U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

00431

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DRAFT FINAL Rev1

OPEN BURNING (OB) GROUNDS RECORD OF DECISION (ROD)

SENECA ARMY DEPOT ACTIVITY (SEDA)

JUNE 1998

DRAFT-FINAL RECORD OF DECISION (ROD) (Rev.1)
FORMER OPEN BURNING (OB) GROUNDS SITE
SENECA ARMY DEPOT ACTIVITY (SEDA)
ROMULUS, NY

Prepared For:
United States Army Corps of Engineers

Prepared By:
Parsons Engineering Science, Inc.
30 Dan Road
Canton, MA 02021-2809
June 1998
CONTRACT NO. DACA87-92-D-0022

Delivery Order 0010

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable, or Relevant and Appropriate Requirement
BCT	Base Clean-up Team
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Responsibility, Compensation and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CY	cubic yards
DDESE	Department of Defense Explosives Safety Board
DNT	Dinitrotoluene
DQO	Data Quality Objective
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
ES	Engineering Science, Inc. (also Parsons Engineering Science, Inc.)
FFA	Federal Facilities Agreement
FS	Feasibility Study
GA	NYSDEC groundwater classification suitable as a source for drinking water
HEAST	USEPA Health Effects Summary Table
HI	Hazard Index
HQ	Hazard Quotient
HWR	Hazardous Waste Regulations
IAG	Interagency Agreement
IRIS	Integrated Risk Information System
L	Liter
LDR	Land Disposal Restriction
LEL	Lowest Effects Level
LOT	Limit of Tolerance
LRA	Land Redevelopment Authority
LTTD	Low Temperature Thermal Desorption
MAIN	Charles T. Main, Inc. (now known as Engineering Science, Inc.)
MC	Migration Control
MDL	Minimum Detection Limit

ACRONYMS AND ABBREVIATIONS
(Cont.)

SCG	Standard, Criteria and Guideline
SEAD	Former acronym for the Seneca Army depot used to designate SWMU numbers
SEDA	Seneca Army Depot Activity
SVOC	Semi-Volatile Organic Compound
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TBC	To be Considered
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TNT	Trinitrotoluene
TRC	Technical Review Committee
TSD	Treatment, Storage and Disposal Facility
UBK	Uptake Biokinetic Model (for lead)
UCL	Upper Confidence Limit
ug/l	micrograms per liter
USACE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance

1.0 DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Open Burning (OB) Grounds
Seneca Army Depot Activity
Romulus, New York

STATEMENT OF PURPOSE AND BASIS

This decision document presents the U.S. Army's selected remedial action for soils at the Superfund site known as the former Open Burning (OB) Grounds located within the Seneca Army Depot Activity (SEDA). It was developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, 42 USC 9601 *et seq.* and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, to the extent practicable. The SEDA Base Realignment Closure Environmental Coordinator, the Chief of Staff at Army Material Command, the Director of the Office of Site Remediation and Restoration, and the U.S. Environmental Protection Agency (EPA) Region II have been delegated the authority to approve this Record of Decision. The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have been consulted on the planned remedial action in accordance with CERCLA 121(f), 42 U.S.C. 9621 (f), and concurs with the selected remedy.

An administrative record for the site, established pursuant to the NCP, 40 CFR 300.800, contains the documents that form the basis for the Army's selection of the remedial action. This decision 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 116, Romulus, New York, 14541-5001. The Administrative Record Index identifies each of the items considered during the selection of the remedial action. This index is included in **Appendix A**.

ASSESSMENT OF THE SITE

The goal of the selected remedy for the OB Grounds site, summarized in this Record of Decision, is to ensure that potential human health and ecological risks from hazardous substances in soils and groundwater are within acceptable criteria established by the EPA and NYSDEC for current and anticipated future site uses.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy outlined in this ROD addresses potential exposures to elevated levels of metals, such as lead, in the on-site soils and sediment in Reeder Creek. The on-site soils and sediments will be excavated and disposed of in an off-site Subtitle D landfill. This remedy for soils lowers the risks posed to human health and the environment. The remedy includes a monitoring program for groundwater and creek sediments, and will ensure that the 9-inch soil/vegetative cover is maintained.

STATE CONCURRENCE

NYSDEC has concurred with the selected remedy. **Appendix B** of this Record of Decision contains a copy of the Declaration of Concurrence.

DECLARATION

The selected remedy is consistent with CERCLA and to the extent practicable the NCP, is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective. The remedy uses a permanent solution for soil contamination. This remedy will not result in hazardous substances, above cleanup goals, remaining at SEDA. Because these alternatives would result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the lead agency review the remedial action no less than every five years after its initiation. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

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 and the New York State Department of Health.

Concur and recommend for immediate implementation:

_____ _____

Stephen M. Absolom Date
BRAC Environmental Coordinator

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

Concur and recommend for immediate implementation:

_____ _____

Michael O'Toole, Jr., Director Date
Division of Environmental Remediation,

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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 and the New York State Department of Health.

Concur and recommend for immediate implementation:

_____ _____

Jeanne M. Fox Date
Regional Administrator
U.S. Environmental Protection Agency, Region II

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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 and the New York State Department of Health.

Concur and recommend for immediate implementation:

_____ _____

John P. Cahill Date
Commissioner
New York State Department of Environmental Conservation

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2.0 SITE NAME, LOCATION, AND DESCRIPTION

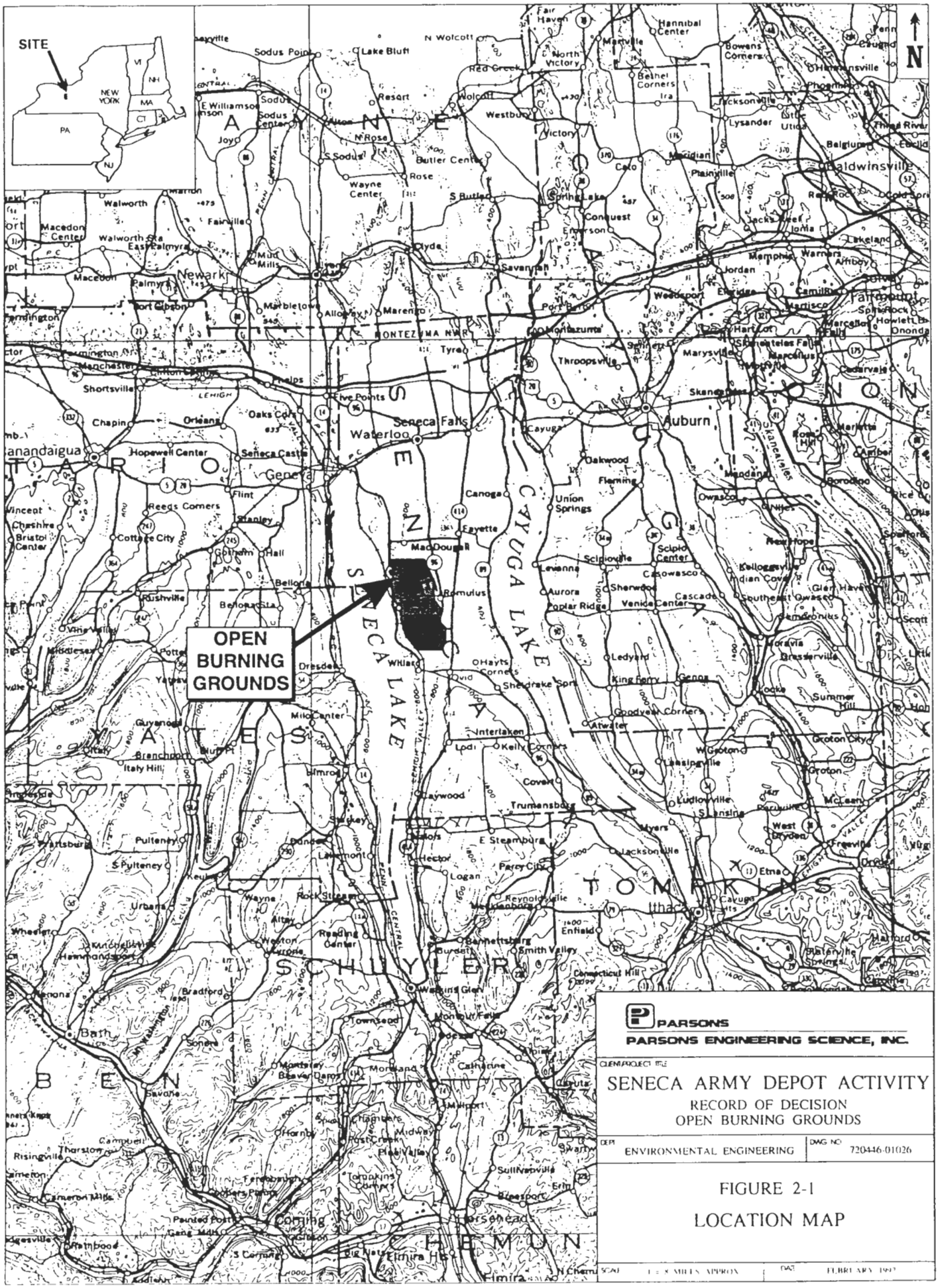
Open Burning (OB) Grounds, Seneca Army Depot Activity (SEDA), Romulus, New York

The OB Grounds site occupies approximately 30 acres within the 10,587 acres of land that comprise SEDA in Romulus, New York. The depot is located between Seneca and Cayuga Finger Lakes as shown in **Figure 2-1**. SEDA is located on an uplands area, at an elevation of approximately 600 feet Mean Sea Level (MSL). This upland area forms an elongated divide separating these two Finger Lakes. New York State Highways 96 and 96A bound SEDA on the east and west, respectively. Sparsely populated farmland covers most of the surrounding area. The OB Grounds site is located on gently sloping terrain in the northwest corner of SEDA as shown in **Figure 2-2**. The OB Grounds is bounded on the east by Reeder Creek, which is a perennial creek that is generally less than 1 foot deep and eventually flows into Seneca Lake. The quality of surface water in Reeder Creek has been designated by the State of New York as a Class C waterbody. Seneca Lake is located approximately 10,000 feet west of the site and is used as a source of drinking water for SEDA and surrounding communities. The site is sparsely vegetated with grasses and brush and there are no permanent structures within the area other than small concrete bunkers. A site plan of the OB Grounds is provided as **Figure 2-3**.

The stratigraphy on the OB grounds site generally consists of between 2 and 10 feet of glacially derived till below which is a zone of weathered bedrock. The bedrock at this site is shale, which grades into competent shale at depth as shown in **Figure 2-4**. The location of the geological cross-section, depicted in **Figure 2-4**, is identified on **Figure 2-3**. The thickness of the weathered shale zone below the till ranges from approximately 1 foot to as much as 15 feet across the site but is generally only a few feet thick. Below this depth is competent shale which is expected to extend for hundreds of feet. The borings performed at the site did not extend past the upper several feet of weathered shale. The depth to groundwater in the till/weathered shale aquifer varies seasonally between approximately 2 and 7 feet below the ground surface. Infiltration of precipitation is the sole source of groundwater for the overburden aquifer and the direction of groundwater flow in the till/weathered shale aquifer is generally to the east toward Reeder Creek as shown in **Figure 2-5**. A possible groundwater divide has been noted during various monitoring episoides. The location of the divide, near Pad J, is highlighted on **Figure 2-5** and represents a high point of the upgradient groundwater flow regime. The divide divertes a portion of the groundwater to the west, away from Reeder Creek to the east. The flow regime of groundwater flowing to the west is not completely known, however, a series of monitoring wells, MW-21, MW-5, MW-36 and MW-37, are situated such that the quality of groundwater

downgradient of the groundwater divide can be monitored. The sampling results from these wells do not suggest that the quality of groundwater has been impacted and therefore the significance of the divide is minimal.

The site groundwater is classified as GA by the State of New York, which means that it is designated as suitable source for potable water. Surface water run-off is to the east-northeast via a series of drainage ditches and culverts into Reeder Creek. The ditches and culverts were created during the construction of the burn pads and access roads. The construction of the pads also resulted in the formation of areas where surface water collects. These areas drain slowly due to the clay content in the soil and have resulted in the formation of low lying wet areas. A total of 38 wet areas have been identified in and around the OB Grounds. A more comprehensive description of the site and the associated groundwater resource is presented in the Remedial Investigation (RI) Report (Parsons ES,1994).



