation native soil, debris, and dead vegetation. The man-made drainage ditches located throughout the Depot were subject to a periodic inspection and maintenance (i.e., dredging) program during the active days of the military operation. Drainage ditches found around SEAD-4/38 are generally void of fish and aquatic animal life. As such, ditch soil at the AOCs has been evaluated as "soil" and compared to the New York State soil cleanup objectives presented in Title 6 NYCRR Subpart 375-6. There are currently no chemical specific ARARs for sediment in the State of New York; NYSDEC guidelines for sediment are considered TBCs to evaluate soil collected from the man-made lagoon at SEAD-4.

Chemical Specific ARARs, and other pertinent advisories, criteria, or guidance to be considered (TBC)

Soil

Title 6 New York Code of Rules and Regulations Part 375-6 Remedial Program Soil Cleanup Objectives, Soil Cleanup Objectives, June 14, 2006 was considered during the development of this Record of Decision.

Regional Screening Levels for Chemical Contaminants at Superfund Sites. July, 2008 was considered during the development of this Record of Decision.

Source (http://epa-prgs.ornl.gov/chemicals/download.shtml)

Lagoon Soil

NYSDEC Technical Guidance for Screening Contaminated Sediments was considered during the development of this Record of Decision.

Groundwater

Title 40 Code of Federal Regulations, Part 141 – National Primary Drinking Water Regulations.

Title 6 New York Code of Rules and Regulations Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.

Title 6 New York Code of Rules and Regulations Part 375-6 Remedial Program Soil Cleanup Objectives, Protection of Groundwater, June 14, 2006,

Surface Water

Title 6 New York Code of Rules and Regulations Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations.

Federal Location-Specific ARARs

- 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 and 100-year Floodplains Requirements (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).
- Endangered Species Act of 1973 (16 USC 1531 - 1544).
- Fish and Wildlife Coordination Act of 1934 (16 USC 661).
- Wilderness Act of 1964 (16 USC 1131 - 1136).

New York Location-Specific ARARs

- New York State Freshwater Wetlands Law (New York Environmental Conservation Law (ECL) articles 24 and 71).
- New York State Freshwater Wetlands Permit and Classification Requirements (6 NYCRR 663 and 664).
- New York State Floodplain Management Act, ECL, article 36, and Floodplain Management regulations (6 NYCRR Part 500).
- Endangered and Threatened Species of Fish and Wildlife, Species of Special Concern Requirements (6 NYCRR part 182).
- New York State Inactive Hazardous Waste Disposal Sites—Remedy Selection (6 NYCRR 375.10(b)("goal of the program for a specific site is to restore that site to pre-disposal conditions, to the extent feasible and authorized by law.").
- New York State Flood Hazard Area Construction Standards.

Federal Action-Specific ARARs

- RCRA subtitle C, Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal systems, (*i.e.,* landfill, incinerators, tanks, containers, etc.) (*i.e.,* 40 CFR part 264); RCRA section 3004(o), 42 USC 6924(o) (RCRA statutory minimum technology requirements.)
- RCRA, Closure and Post-removal-Closure Standards (40 CFR 264, subpart G).
- RCRA Groundwater Monitoring and Protection Standards (40 CFR 264.92 and 264.97 – 264.99).
- RCRA Generator Requirements for Manifesting Waste for Off-site Disposal (40 CFR part 262, subpart B).
- RCRA Transporter Requirements for Off-Site Disposal (40 CFR part 263).

- RCRA, Subtitle D, Non-Hazardous Waste Management Standards (40 CFR part 257).
- RCRA Land Disposal Restrictions (40 CFR part 268) (on and off-site disposal of excavated soil).
- CWA--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 part 264, subparts AA, BB, and CC).

New York Action-Specific ARARs

- 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 Hazardous Waste Regulations—identification, generators, transportation, treatment/storage/disposal, land disposal restrictions, and minimum technology requirements (6 NYCRR 370-376)
- New York State Solid Waste Management and Siting Restrictions (6 NYCRR 360-361).
- New York State Hazardous Waste Generator and Transporter Requirements for Manifesting Waste for Off-Site Disposal (6 NYCRR 364 and 372).
- New York State Inactive Hazardous Waste Disposal Sites—Remedy Selection (6 NYCRR 375.10(b)("At a minimum, the remedy selected shall eliminate or mitigate all significant threats to the public health and to the environment presented by hazardous waste disposed at the site through the proper application of scientific and engineering principles.").
- New York State Inactive Hazardous Waste Disposal Sites – Interim Remedial Measures (IRMs) (6 NYCRR 375-1.3(n) and 375.1.11).