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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT ENVIRONMENTAL ENGINEERING | DWG NO 720446-01026

FIGURE 2-1

LOCATION MAP

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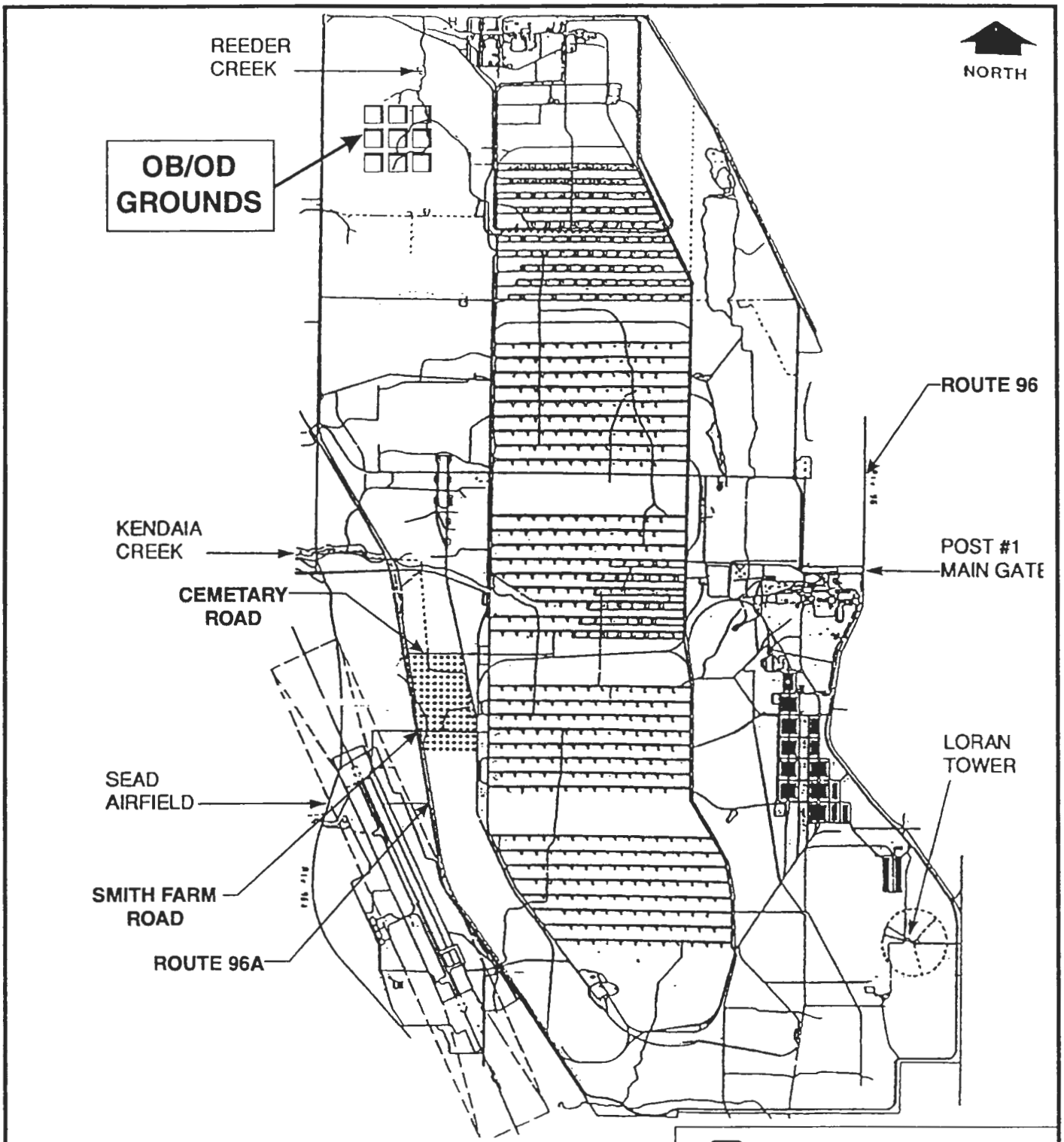

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SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT	DWG NO
ENVIRONMENTAL ENGINEERING	720446-01026

FIGURE 2-2

SENECA ARMY DEPOT MAP

SCALE	DATE
NA	FEBRUARY 1997

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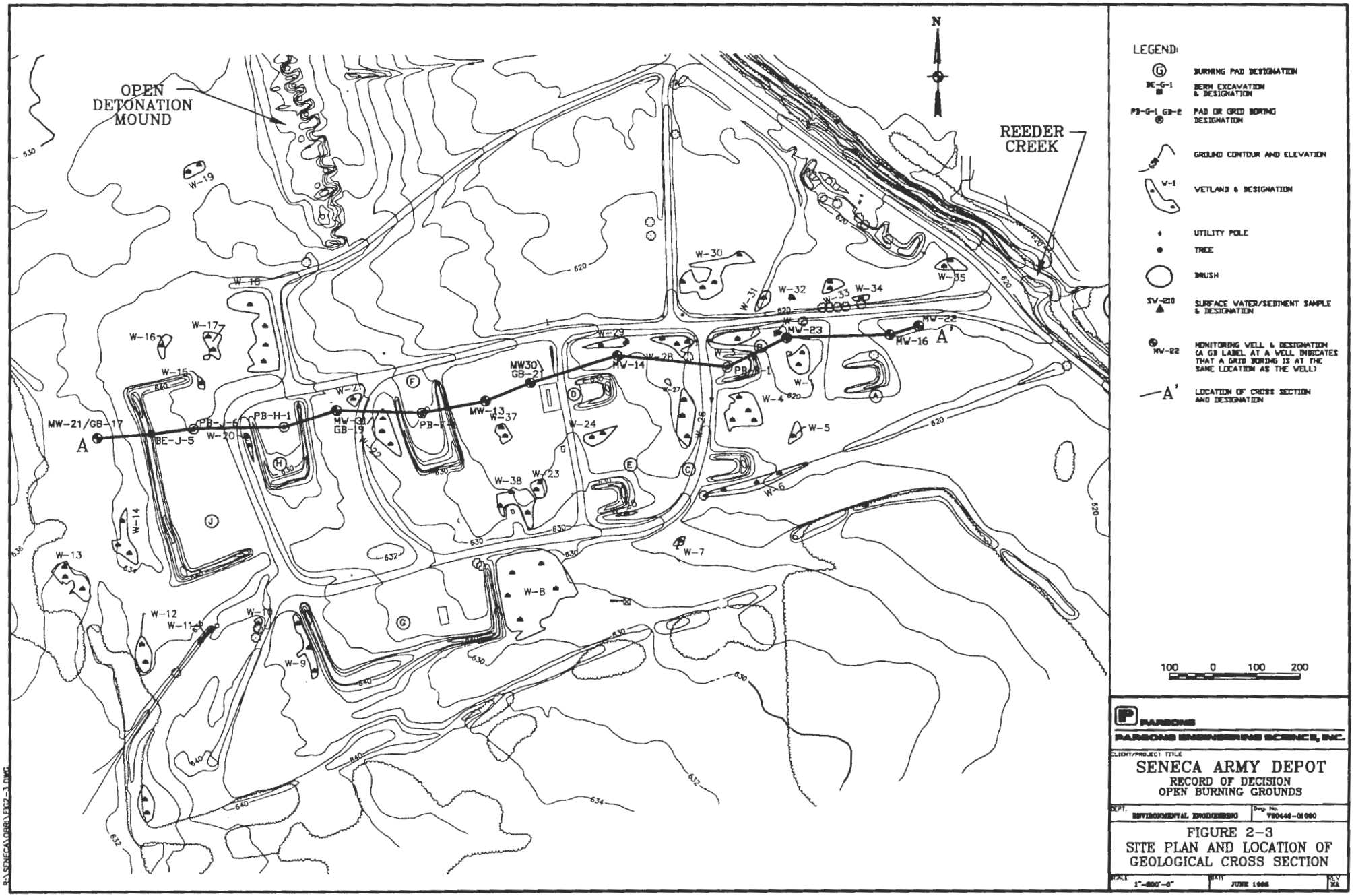


PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
RECORD OF DECISION
OPEN BURNING GROUNDS

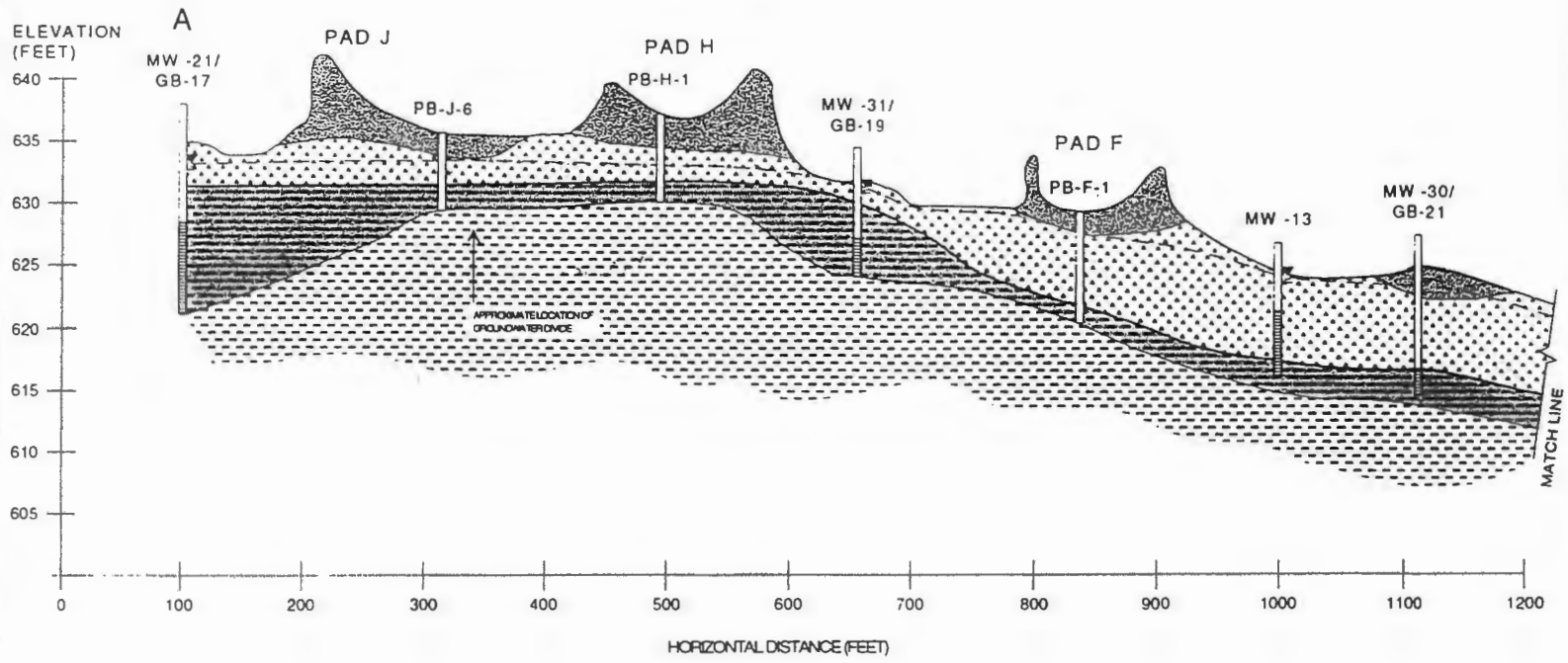
DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 730448-01080

FIGURE 2-3
SITE PLAN AND LOCATION OF GEOLOGICAL CROSS SECTION

SCALE 1"=800'-0" | DATE JUNE 1996 | REV NA

R:\SENECA\OBR\FY2-3.DWG

CROSS SECTION A - A'



LEGEND

- FILL
- TILL
- WEATHERED SHALE
- COMPETENT SHALE
- GROUNDWATER TABLE

NOTES:

1. Lithologic units are based on descriptions supplied by Engineering-Science, Inc. Interpretations are based on extrapolations between widely spaced boreholes, actual conditions may vary.
2. Groundwater table based on depth to water measurements made in January 1992.

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SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
OPEN BURNING GROUNDS

DR ENVIRONMENTAL ENGINEERING | CHG NO 720446-01026

FIGURE 2-4

GEOLOGIC CROSS-SECTION A-A'

SCALE NOR 1"=100' VER 1" = 10' | DATE FEBRUARY 1997


N
APPROXIMATE GROUNDWATER DIVIDE
LEGEND:
BURNING PAD DESIGNATION
PAD OR GRID BORING
GROUND CONTOUR AND ELEVATION
W-1
WETLAND & DESIGNATION
616.82
MONITORING WELL & DESIGNATION AND MSL ELEVATION DATUM
UTILITY POLE
TREE
BRUSH
744
GROUNDWATER ELEVATION CONTOUR MSL DATUM
GENERAL GROUNDWATER FLOW DIRECTION
125' 0 125' 250'
1" = 250'
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OPEN BURNING GROUNDS
ENVIRONMENTAL ENGINEERING
720448-01028
FIGURE 2-5 GROUNDWATER ELEVATIONS, TILL/WEATHERED SHALE AQUIFER APRIL 1993
1" = 250'
FEBRUARY 1997
A

3.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

3.1 Land Use and Response History

SEDA was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since that time. Prior to construction of the Depot, much of the land, including that occupied by the OB Grounds site, was used for farming. The land at the OB Grounds has been used for demilitarization of munitions for approximately forty years. The open burning procedure involved the preparation of combustible beds of pallets and wooden boxes on the pads followed by the placement of ammunition or the components to be demilitarized on the beds. A trail of propellant was placed on the ground leading to the combustible bed. Once ignited the energetic material was allowed to burn until only ash and casing residues remained. Items burned included various military munitions such as propellants and projectiles.

The burning of munitions has been performed at designated burning pads, which range in size from approximately 100 by 100 feet to 300 by 800 feet. There are a total of nine (9) such pads at the OB Grounds. The burning pads at the site are built on top of the natural glacial till soils. Originally, demilitarization of munitions was performed via open burning on the ground surface. Difficulties in sustaining the burning process were noted due to the poor drainage characteristics of the soil. Subsequently, individual burn pads were built up with crushed shale and soils to provide a drier environment in which to perform the burning. Each burn pad has from 1/2 to 2 feet of crushed shale at the surface. Below this material are the pre-existing agricultural soils overlying the glacial till. Berms surround each of the burning pads on three sides

Designated munition waste was open-burned on the nine separate burning pads until 1987. After 1987, munitions were destroyed by burning them within an aboveground steel tray to minimize the impact of the burning on the environment.

An elongated, low hill is located in the southern portion of the open burning area. The exact origin of the hill is unknown but was suspected to have been formed during the clearing activities, early in the history of the OB Grounds.

The open burning of waste munitions was identified as a Resource Conservation and Recovery Act (RCRA) regulated process. Due to the nature of the SEDA mission, it was necessary for the facility to treat, store and dispose of hazardous wastes including waste munitions. Consequently,

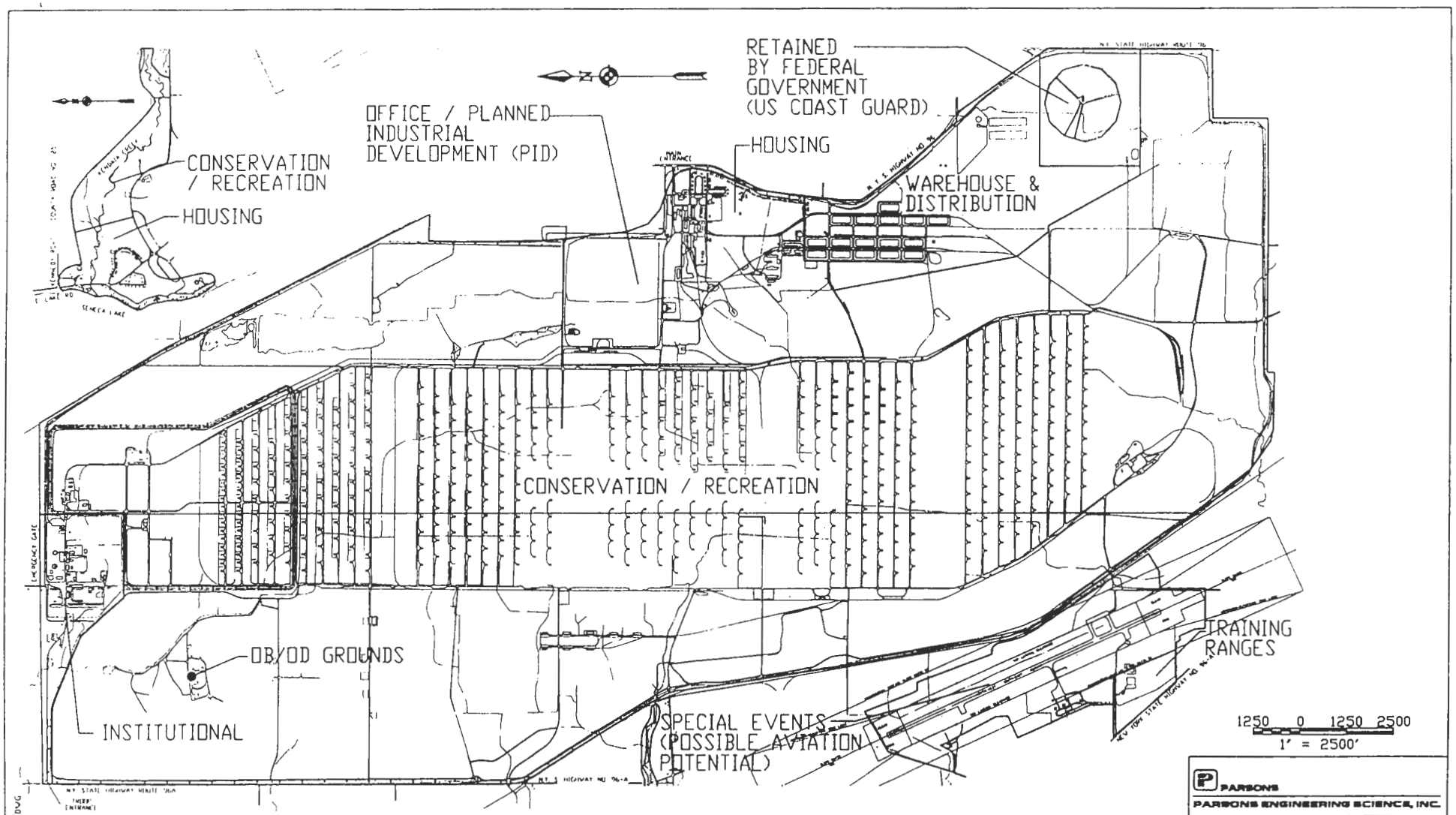
a RCRA permit was a regulatory requirement in order for SEDA to perform these operations as a Treatment, Storage, and Disposal (TSD) facility.

SEDA applied for a RCRA Part A and Part B permit on May 1, 1987 and has been operating as a TSD facility under the interim status provisions of RCRA. Interim status allows a facility to operate as a TSD facility during the RCRA Part B permit application process.

Final closure of the OB Grounds under RCRA guidelines was deferred when SEDA was proposed for the National Priority List (NPL) in July 1989. In August 1990, SEDA was finalized and listed in Group 14 on the Federal Section of the National Priority List (NPL). Following finalization on the NPL, it was agreed that any corrective actions that would be required for any targeted problem sites would become regulated under CERCLA guidelines. The EPA, NYSDEC and the Army entered into an agreement, called the Federal Facility Agreement (FFA), also known as the Interagency Agreement (IAG). The FFA was developed, in concert with the EPA Region II and NYSDEC, to integrate the Army's RCRA corrective action obligations with CERCLA response obligations in order to facilitate overall coordination of investigations mandated at SEDA. Therefore, any required future investigations was to be based on CERCLA guidelines. RCRA was considered to be an Applicable or Relevant and Appropriate Requirement (ARAR) pursuant to Section 121 of CERCLA. This agreement became effective in January, 1993.

In early 1995, under the Base Realignment and Closure (BRAC) process, the Department of Defense recommended closure of SEDA. This recommendation was approved by Congress on September 28, 1995 and the Depot is scheduled to be closed by July 2001.

In accordance with the requirements of the BRAC process, the Seneca County Board of Supervisors established, in October 1995, the Seneca Army Depot Local Redevelopment Authority (LRA). The LRA is a voluntary committee comprised of select community leaders that represent the interests of the local community in determining the future reuse of the Seneca Army Depot Activity. The LRA community membership includes persons with a broad range of backgrounds including local businesspersons, native americans, community-at-large representatives and local and county government representatives. The primary responsibility assigned to the LRA is the preparation of a plan for the redevelopment of the Depot. The Reuse Plan and Implementation Strategy for Seneca Army Depot was adopted by the LRA and approved by the Seneca County Board of Supervisors on October 22, 1996. Under this plan and subsequent amendment, the OB Grounds site is located within an area that has been designated as Conservation/Recreation as shown in **Figure 3-1**.



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SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT: ENVIRONMENTAL ENGINEERING | Dwg No: 720446-01088

FIGURE 3-1
FINAL LAND USE PLAN

SCALE: 1" = 2500' | DATE: FEBRUARY 1997 | REV: A

ACAD\SENECA\OBRI\OBRLAND.DWG

3.2 Enforcement History

The following list summarizes the significant dates relative to environmental studies and remediation at the OB grounds site, and closure of SEDA under BRAC:

1. A Munitions Destruct Study, Seneca Army Depot, APAP Study No. D 1031-W, was conducted in November 1979.

2. An Installation Assessment of Seneca Army Depot, Report No. 157, AMXTH-IR-A-157, was conducted by the U.S. Army Toxic and Hazardous Materials Agency, (USATHAMA) in January 1980.

3. A Phase 2, Hazardous Waste Management Special Study: No. 39-26-0147-83, was conducted by the US Army Material Development and Readiness Command (DARCOM) in 1993. The purpose of this effort was to obtain environmental quality information on the effects of these operations and to offer recommendations for the proper operation and management of these facilities. This study concentrated on attempting to determine total explosive and EP toxicity extracts of the metal content in soils and residues.

4. Burning Pads B and H Closure, was investigated by O'Brien & Gere Engineers, Inc. in 1985. Previous studies were reviewed and procedures were recommended for the environmentally sound closure of Burning Pads B and H following RCRA guidelines.

5. A Phase 4 Evaluation of the Opening Burning/Open Detonation Grounds, Soil Contamination, was conducted by the US Army Environmental Hygiene Agency, (USAEHA) in 1984. USAEHA conducted an additional investigation of the soils at Burn Pads B, F, and H.

6. The Closure of Open-Burning/Open Detonation Ground Burning Pads Seneca Army Depot, Hazardous Waste Study No. 37-26-0778-86, was conducted by USAEHA in January 1986.

7. An Interim Final Report, Groundwater Contamination Survey No. 38-26-0888-88, Evaluation of Solid Waste Management Units was prepared by USAEHA in 1987. This

report presents an evaluation of the Open Burning/Open Detonation grounds and includes analytical data from monitoring wells from 1982 to 1987.

8. An Evaluation of Solid Waste Management Units, Seneca Army Depot, Interim Final Report, Groundwater Contamination Survey No. 38-26-0868-88, was conducted by USAEHA in 1988.

9. An Update of the Initial Installation Assessment of Seneca Army Depot was prepared for SEDA and USATHAMA by Environmental Science and Engineering, Inc. in August 1988.

10. A Criteria Development Report for Closure of Nine Burning Pads, was prepared by Metcalf & Eddy Engineers in 1989.

11. An Archeological Overview and Management Plan for Seneca Army Depot was prepared by Envirospace Company in 1986 for the National Park Service, U.S. Department of the Interior.

12. A RCRA Part A and B Permit Application for Seneca Army Depot was prepared by Seneca Army Depot in 1987.

13. A RCRA Part A and B Permit Application for Seneca Army Depot, Subpart X, was prepared by EBASCO, Inc. August 1990.

14. SEDA was proposed for inclusion on the National Priorities List (NPL) under Superfund; the site was added to the NPL in August 1990.

15. Specific Comments, RCRA Part B Permit Application, Seneca Army Depot, EPA ID No. NY0213820830. EPA Region II Comments, were prepared on May 15, 1991.

16. Part 373, Notice of Incomplete Application for Seneca Army Depot, DEC #8-4530-00006100001-0., was prepared on March 29, 1991.

17. A Federal Facilities Agreement (FFA) under CERCLA Section 120 between the U.S. Environmental Protection Agency Region II, the U.S. Department of the Army, and the NYS Department of Environmental Conservation became effective in January 1993.

18. A Remedial Investigation Report, OB Grounds, Seneca Army Depot, Romulus, New York, was prepared by Parsons ES, Inc. in September 1994.

19. A Feasibility Study, OB Grounds, Seneca Army Depot, Romulus, New York, was prepared by Parsons ES, Inc. in June ,1996.

20. SEDA was selected for closure under the 1995 Base Realignment and Closure (BRAC) process.

21. A Draft Final Environmental Baseline Survey Report was prepared for the SEDA under BRAC in October 1996.

22. A Reuse Plan and Implementation Strategy for the Seneca Army Depot, was prepared by RKG Associates Inc. in association with Bergmann Associates, in December 1996.

4.0 COMMUNITY PARTICIPATION

Throughout the Remedial Investigation/Feasibility Study (RI/FS) process, community concern and participation has been high. The SEDA Public Affairs Office has been active in responding to requests for information, concerns, and questions from the community. The status of CERCLA activities at SEDA were summarized in Technical Review Committee (TRC) meetings open to the community that occurred every three months between 1991 and 1995, prior to the beginning of the BRAC closure process.

The Seneca Army Depot LRA was established in October 1995 to address employment and economic impacts associated with the closure of the Depot. To support the LRA in matters pertaining to environmental issues at the Depot, a committee was formed, designated the Restoration Advisory Board (RAB). The RAB included representatives from the Army, EPA, the State of New York Department of Environmental Conservation (NYSDEC), the State of New York Department of Health (NYSDOH) and members of the community, many of whom were members of the TRC. Since the objectives of the Base Clean-up Team (BCT) and the RAB were similar to the TRC, the TRC was discontinued when the RAB was formed. The goal of the RAB is to represent community interests, interface with the Army and report the progress of environmental clean-up to the LRA in support of the future planned development at SEDA. The RAB provides the opportunity to facilitate the exchange of information between the Depot and the community. To encourage this exchange, monthly meetings and presentations have been made to the RAB regarding the overall CERCLA progress that has been made at several sites within the Depot, including the OB Grounds. Presentations have also been made on other applicable topics such as remedial technologies, risk assessment and the site classification process. The Base Clean-up Team (BCT) was formed to develop and implement strategies for resolution of site clean-up activities. The BCT is comprised of Army and regulatory representatives that have been meeting on a regular monthly basis since the inception in 1995.

The RI report, the FS report and the Proposed Remedial Action Plan (PRAP) for the site have been released to the public for comment. These documents were made available to the public in the administrative record file at the information repositories at Building 116 within the Seneca Army Depot Activity in order to solicit public input and gauge community acceptance of the proposed plan. The notice of availability for the above-referenced documents was published in the Finger Lake Times and the Seneca Citizen on November 23, 1997, November 30, 1997 and December 14, 1997. The public comment period on these documents was held from December 1, 1997 to January 10, 1998. On December 17, 1997, the Army, the EPA and the NYSDEC conducted a public meeting at the Seneca County Board of Supervisors Room, located at the

Seneca County Office Building in Waterloo, NY to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see **Appendix C**).

5.0 SCOPE AND ROLE OF RESPONSE ACTION

Based upon an evaluation of the various alternatives, the U.S. Army, EPA, and NYSDEC have selected a remedy for the OB Grounds. The selected remedy involves the off-site disposal of soils and includes the following:

- Excavation and off-site disposal of approximately 17,900 CY of site soils with lead concentrations above 500 mg/kg and sediments from Reeder Creek with concentrations of copper and lead above the NYSDEC Sediment Criteria of the 16 mg/kg and 31 mg/kg, respectively. The soils and sediment will be disposed of at an off-site, Subtitle D permitted, landfill.
- Solidification of approximately 3,800 CY of soils will be performed on soils that are known or are expected to exceed the RCRA toxicity limits due to metals.
- Construction of a cover in the areas of the OB Grounds with soils remaining on the site with lead concentrations above 60 mg/kg. The cover will consist of 9 inches of clean fill, which will be vegetated with indigenous grasses and properly sloped to control erosion and to prevent direct contact and incidental soil ingestion by terrestrial wildlife. The area to be covered is approximately 27.5 acres. This area includes area of all the pads and an area near Reeder Creek. This area was incorrectly identified as 43.8 acres in the Proposed Remedial Action Plan (PRAP).
- Control of surface water runoff, as necessary, to prevent erosion of the vegetative cover and solids loading to the creek. This will be accomplished with vegetation, regrading of site topography and drainage swales.
- Post remediation monitoring of the on-site groundwater and sediment in Reeder Creek for metals will be conducted to ensure that the remedial action is effective in preventing future impacts to groundwater and Reeder Creek. Monitoring of the 9-inch soil/vegetative cover will be performed to ensure that the cover is maintained. Should a significant exceedance be noted, the exceedance will be confirmed through additional sampling and, if confirmed, appropriate corrective measures will be implemented to eliminate the threat posed by the exceedance.

The selected remedy is discussed in greater detail in Section 11.0.

The selected remedial action was chosen as the most cost effective means to ensure that the already low human health risks from potential exposures to constituents in soil and sediment are maintained for both present and future site use conditions. The remedial action will decrease future exposure of wildlife from direct ingestion of and/or direct contact to contaminated soil and

sediment via removal to an off-site landfill. The action will also include the construction of a nine (9) inch vegetative cover over any remaining on-site soil as an additional protective measure from exposure. The selected remedy is the easiest to implement and is effective in eliminating long-term threats with permanent remedial actions. Although this remedy ranks low for short term protectiveness of human health due to increased dust and heavy equipment traffic, these negative components can be controlled through the use of dust suppressants and the construction of temporary haul roads located away from congested areas.

The selected remedy also includes provisions for the protection of the environment. The vegetative cover will prevent direct ingestion of soil by wildlife, such as foraging birds, and will prevent soil from eroding into Reeder Creek. Aquatic receptors will be protected by the removal of sediments from Reeder Creek.

The groundwater conditions at the site does not require a remedial action. To ensure the future quality of groundwater, the remedial plan will include a continuation of the existing groundwater monitoring program. The proposed future use of the OB Grounds, is as a conservation/recreation area. The preferred alternative will ensure that groundwater concentrations remain at or below the current levels. Should such conditions change, additional remedial actions to address the groundwater will be considered.

The Army, the EPA, and the NYSDEC believe that the preferred alternative will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions and treatment technologies to the maximum extent practicable. The remedy also will meet the statutory preference for the use of treatment as a principal element through the use of stabilization of wastes.

6.0 SUMMARY OF SITE CHARACTERISTICS

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

The primary media investigated at the OB grounds included soil, surface water and sediment (from Reeder Creek, on-site areas and drainage swales), and groundwater. On-site soil and sediment in Reeder Creek were found to be the media were considered to be impacted. Lead was found at a maximum concentration of 56,700 mg/Kg in soil.

Criteria, guidelines and standards was used as an initial evaluation of site conditions and was useful in determining if impacts to various media have occurred. Where applicable, these criteria, guidelines and standards have been included for comparison. However, individual media sample exceedances of a criteria, guideline or standard did not constitute the need for a remedial action. This decision has been based upon the baseline risk assessment.

Chemicals of concern were obtained following a process described in Chapter 6, the risk assessment, of the RI. This process involves eliminating all compounds that were not detected in any sample for that media. For soil and groundwater, statistical comparisons to either background, in the case of soils and upgradient conditions, in the case of groundwater, were made to further refine the list of chemicals. Frequency of detection and contribution to risk as a percentage of product of the maximum detected value and the chemical toxicity were also used to refine the list of chemicals of concern. Each media was screened in a similar manner so as to focus the risk assessment on those chemicals that have the greatest risk potential.

The primary chemicals of concern included metals, polynuclear aromatic hydrocarbons (PAHs), explosive compounds and phthalates. These components are believed to have been released to the environment during former open burning activities. Summaries of the Remedial Investigation data are presented, by media, in each of the following sections. These summaries identify the chemicals that were detected, the number of analyses performed, the number of times each chemical was detected, the frequency that each chemical was detected, the maximum concentration of each chemical, the Standard, Criteria or Guideline (SCG) used for comparison and the number of times each chemical was detected above the SCG.

6.1 Impacts to Soils

Guidelines for soil cleanup are presented in the NYSDEC Technical Administrative Guidance Memorandum (TAGM) HWR-94-4046. This guidance was used to compare site soil concentrations in order to provide an initial indication of site conditions. Details of this comparison are presented in Chapter 4 of the RI. Concentrations above these guidance values imply that conditions at the site that may pose a threat to human health and the environment. **Table 6-1** presents a summary of all the soil data collected during the RI. These data include: grid borings, pad borings, berm excavations, geophysical anaomolies excavations and low hill excavations. The analytes that exceeded these guidance values are the PAH compounds benzo(a)anthracene, benzo(a)pyrene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, and dibenz(a,h)anthracene. The metals barium, cadmium, chromium, copper, lead, mercury, thallium and zinc also exceeded these guidance values. The following analytes also exceeded the NYSDEC TAGM guidance values : 3-nitroaniline, dieldrin, 4-DDT.

Following a comparison to TAGM guidance values, described in Chapter 4 of the RI, a risk assessment was conducted in accordance with the requirements of CERCLA. During the risk assessment process, compounds detected at the site were screened to determine their significance in contributing to the overall site risk. The compounds that remain are considered to be the chemicals of concern that are used in assessing the risk for the site. The results of this analysis is described in Section 7 of the ROD.

The distribution of metals and semivolatiles are generally highest in the surface of the burn pads and the berms when compared to the concentrations in the areas around the burn pads. Generally, only the upper two feet of the burn pads are affected with constituents while the berms are believed to be affected throughout. The most significantly affected area off the pads is between Pad B and Pad C.

6.2 Impacts to Groundwater

Two rounds of groundwater sampling were performed. The first round of groundwater sampling, performed in January, 1992, involved both non-filtered and filtered samples. The concentration of metals, in the filtered samples, were all below detectable limits. However, for the non-filtered samples or Phase 1, the concentration of lead was above the New York State, groundwater quality GA standard in 15 of the 28 monitoring wells sampled. Other metals were also measured above the GA groundwater quality standard in the non-filtered samples of Phase 1. This suggests that the dissolved concentration of lead is below the GA standard and the concentration

TABLE 6-1

SUMMARY OF REMEDIAL INVESTIGATION DATA
SOIL DATA at the OPEN BURNING GROUNDS
(All Soils Data : Pads, Berms, Grid Borings, Low Hill Excavations)

COMPOUND	NUMBER OF ANALYSES	NUMBER OF DETECTIONS	FREQUENCY OF DETECTION	MAXIMUM DETECTED	TAGM (a)	NUMBER ABOVE TAGM
Volatile Organics (ug/Kg)						
Methylene Chloride	280	7	2.5%	21	100	0
Acetone	280	3	1.1%	230	200	1
1,2-Dichloroethene (total)	280	1	0.4%	1	300	0
Chloroform	280	19	6.8%	13	300	0
2-Butanone	280	4	1.4%	22	300	0
1,1,1-Trichloroethane	280	1	0.4%	2	800	0
Carbon Tetrachloride	280	2	0.7%	4	600	0
Trichloroethene	280	8	2.9%	100	700	0
Benzene	280	4	1.4%	3	60	0
Tetrachloroethene	280	25	8.9%	110	1,400	0
Toluene	280	24	8.6%	5	1,500	0
Chlorobenzene	280	1	0.4%	4	1,700	0
Xylene (total)	280	3	1.1%	11	1,200	0
Semivolatile Compds. (ug/Kg)						
Phenol	263	2	0.8%	360	30	2
2-Methylphenol	263	2	0.8%	760	100	2
4-Methylphenol	263	2	0.8%	1,300	900	0
2,4-Dimethylphenol	263	2	0.8%	630	50,000	0
Benzoic acid	124	2	1.6%	98	2,700	0
Naphthalene	263	19	7.2%	570	13,000	0
2-Methylnaphthalene	263	33	12.5%	4,700	36,400	0
2-Chloronaphthalene	263	2	0.8%	130	50,000	0
2-Nitroaniline	263	1	0.4%	20	430	0
Acenaphthylene	263	3	1.1%	540	41,000	0
2,6-Dinitrotoluene	263	32	12.2%	2,000	1,000	0
3-Nitroaniline	263	1	0.4%	350	500	0
Acenaphthene	263	8	3.0%	480	50,000	0
Dibenzofuran	264	4	1.5%	140	6,200	0
2,4-Dinitrotoluene	264	62	23.5%	33,000	50,000	0
Diethylphthalate	264	17	6.4%	250	7,100	0
Fluorene	264	7	2.7%	710	50,000	0
N-Nitrosodiphenylamine	264	40	15.2%	7,000	50,000	0
Hexachlorobenzene	264	5	1.9%	90	410	0
Pentachlorophenol	264	2	0.8%	140	1,000	0
Phenanthrene	264	45	17.0%	2,600	50,000	0
Anthracene	264	9	3.4%	700	50,000	0
Carbazole	140	5	3.6%	1,200	50,000	0
Di-n-butylphthalate	264	86	32.6%	5,800	8,100	0
Fluoranthene	264	32	12.1%	4,400	50,000	0
Pyrene	264	35	13.3%	5,600	50,000	0
Butylbenzylphthalate	264	4	1.5%	140	50,000	0
Benzo(a)anthracene	264	15	5.7%	3,900	220	5
Chrysene	264	19	7.2%	8,900	400	1
bis(2-Ethylhexyl)phthalate	264	94	35.6%	16,000	50,000	0
Di-n-octylphthalate	264	4	1.5%	410	50,000	0
Benzo(b)fluoranthene	264	19	7.2%	11,000	1,100	0
benzo(k)fluoranthene	264	15	5.7%	4,500	1,100	0
Benzo(a)pyrene	264	16	6.1%	3,700	61	12
Indeno(1,2,3-cd)pyrene	264	10	3.8%	2,300	3,200	0
Dibenz(a,h)anthracene	264	4	1.5%	670	14	4
Benzo(g,h,i)perylene	264	13	4.9%	960	50,000	0

TABLE 6-1

SUMMARY OF REMEDIAL INVESTIGATION DATA
SOIL DATA at the OPEN BURNING GROUNDS
(All Soils Data : Pads, Berms, Grid Borings, Low Hill Excavations)

COMPOUND	NUMBER OF ANALYSES	NUMBER OF DETECTIONS	FREQUENCY OF DETECTION	MAXIMUM DETECTED	TAGM (a)	NUMBER ABOVE TAGM
Pesticides (ug/Kg)						
beta-BHC	258	1	0.4%	2	200	0
delta-BHC	258	4	1.6%	15	300	0
gamma-BHC (Lindane)	258	1	0.4%	10	60	0
Heptachlor	258	1	0.4%	32	100	0
Aldrin	258	9	3.5%	4	41	0
Heptachlor epoxide	258	1	0.4%	1	20	0
Endosulfan I	258	6	2.3%	4	900	0
Dieldrin	258	1	0.4%	6	44	0
4,4'-DDE	258	41	15.9%	830	2,100	0
Endrin	258	5	1.9%	41	100	0
Endosulfan II	258	6	2.3%	480	900	0
4,4'-DDD	258	10	3.9%	4	2,900	0
Endosulfan sulfate	258	5	1.9%	11	1,000	0
4,4'-DDT	258	31	12.0%	2,800	2,100	0
Endrin aldehyde	138	1	0.7%	5		NA
alpha-Chlordane	258	7	2.7%	270	540	0
Aroclor-1254	258	1	0.4%	430	1,000	0
Aroclor-1260	258	2	0.8%	240	1,000	0
Explosives (ug/Kg)						
HMX	251	6	2.4%	1,300	-	NA
RDX	251	27	10.8%	4,800	-	NA
1,3,5-Trinitrobenzene	251	45	17.9%	7,800	-	NA
1,3-Dinitrobenzene	251	9	3.6%	440	-	NA
Tetryl	251	8	3.2%	1,000	-	NA
2,4,6-Trinitrotoluene	251	31	12.4%	80,000	-	NA
4-amino-2,6-Dinitrotoluene	251	43	17.1%	8,900	-	NA
2-amino-4,6-Dinitrotoluene	251	47	18.7%	11,000	-	NA
2,6-Dinitrotoluene	251	1	0.4%	67	1,000	0
2,4-Dinitrotoluene	251	90	35.9%	5,100	-	NA
Metals (mg/Kg)						
Aluminum	249	249	100.0%	38,900	17,503	91
Antimony	249	47	18.9%	143	5.2	45
Arsenic	249	235	94.4%	26	7.5	24
Barium	249	228	91.6%	34,400	300	85
Beryllium	249	148	59.4%	2	1.0	5
Cadmium	249	168	67.5%	28	1.8	130
Calcium	248	248	100.0%	195,000	46,825	27
Chromium	249	233	93.6%	1,430	26.6	105
Cobalt	249	249	100.0%	33	30.0	2
Copper	249	238	95.6%	38,100	25.0	203
Iron	249	249	100.0%	95,800	32,698	71
Lead	249	237	95.2%	56,700	30.0	178
Magnesium	249	249	100.0%	24,100	9,071	39
Manganese	249	249	100.0%	1,650	1,066	12
Mercury	249	164	65.9%	1	0.10	68
Nickel	249	249	100.0%	76	41.3	96
Potassium	249	249	100.0%	3,570	1,530	136
Selenium	249	142	57.0%	3	2.0	5
Silver	249	56	22.5%	43	0.60	36
Sodium	249	191	76.7%	1,900	76.4	125
Thallium	249	30	12.0%	38	0.30	30
Vanadium	249	245	98.4%	42	150	0
Zinc	249	249	100.0%	127,000	89.1	183
Cyanide	248	5	2.0%	3	-	NA

NOTES: a) New York State Department of Environmental Concervation (NYSDEC); Technical and Admistrative Guidance Memorandum (TAGM) HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels".

of metals in groundwater is influenced by the turbidity of the sample. Concerns regarding the validity of filtered samples as representative of "true" groundwater conditions required the development of low-flow, non-filtering, sampling techniques. For purposes of the risk assessment and comparisons to groundwater standards, only the Phase 2 data were used. However, in some instances, such as the presence of explosives in groundwater, the Phase 1 data influenced the selection of chemicals that were used to evaluate risk. Where the compound was not detected in the Phase 2 sampling results, but was detected in the Phase 1 data, the compound was retained for evaluation in the risk assessment. The concentration used to evaluate risk was then set at one-half the detection limit for the Phase 2 data.

A second round of groundwater sampling was conducted using low-flow sampling techniques. Low-flow sampling techniques allow for the collection of a groundwater sample, without filtering, that would be considered a representation of the "true", natural, turbidity levels in groundwater. These techniques were implemented during the second round of sampling, performed in March, 1993. As a result of using low-flow techniques, the number of exceedances were decreased from the non-filtered data, collected during Phase 1. The sampling results of the Phase 2 sampling round is presented in **Table 6-2.** The number of analyses shown in **Table 6-2** are less than the total number of wells at the OB Grounds because upgradient wells have been removed from the analysis. A number of wells were also determined to be dry and incapable of yielding a sample.

Lead concentrations exceeded the New York Ambient Water Quality Criteria Standards (NYSAWQCS) for the Class GA groundwater standard of 25 ug/L and the Federal Action Level for drinking water of 15 ug/L in 2 of the 36 monitoring wells sampled during Phase 2. The Federal Action Level for drinking water has been adopted by the State of New York as the New York State Drinking Water Quality Standards (NYSDWQS). Additional monitoring wells were added after the first round of sampling to eliminate data gaps, bringing the total number of wells to 36 instead of the original 28. The wells that exceeded the NYSDEC GA standard for lead in groundwater are MW-19 and MW-14. The concentrations of lead in these two wells were found to be 36 ug/L and 86 ug/L. The Army believes that elevated turbidity of these two groundwater samples contributed to the elevated concentrations.

Groundwater monitoring has been on-going at this site, since 1990 for compliance with RCRA. Since the development of the low-flow sampling techniques in 1993, these techniques have also been utilized as part of the RCRA groundwater monitoring program. The low-flow technique and subsequent improvements have been successful in consistently obtaining low-turbidity samples without filtering. One of the two wells that exceeded the GA standard from the second

Table 6-2

SUMMARY OF REMEDIAL INVESTIAGATION DATA
GROUNDWATER DATA at the OPEN BURNING GROUNDS
(INCLUDES ONLY THE PHASE 2 SAMPLING ROUND)

	NUMBER OF ANALYSES (a)	NUMBER OF DETECTIONS	FREQUENCY OF DETECTION	MAXIMUM DETECTED	NYS AWQCS (a)	NYSDWQS (b)	NUMBER OF SAMPLES ABOVE NYSAWQCS	NUMBER OF SAMPLES ABOVE NYSDWQS
VOCs (ug/L)								
Acetone	27	1	3.7%	15	-	5	NA	1
Semivolatiles (ug/L)								
Diethylphthalate	27	1	3.7%	1.0	50	50	0	0
Di-n-butylphthalate	27	2	7.4%	2.0	50	50	0	0
Di-n-octylphthalate	27	1	3.7%	0.9	50	50	0	0
Explosives (ug/L)								
RDX	27	0	0.0%	0.00	5	-	0	NA
2,4,6-Trinitrotoluene	27	0	0.0%	0.00	500	-	0	NA
2,6-Dinitrotoluene	27	0	0.0%	0.00	5	-	0	NA
Metals (ug/L)								
Aluminum	27	26	96.3%	40,200	-	50	NA	26
Antimony	27	0	0.0%	0.0	3	6	0	0
Arsenic	27	1	3.7%	8.0	50	50	0	0
Barium	27	27	100.0%	348	1000	2000	0	0
Beryllium	27	4	14.8%	2.4	3	4	0	0
Cadmium	27	0	0.0%	0.0	10	5	0	0
Calcium	27	27	100.0%	295,000	-	-	NA	NA
Chromium	27	10	37.0%	59	50	100	1	0
Cobalt	27	2	7.4%	28	5	-	2	NA
Copper	27	8	29.6%	70	200	1300	0	0
Iron	27	23	85.2%	58,000	300	300	21	21
Lead	27	15	55.6%	86	25	15	2	2
Magnesium	27	27	100.0%	80,300	35000	-	8	NA
Manganese	27	27	100.0%	949	300	300	1	1
Mercury	27	1	3.7%	0.2	2	2	0	0
Nickel	27	15	55.6%	98	-	100	NA	0
Potassium	27	24	88.9%	11,000	-	-	NA	NA
Selenium	27	6	22.2%	2	10	10	0	0
Silver	27	0	0.0%	0.0	50	50	0	0
Sodium	27	27	100.0%	80,100	20000	-	9	NA
Vanadium	27	14	51.9%	58	-	-	NA	NA
Zinc	27	6	22.2%	627	300	5000	1	0
Cyanide	27	2	7.4%	33	100	200	0	0

NOTES:

a) The Number of Analyses includes only Phase 2 data, excluding upgradient and duplicate samples.
b) NY State Ambient Water Quality Criteria Standards (NYSAWQCS) for Class GA Groundwater Quality (GA is for use as a source of potable water).
c) NY State Drinking Water Regulations and 10NYCRR Part 5, Subpart 5-1, 1992.
d) NA = not applicable

round of RI sampling, MW-14, happens to be a well that is also part of the quarterly RCRA monitoring program. The concentration of lead in MW-14 was measured at 86 ug/L during the second round of sampling for the RI. Review of the past 2 years of quarterly RCRA monitoring indicates that the concentration of lead in this same well has been non-detect at less than 1.7 ug/L. This data suggests that the reduction in the concentration of lead in the well MW-14 is due to reductions of the turbidity levels in the sample caused by the use of improved sampling techniques.

Iron and manganese were also detected in groundwater above the GA standard. Aluminum and magnesium were detected above NYS guidance values. Iron, manganese, and aluminum were also evaluated according to secondary federal standards intended to establish reasonable goals for aesthetic quality for drinking water such as odor, taste, and color.

Concentrations of the explosives RDX, Trinitrotoluene (TNT), and Dinitrotoluene (DNT) were also detected in 4 of the 28 monitoring wells sampled during the Phase 1 sampling effort but were all at concentrations below the NYAWQCS, groundwater GA criteria. There are no federal or state drinking water standards for RDX, TNT and DNT. None of these compounds were detected in the Phase II data. There is no New York State criteria specifically for RDX in groundwater, however, this compound is considered to be a Principal Organic Contaminant (POC) which has a criteria of 5 ug/L. The NYAWQCS, GA standard for the compound TNT is 5 ug/L. The NYAWQCS, GA standard for DNT is also 5 ug/L. Since none of these compounds were detected above these criteria in the monitoring well network, during either Phase 1 or Phase 2, a groundwater remedial action is not warranted.

Following a comparison of groundwater data to the NYSDEC GA standards, the risk assessment was performed that involved a selection of chemicals of concern. The initial list of potential chemicals of concern included a list of both organic compounds and inorganic chemicals, i.e. metals. This list was refined to eliminate compounds that were never detected at the site. The list of metals in groundwater were also refined following a comparison to upgradient groundwater conditions and eliminating metals that are essential human nutrients.

6.3 Impacts to Surface Water

Surface water data was collected from both on-site surface water and from Reeder Creek. Reeder Creek flows adjacent to the boundaries of the OB Grounds and surface water from the OB Grounds drains to Reeder Creek. The on-site surface water bodies are small pools that are present following a rainfall event(s) but dry up during the year. Reeder Creek is a year round

flowing stream, although the streamflow fluctuates during the year. The highest flow was generally observed during the late winter and early spring seasons whereas the lowest was generally during the late summer and early fall seasons.

Since this media is surface water, the New York State Ambient Water Quality Concentration Standard (NYSAWQCS)s were considered as an appropriate screening criteria. Surface water samples were collected at on-site locations and in Reeder Creek. A summary of the RI data for surface water at all locations is presented as **Table 6-3.** The number of analyses, the number of detections and the frequency of detection includes all data from both Reeder Creek and the on-site surface water bodies. The summary table compares all data to the Class D standard because at the time the RI was conducted the NYSDEC had classified the reach of Reeder Creek adjacent to the OB Grounds as Class D. The NYSDEC has recently reclassified all of Reeder Creek as a Class C waterbody. The surface water concentrations of aluminum and iron in Reeder Creek exceeded the NYSAWQCS for a Class C waterbody. Comparisons are also provided in **Table 6-3** between the samples collected for Reeder Creek and the on-site surface water bodies with the Class D NYSAWQCS. Only iron exceeded the Class D standard in Reeder Creek. The maximum concentration of aluminum in Reeder Creek was 300 ug/L which is above the NYSDEC Class C standard of 100 ug/L. There is no aluminum standard for a Class D waterbody. Vanadium was detected at a maximum concentration of 39 ug/L in Reeder Creek, which is above the NYSAWQS of 14 ug/L for a Class C waterbody but is not above the Class D criteria of 190 ug/L.

The surface water pools at the OB Grounds have not been classified by the NYSDEC and comparisons to the NYSAWQCS do not apply to the surface water that accumulates at the OB Grounds. For the risk assessment, the on-site surface water data was separated from the surface water data collected from Reeder Creek. This is because of the exposure routes that were considered in the risk assessment. For example, off-site residences could swim and wade in Reeder Creek but could not perform the same activities on-site. Due to the shallow nature of the on-site surface water pool, swimming would be a physical impossibility, requiring the data to be separated.

The selected remedial action will improve the quality of the on-site surface water by preventing interactions with any remaining on-site soils, thereby minimizing the potential for exposure. Erosion will also be controlled during construction activities and as part of a permanent design.

TABLE 6-3

SUMMARY OF REMEDIAL INVESTIGATION DATA
SURFACE WATER at the OPEN BURNING GROUNDS
(All Surface Water Locations; Including Reeder Creek and On-Site Areas)

	NUMBER OF ANALYSES	NUMBER OF DETECTIONS	FREQUENCY OF DETECTION	MAXIMUM DETECTED	NYS AWQCS (a)	NUMBER OF REEDER CRK. SAMPLES ABOVE NYS AWQCS	NUMBER OF ON-SITE SAMPLES ABOVE NYS AWQCS
VOCs (ug/L)							
Methylene Chloride	30	1	3.3%	8	-	NA	NA
Acetone	30	2	6.7%	35	-	NA	NA
Carbon Disulfide	30	1	3.3%	3	-	NA	NA
1,2-Dichloroethane	30	1	3.3%	2	-	NA	NA
Trichloroethene	30	1	3.3%	17	11	0	1
Semivolatiles (ug/L)							
bis(2-Ethylhexyl)phthalate	31	1	3.2%	71	-	NA	NA
Explosives (ug/L)							
RDX	32	6	18.8%	9	-	NA	NA
Tetryl	32	1	3.1%	1	-	NA	NA
Metals (ug/L)							
Aluminum	30	10	33.3%	5,220	NA	NA	NA
Arsenic	30	3	10.0%	4	360	0	0
Barium	30	26	86.7%	523	NA	NA	NA
Beryllium	30	3	10.0%	1	NA	NA	NA
Calcium	30	30	100.0%	183,000	NA	NA	NA
Chromium	30	1	3.3%	9	3,076	0	0
Copper	30	10	33.3%	60	34	0	1
Iron	30	22	73.3%	8,550	300	3	11
Lead	30	17	56.7%	74	200	0	0
Magnesium	30	30	100.0%	59,900	NA	NA	NA
Manganese	30	26	86.7%	1,080	NA	NA	NA
Mercury	30	3	10.0%	0	0	0	0
Nickel	30	1	3.3%	6	3,135	0	0
Potassium	30	17	56.7%	6,050	NA	NA	NA
Selenium	30	15	50.0%	3	NA	NA	NA
Sodium	30	28	93.3%	59,100	NA	NA	NA
Vanadium	30	6	20.0%	39	190	0	0
Zinc	30	1	3.3%	13	573	0	0
Cyanide	30	2	6.7%	15	22	0	0

NOTES:

a) New York State Ambient Water Quality Criteria Standards for Surface Waters and Groundwaters,. 6 NYCRR Parts 700-705, September 1991, NYSDEC Division of Water; Class D Water Quality Standard Reeder Creek was classified as Class D at the time the RI was prepared.
Selected metals values are based on a hardness of 201.
b) NA = not applicable

6.4 Impacts to Sediment

The NYSDEC Sediment Criteria are guidelines that were used to compare sediment data collected from Reeder Creek and on-site sediment found in the intermittent surface water pools. Since background for sediment at Reeder Creek was not determined comparisons to background could not be performed and the NYSDEC Sediment Guidelines were used. Concentrations of chemicals above the NYSDEC Sediment Guidelines were used to determine if impacts to sediment were likely to have occurred. The list of chemicals of concern were then refined during the data evaluation portion of the risk assessment. The RI data for sediment from locations in both the on-site surface water bodies and Reeder Creek are presented in **Table 6-4.** Comparisons are also provided between all the data and the 1989 NYSDEC Sediment Criteria, which was used during the RI. In 1993, the NYSDEC updated the Sediment Criteria which resulted in slightly difference values being used for clean-up than the Sediment Criteria values considered in the RI. The sediment data from Reeder Creek and the on-site areas were separated into two datasets for evaluation during the risk assessment process to determine the impacts to on-site sediment and sediment in Reeder Creek.

During the ecological survey at the OB Grounds, on-site sediment was determined to be more characteristic of terrestrial soil than sediment found in aquatic conditions. This is likely a result of the continual cycle of collection and storage of surface water in the on-site pools followed by the loss of the surface water through evaporation. As a result, the on-site sediment was evaluated as sediment but was also added to the on-site surficial soil database and evaluated as part of the impacts to surficial soil during the risk assessment process.

Exceedances of this guideline for sediment in Reeder Creek were noted for the metals copper and lead. The maximum concentration of lead in sediment in Reeder Creek was 332 mg/Kg. The 1989 NYSDEC sediment guideline for lead was 27 mg/Kg 1993. The 1993 NYSDEC sediment guideline for lead is 31 mg/Kg. The maximum concentration of copper was found to be 2,380 mg/Kg. The 1989 NYSDEC sediment guideline was 19 mg/Kg. The 1993 NYSDEC sediment guideline for copper is 16 mg/Kg. Other exceedances were also noted, the maximum concentration of arsenic was 7.4 mg/Kg. The 1989 NYSDEC sediment guideline for arsenic was 5 mg/Kg. The 1993 NYSDEC sediment guideline for arsenic is 6 mg/Kg. The maximum concentration of cadmium was 3.4 mg/Kg, the 1993 NYSDEC sediment guideline is 0.6 mg/Kg. The maximum concentration of manganese was 596 mg/Kg, the 1993 NYSDEC sediment guideline is 460 mg/Kg. The maximum concentration of mercury was 0.7 mg/Kg, the 1993 NYSDEC sediment guideline is 0.15 mg/Kg. The maximum concentration of nickel was 42

TABLE 6-4

SUMMARY OF REMEDIAL INVESTIGATION DATA
SEDIMENT at the OPEN BURNING GROUNDS
(All Sediment Locations Including Reeder Creek and the On-site Areas)

	NUMBER OF ANALYSES	NUMBER OF DETECTIONS	FREQUENCY OF DETECTION	MAXIMUM DETECTED	NYSDEC SEDIMENT CRITERIA FOR AQUATIC LIFE (a)	NUMBER OF SAMPLES ABOVE NYSDEC SEDIMENT CRITERIA
VOCs (ug/kg)						
Acetone	34	2	5.9%	34	-	NA
Carbon Disulfide	34	2	5.9%	6	-	NA
Chloroform	34	6	17.6%	20	-	NA
Trichloroethene	34	1	2.9%	18	-	NA
Semivolatiles (ug/kg)						
4-Methylphenol	32	3	9.4%	350	6 (b)	3
Naphthalene	32	2	6.3%	24	-	NA
2-Methylnaphthalene	32	1	3.1%	12	-	NA
2,6-Dinitrotoluene	32	1	3.1%	120	-	NA
2,4-Dinitrotoluene	32	4	12.5%	1,600	-	NA
N-Nitrosodiphenylamine (1)	32	4	12.5%	120	-	NA
Phenanthrene	32	5	15.6%	76	1390	0
Anthracene	32	1	3.1%	77	-	NA
Carbazole	15	1	6.7%	27	-	NA
Di-n-butylphthalate	32	6	18.8%	730	1197(c)	0
Fluoranthene	32	3	9.4%	140	-	NA
Pyrene	32	4	12.5%	110	-	NA
Benzo(a)anthracene	32	1	3.1%	48	-	NA
Chrysene	32	2	6.3%	62	-	NA
bis(2-Ethylhexyl)phthalate	32	15	46.9%	96	1197(c)	0
Benzo(b)fluoranthene	32	1	3.1%	52	-	NA
benzo(k)fluoranthene	32	1	3.1%	54	-	NA
Benzo(a)pyrene	32	1	3.1%	38	-	NA
Indeno(1,2,3-cd)pyrene	32	1	3.1%	37	-	NA
Pesticides/PCBs (ug/kg)						
4,4'-DDE	32	3	9.4%	10	500	0
4,4'-DDT	32	2	6.3%	13	500	0
Explosives (ug/kg)						
HMX	31	2	6.5%	130	-	NA
RDX	31	1	3.2%	500	-	NA
2,4,6-Trinitrotoluene	31	1	3.2%	100	-	NA
4-amino-2,6-Dinitrotoluene	31	1	3.2%	160	-	NA
2-amino-4,6-Dinitrotoluene	31	2	6.5%	180	-	NA
2,4-Dinitrotoluene	31	3	9.7%	98	-	NA
Metals (mg/kg)						
Aluminum	32	30	93.8%	25,800	-	NA
Antimony	32	2	6.3%	28	-	NA
Arsenic	32	24	75.0%	10	5	11
Barium	32	25	78.1%	1,780	-	NA
Beryllium	32	22	68.8%	2	-	NA
Cadmium	32	23	71.9%	10	2.5	10
Calcium	32	32	100.0%	104,000	-	NA
Chromium	32	24	75.0%	42	26	6
Cobalt	32	24	75.0%	18	-	NA
Copper	32	30	93.8%	3,790	19	30
Iron	32	32	100.0%	40,900	24,000	28
Lead	32	31	96.9%	7,400	27	23
Magnesium	32	32	100.0%	12,000	-	NA
Manganese	32	32	100.0%	1,520	428	15
Mercury	32	22	68.8%	2	0.11	10
Nickel	32	24	75.0%	64	22	24
Potassium	32	32	100.0%	3,530	-	NA
Selenium	32	14	43.8%	2	-	NA
Silver	32	5	15.6%	2	-	NA
Sodium	32	19	59.4%	191	-	NA
Vanadium	32	24	75.0%	38	-	NA
Zinc	32	26	81.3%	1,200	85	19
Cyanide	32	2	6.3%	1	-	NA

NOTES:
a) NYSDEC Sediment Criteria - 1989.
b) NYSDEC 1989 guidelines for total phenols
c)NYSDEC 1989 guideline for phthalates (bis(2-Ethylhexyl) phthalate.
d) NA = Not Applicable

mg/Kg, the 1993 NYSDEC sediment guideline is 16 mg/Kg. The maximum concentration of zinc was 497 mg/Kg, the 1993 NYSDEC sediment guideline is 120 mg/Kg.

Exceedances of the NYSDEC sediment guideline for sediment in on-site wetlands were also noted for several metals including copper, lead and zinc. The maximum on-site concentration of lead was 7,400 mg/Kg. The 1989 NYSDEC sediment guideline for lead was 27 mg/Kg. The 1993 NYSDEC sediment guideline is 31 mg/Kg. The maximum on-site concentration of copper in sediment was found to be 3,790 mg/Kg. The 1989 NYSDEC sediment guideline was 19 mg/Kg. The 1993 NYSDEC sediment guideline for copper is 16 mg/Kg. The maximum concentration of zinc was found to be 1,200 mg/Kg. The 1989 NYSDEC sediment guideline for sine was 85 mg/Kg. The 1993 NYSDEC sediment guideline is 120 mg/Kg. Other exceedances were also noted, for example, the maximum on-site concentration of arsenic was 10 mg/Kg. The 1989 NYSDEC sediment guideline for arsenic was 5 mg/Kg. The 1993 NYSDEC sediment guideline for arsenic is 6.0 mg/Kg. The maximum concentration of cadmium was 10 mg/Kg. The 1989 NYSDEC sediment guideline was 0.8 mg/Kg. The 1993 NYSDEC sediment guideline for cadmium is 0.6 mg/Kg. The maximum concentration of manganese was 1520 mg/Kg, the 1989 NYSDEC sediment guideline was 428 mg/Kg. The 1993 NYSDEC sediment guideline is 460 mg/Kg. The maximum concentration of mercury was 2 mg/Kg, the 1989 NYSDEC sediment guideline was 0.11 mg/Kg. The 1993 NYSDEC sediment guideline is 0.15 mg/Kg. The maximum concentration of nickel was 64 mg/Kg, the 1989 NYSDEC sediment guideline was 22 mg/Kg. The 1993 NYSDEC sediment guideline for nickel is 16 mg/Kg.

7.0 SUMMARY OF SITE RISKS

A baseline risk assessment, for both human health and ecological receptors, estimated the risks associated with current and future site conditions.

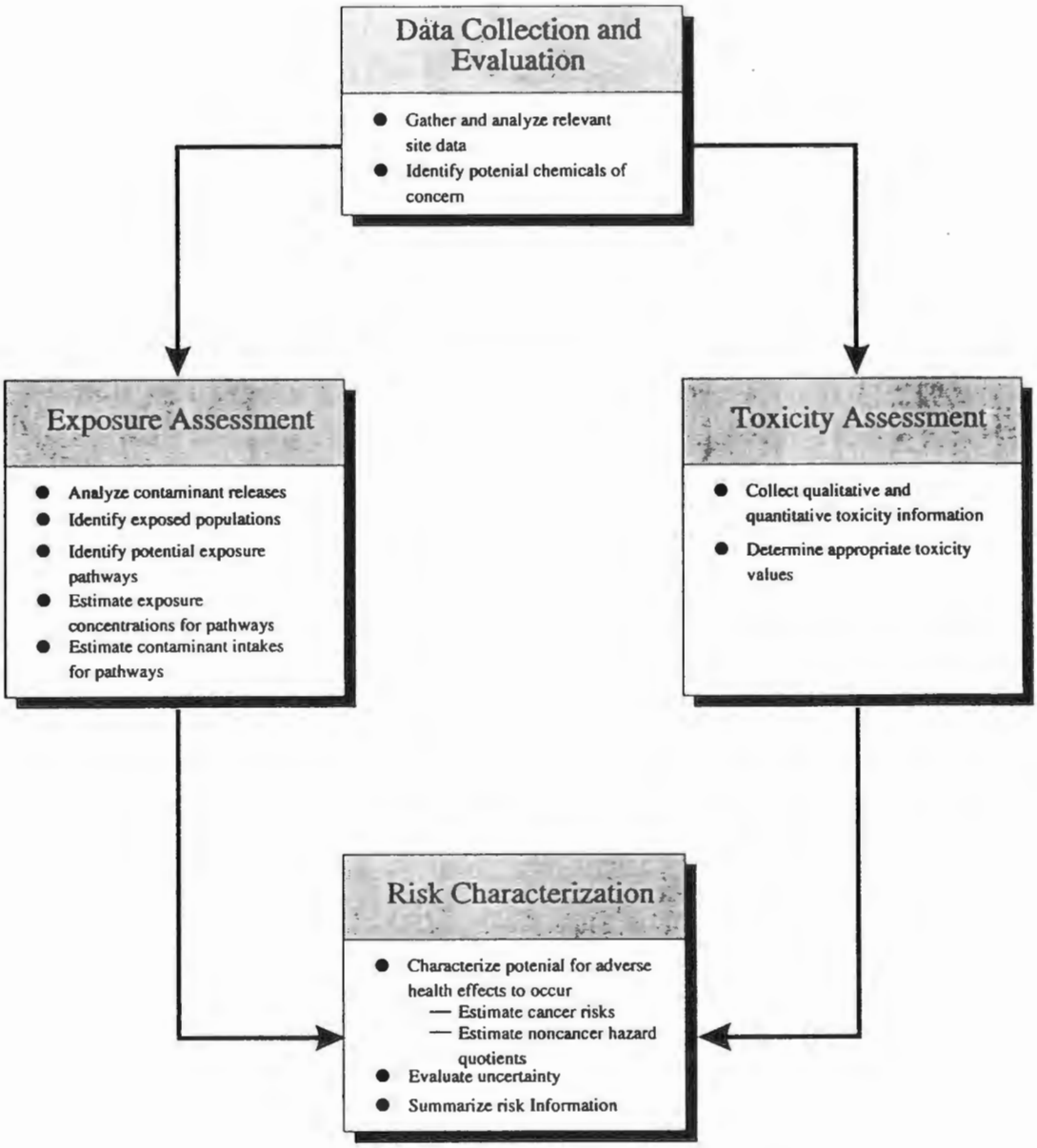
7.1 Human Health Risk Assessment

The baseline human health risk assessment followed the USEPA guidance and New York State guidance, where appropriate, to calculate carcinogenic and non-carcinogenic human health risks. A four-step process was utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the chemicals of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response). *Risk Characterization*--summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative (e.g., one-in-a-million excess cancer risk) assessment of site-related risks. The methodology is shown in **Figure 7-1**.

The baseline risk assessment considered chemicals in groundwater, soils, sediment and surface water for the OB Grounds site that may pose a significant risk to human health and the environment. These constituents included explosives, Polynuclear Aromatic Hydrocarbons (PAH), and heavy metals such as lead, barium, copper and zinc. A summary of the chemicals of concern for potential human health receptors in sampled matrices is provided in **Table 7-1**.

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

Table 7-2 lists all the chemicals analyzed for at the OB Grounds and the toxicity values used to evaluate the risk posed by these compounds. Not every chemical presented in **Table 7-2** was evaluated in the human health risk assessment. This list was refined to a smaller list following risk assessment guidance provided by the EPA. **Table 7-1** provides the list of chemicals of



Source: USEPA, 1989a

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT	DWG NO
ENVIRONMENTAL ENGINEERING	720446-01026

FIGURE 7-1

BASELINE RISK ASSESSMENT PROCESS

SCALE	DATE
Not Applicable	FEBRUARY 1997

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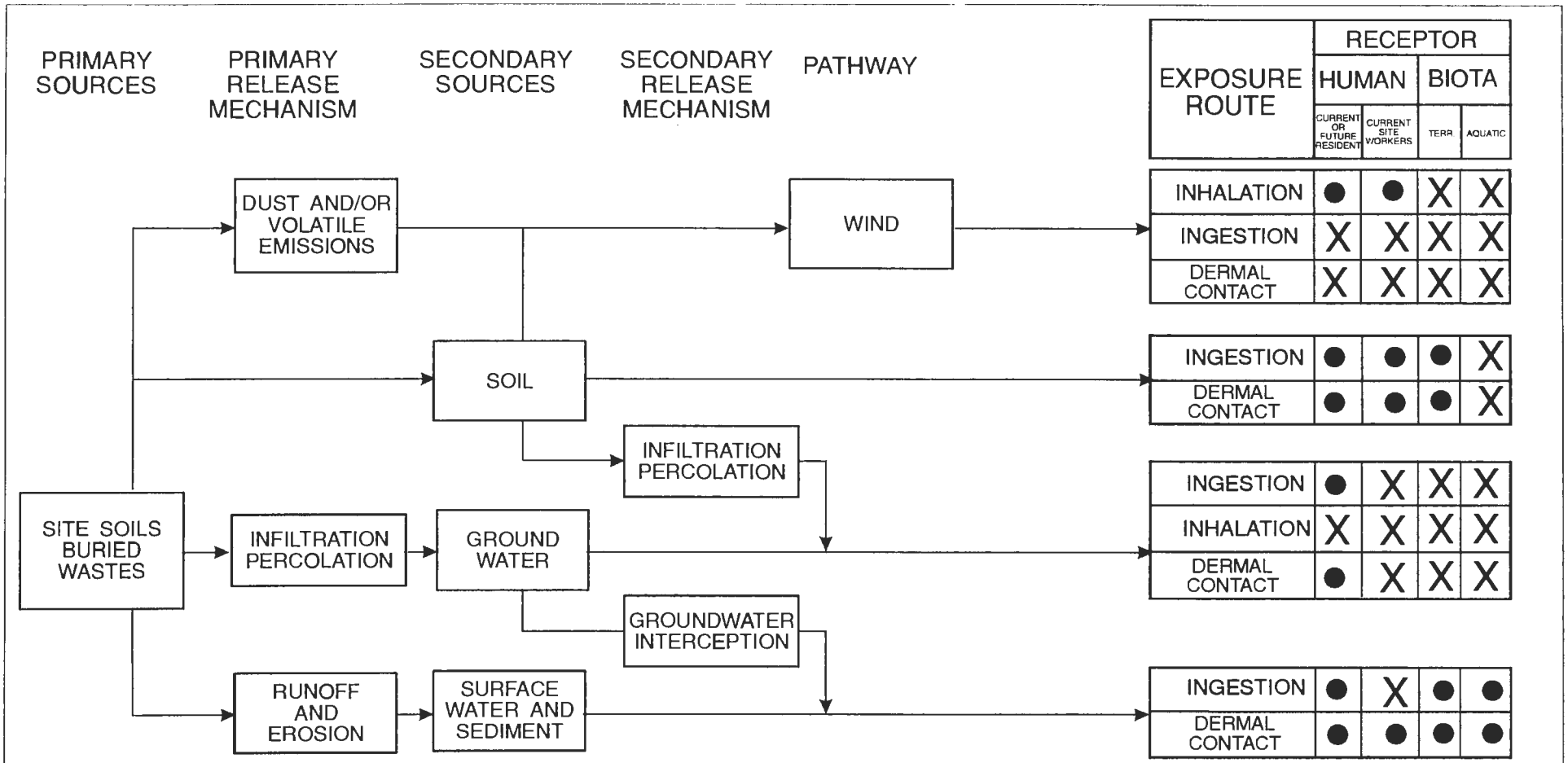

EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	CURRENT OR FUTURE RESIDENT	CURRENT SITE WORKERS	TERR	AQUATIC
INHALATION	●	●	X	X
INGESTION	X	X	X	X
DERMAL CONTACT	X	X	X	X
INGESTION	●	●	●	X
DERMAL CONTACT	●	●	●	X
INGESTION	●	X	X	X
INHALATION	X	X	X	X
DERMAL CONTACT	●	X	X	X
INGESTION	●	X	●	●
DERMAL CONTACT	●	●	●	●

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY DISCOUNTED AS NOT BEING APPLICABLE TO RECEPTOR

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720446-01026

FIGURE 7-2

EXPOSURE PATHWAY SUMMARY

SCALE NA | DATE FEBRUARY 1997

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TABLE 7-1

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
GROUNDWATER SAMPLES

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Volatile Organics						
Acetone	ug/L	28	15	3.7	2.9	3.7
Semivolatiles						
Di-n-butylphthalate	ug/L	27	5.0	5.0	4.7	5.0
Di-n-octylphthalate	ug/L	27	5.0	5.1	4.8	5.0
Explosives						
RDX	ug/L	27	0.06	0.06	0.06	0.06
2,4,6-Trinitrotoluene	ug/L	27	0.06	0.06	0.06	0.06
2,6-Dinitrotoluene	ug/L	27	0.06	0.06	0.06	0.06

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
SURFACE WATER DATA FOR ON-SITE WETLANDS

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Volatile Organics						
1,2-Dichloroethane	ug/L	19	5.0	4.3	3.8	4.3
Trichloroethene	ug/L	19	17	5.7	4.4	5.7
Semivolatiles						
bis(2-Ethylhexyl)phthalate	ug/L	19	71	9.4	8.5	9.4
Explosives						
RDX	ug/L	19	9.4	1.9	0.9	1.9
Tetryl	ug/L	19	0.5	0.2	0.1	0.2
Metals						
Aluminum	ug/L	13	5,220	18,766	882	5,220
Arsenic	ug/L	19	4.4	2.0	1.5	2.0
Barium	ug/L	16	523	191	142	191
Beryllium	ug/L	18	1.3	0.6	0.4	0.6
Chromium	ug/L	19	8.6	3.1	2.4	3.1
Copper	ug/L	19	60	71	15	60
Lead	ug/L	19	74	53	11	53
Manganese	ug/L	16	1,080	1,090	199	1,080
Nickel	ug/L	19	18	6.8	5.3	6.8
Vanadium	ug/L	19	37	32	9.1	32

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
SURFACE WATER DATA FOR REEDER CREEK

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Volatile Organics						
1,2-Dichloroethane	ug/L	11	5.0	3.7	3.1	3.7
Trichloroethene	ug/L	11	5.0	3.8	3.2	3.8
Explosives						
RDX	ug/L	12	0.7	0.2	0.1	0.2
Tetryl	ug/L	12	0.2	0.1	0.1	0.1
Metals						
Aluminum	ug/L	9	300	139	93	139
Arsenic	ug/L	11	1.9	1.4	1.2	1.4
Barium	ug/L	11	67	58	52	58
Beryllium	ug/L	5	1.4	6.7	0.5	1.4
Chromium	ug/L	11	4.8	4.3	3.4	4.3
Copper	ug/L	11	10	8.9	6.9	8.9
Lead	ug/L	11	2.2	1.0	0.7	1.0
Manganese	ug/L	10	236	130	88	130
Nickel	ug/L	11	18	15	11	15
Vanadium	ug/L	11	39	19	14	19

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
SEDIMENT DATA FOR ON-SITE WETLANDS

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Semivolatiles						
2-Methylnaphthalene	ug/kg	17	500	363	312	363
Phenanthrene	ug/kg	20	600	395	331	395
Benzo(a)anthracene	ug/kg	18	500	367	311	367
Benzo(b)fluoranthene	ug/kg	18	500	367	312	367
Benzo(k)fluoranthene	ug/kg	18	500	367	312	367
Benzo(a)pyrene	ug/kg	18	500	367	311	367
Indeno(1,2,3-cd)pyrene	ug/kg	18	500	367	311	367
Explosives						
4-amino-2,6-Dinitrotoluene	ug/kg	22	160	72	65	72
2-amino-4,6-Dinitrotoluene	ug/kg	22	180	76	67	76
Metals						
Aluminum	mg/kg	22	25,800	17,743	16,486	17,743
Antimony	mg/kg	12	28	11	7.3	11
Arsenic	mg/kg	19	10	5.7	4.9	5.7
Barium	mg/kg	19	1,780	366	272	366
Beryllium	mg/kg	18	2	1.1	1.0	1.1
Cadmium	mg/kg	22	10	3.4	2.6	3.4
Chromium	mg/kg	19	42	27	25	27
Cobalt	mg/kg	19	18	13	12	13
Copper	mg/kg	22	3,790	489	288	489
Lead	mg/kg	22	7,400	1,675	526	1,675
Manganese	mg/kg	22	1,520	598	502	598
Mercury	mg/kg	20	2.0	0.9	0.3	0.9
Nickel	mg/kg	19	64	40	37	40
Selenium	mg/kg	18	1.8	0.9	0.7	0.9
Vanadium	mg/kg	19	38	27	25	27
Zinc	mg/kg	21	1,200	446	273	446

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
SEDIMENT DATA FOR REEDER CREEK

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Semivolatiles						
2-Methylnaphthalene	ug/kg	8	490	412	315	412
Phenanthrene	ug/kg	8	490	397	269	397
Benzo(a)anthracene	ug/kg	8	490	408	336	408
Benzo(b)fluoranthene	ug/kg	8	490	408	336	408
Benzo(k)fluoranthene	ug/kg	8	490	408	336	408
Benzo(a)pyrene	ug/kg	8	490	408	336	408
Indeno(1,2,3-cd)pyrene	ug/kg	8	490	408	336	408
Explosives						
4-amino-2,6-Dinitrotoluene	ug/kg	9	60	60	60	60
2-amino-4,6-Dinitrotoluene	ug/kg	9	60	60	60	60
Metals						
Aluminum	mg/kg	10	15,600	12,203	10,105	12,203
Antimony	mg/kg	4	4.1	4.1	3.7	4.1
Arsenic	mg/kg	6	7.4	6.7	5.3	6.7
Barium	mg/kg	6	95	66	47	66
Beryllium	mg/kg	5	0.7	0.7	0.5	0.7
Cadmium	mg/kg	10	3.4	2.3	1.7	2.3
Chromium	mg/kg	6	25	23	18	23
Cobalt	mg/kg	6	11	10	8.0	10
Copper	mg/kg	10	2,380	1,033	263	1,033
Lead	mg/kg	10	332	419	94	419
Manganese	mg/kg	10	596	475	420	475
Mercury	mg/kg	7	0.7	1.2	0.2	1.2
Nickel	mg/kg	6	42	38	30	38
Selenium	mg/kg	6	1.4	1.0	0.6	1.0
Vanadium	mg/kg	6	20	18	14	18
Zinc	mg/kg	6	497	900	148	900

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
SURFACE SOIL/SEDIMENT SAMPLES

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	SAMPLE POPULATION	MAXIMUM	95th UCL of the mean	MEAN	EXPOSURE POINT CONC.
Semivolatiles						
2-Methylnaphthalene	ug/kg	208	1,300	300	284	300
3-Nitroaniline	ug/kg	209	2,950	1,270	1,188	1,270
2,4-Dinitrotoluene	ug/kg	216	33,000	698	849	698
Phenanthrene	ug/kg	213	2,600	319	292	319
Benzo(a)anthracene	ug/kg	207	3,900	349	313	349
Chrysene	ug/kg	209	8,900	351	340	351
Benzo(b)fluoranthene	ug/kg	207	11,000	353	353	353
Benzo(k)fluoranthene	ug/kg	207	4,500	334	318	334
Benzo(a)pyrene	ug/kg	207	3,700	350	314	350
Indeno(1,2,3-cd)pyrene	ug/kg	206	2,300	327	305	327
Dibenz(a,h)anthracene	ug/kg	201	670	301	290	301
Benzo(g,h,i)perylene	ug/kg	202	960	302	294	302
Pesticides/PCBs						
Dieldrin	ug/kg	211	50	12	11	12
4,4'-DDE	ug/kg	214	830	18	17	18
4,4'-DDT	ug/kg	215	2,800	19	26	19
Explosives						
RDX	ug/kg	217	4,800	91	121	91
1,3,5-Trinitrobenzene	ug/kg	217	7,800	110	173	110
Tetryl	ug/kg	217	1,000	150	138	150
2,4,6-Trinitrotoluene	ug/kg	217	80,000	131	607	131
4-amino-2,6-Dinitrotoluene	ug/kg	217	8,900	130	182	130
2-amino-4,6-Dinitrotoluene	ug/kg	217	11,000	143	212	143
Metals						
Barium	mg/kg	194	34,400	1,446	1,479	1,446
Cadmium	mg/kg	217	28	5.7	3.5	5.7
Chromium	mg/kg	198	1,430	32	36	32
Copper	mg/kg	211	38,100	678	797	678
Lead	mg/kg	208	56,700	2,836	1,888	1,888
Thallium	mg/kg	214	38	0.3	0.5	0.3
Zinc	mg/kg	216	127,000	884	1,318	884

TABLE 7-2

TOXICITY VALUES

SENECA ARMY DEPOT
OB GROUNDS

Analyte	RfD (mg/kg-day)		RfC (mg/kg-day)		Carc. Slope Oral (mg/kg-day)-1		Rank Wt. of Evidence	Carc. Slope Inhalation (mg/kg-day)-1	
Volatile Organics									
Methylene Chloride	6.00E-02	a	8.57E-01	b	7.50E-03	a	B2	1.65E-03	a
Acetone	1.00E-01	a	NA		NA		D	NA	
Dichloroethane, 1,2-	NA		2.90E-03		9.10E-02	a	B2	9.10E-05	a
Dichloroethene, 1,2- (total)	9.00E-03	b	NA		NA		NA	NA	
Chloroform	1.00E-02	a	NA		6.10E-03	a	B2	8.05E-02	a
Butanone, 2-	6.00E-01	a	2.86E-01	a	NA		D	NA	
Carbon Tetrachloride	7.00E-04	a	NA		1.30E-01	a	B2	5.25E-02	a
Trichloroethane, 1,1,1-	NA		NA		NA		D	NA	
Carbon disulfide	1.00E-01	a	2.86E-03	b	NA		NA	NA	
Trichloroethene	NA		NA		1.10E-02		NA	6.00E-03	
Benzene	NA		NA		2.90E-02	a	A	2.91E-02	a
Tetrachloroethene	1.00E-02	a	NA		5.00E-02		NA	2.00E-03	
Toluene	2.00E-01	a	1.14E-01	a	NA		D	NA	
Chlorobenzene	2.00E-02	a	5.71E-03	b	NA		D	NA	
Xylene (total)	2.00E+00	a	NA		NA		D	NA	
Semivolatiles									
Phenol	6.00E-01	a	NA		NA		D	NA	
Methylphenol, 2-	5.00E-02	a	NA		NA		C	NA	
Methylphenol, 4-	5.00E-03	b	NA		NA		C	NA	
Dimethylphenol, 2,4-	2.00E-02	a	NA		NA		NA	NA	
Benzoic acid	4.00E+00	a	NA		NA		D	NA	
Naphthalene	4.00E-02		NA		NA		D	NA	
Methylnaphthalene, 2-	NA		NA		NA		NA	NA	
Chloronaphthalene, 2-	8.00E-02	a	NA		NA		NA	NA	
Nitoaniline, 2-	2.00E-04	b	NA		NA		NA	NA	
Acenaphthylene	NA		NA		NA		NA	NA	
Dinitrotoluene, 2,6-	1.00E-03	b	NA		NA		NA	NA	
Nitroaniline, 3-	NA		NA		NA		NA	NA	
Acenaphthene	6.00E-02	a	NA		NA		NA	NA	
Dibenzofuran	NA		NA		NA		D	NA	
Dinitrotoluene, 2,4-	2.00E-03	a	NA		NA		NA	NA	
Diethylphthalate	8.00E+00	b	NA		NA		NA	NA	
Fluorene	4.00E-02	a	NA		NA		D	NA	
N-Nitrosodiphenylamine	NA		NA		4.90E-03	a	B2	NA	
Hexachlorobenzene	3.00E-04	a	NA		NA		NA	NA	
Pentachlorophenol	3.00E-02	a	NA		1.20E-01	a	B2	NA	
Phenanthrene	NA		NA		NA		NA	NA	
Anthracene	3.00E-01	a	NA		NA		D	NA	
Carbazole	NA		NA		2.00E-02	b	B2	NA	
Di-n-butylphthalate	1.00E-01	a	NA		NA		D	NA	
Fluoranthene	4.00E-02	a	NA		NA		D	NA	
Pyrene	3.00E-02	a	NA		NA		NA	NA	
Butylbenzylphthalate	2.00E+00	b	NA		NA		NA	NA	
Benzo(a)anthracene	NA		NA		7.30E-01	c	B2	NA	
Chrysene	NA		NA		7.30E-02	c	B2	NA	
bis(2-Ethylhexyl)phthalate	2.00E-02	a	NA		1.40E-02	a	B2	NA	
Di-n-octylphthalate	2.00E-02	b	NA		NA		NA	NA	
Benzo(b)fluoranthene	NA		NA		7.30E-01	c	B2	NA	
Benzo(k)fluoranthene	NA		NA		7.30E-01	c	B2	NA	
Benzo(a)pyrene	NA		NA		7.30E+00	a	B2	NA	
Indeno(1,2,3-cd)pyrene	NA		NA		7.30E-01	c	B2	NA	
Dibenz(a,h)anthracene	NA		NA		7.30E+00	c	B2	NA	
Benzo(g,h,i)perylene	NA		NA		NA		NA	NA	

TABLE 7-2

TOXICITY VALUES

SENECA ARMY DEPOT
OB GROUNDS

Analyte	RfD (mg/kg-day)		RfC (mg/kg-day)		Carc. Slope Oral (mg/kg-day)-1		Rank Wt. of Evidence	Carc. Slope Inhalation (mg/kg-day)-1	
Pesticides/PCBs									
beta-BHC	NA		NA		1.80E+00	a	C	1.86E+00	a
delta-BHC	NA		NA		NA		D	NA	
gamma-BHC(Lindane)	3.00E-04	a	NA		NA		NA	NA	
Heptachlor	5.00E-04	a	NA		4.50E+00	a	B2	4.55E+00	a
Aldrin	3.00E-05	a	NA		1.70E+01	a	B2	1.72E+01	a
Heptachlor epoxide	1.30E-05	a	NA		9.10E+00	a	B2	9.10E+00	a
Endosulfan I	5.00E-05	b	NA		NA		NA	NA	
Dieldrin	5.00E-05	a	NA		1.60E+01	a	B2	1.61E+01	a
DDE, 4,4'-	NA		NA		3.40E-01	a	B2	3.40E-01	a
Endrin	3.00E-04	b	NA		NA		D	NA	
Endosulfan II	5.00E-05	b	NA		NA		NA	NA	
DDD, 4,4'-	NA		NA		2.40E-01	a	B2	NA	
Endosulfan sulfate	5.00E-05	b	NA		NA		NA	NA	
DDT, 4,4'-	5.00E-04	a	NA		3.40E-01	a	B2	3.40E-01	a
Endrin aldehyde	NA		NA		NA		NA	NA	
alpha-Chlordane	6.00E-05	b	NA		NA		NA	NA	
Aroclor-1254	NA		NA		NA		NA	NA	
Aroclor-1260	NA		NA		7.70E+00		NA	NA	
Explosives									
HMX	5.00E-02	a	NA		NA		D	NA	
RDX	3.00E-03	a	NA		1.10E-01	a	C	NA	
Trinitrobenzene, 1,3,5-	5.00E-05	a	NA		NA		NA	NA	
Dinitrobenzene, 1,3-	1.00E-03	b	NA		NA		NA	NA	
Tetryl	NA		NA		NA		NA	NA	
Trinitrotoluene, 2,4,6-	5.00E-04	a	NA		3.00E-02	a	C	NA	
Dinitrotoluene, 2,6-, 4-amino-	NA		NA		NA		NA	NA	
Dinitrotoluene, 4,6-, 2-amino-	NA		NA		NA		NA	NA	
Dinitrotoluene, 2,6-	1.00E-03	b	NA		NA		NA	NA	
2,4-Dinitrotoluene	2.00E-03	a	NA		NA		NA	NA	
Metals									
Aluminum	NA		NA		NA		NA	NA	
Antimony	4.00E-04	b	NA		NA		NA	NA	
Arsenic	3.00E-04	a	NA		1.75E+00	d	A	1.51E+01	a
Barium	7.00E-02	a	1.43E-04	b	NA		NA	NA	
Beryllium	5.00E-03	a	NA		4.30E+00	a	B2	8.40E+00	a
Cadmium	5.00E-04	a	NA		NA		B1	6.30E+00	a
Calcium	NA		NA		NA		NA	NA	
Chromium	5.00E-03	a	NA		NA		A	4.20E-02	a
Cobalt	NA		NA		NA		NA	NA	
Copper	4.00E-02	b	NA		NA		D	NA	
Iron	NA		NA		NA		NA	NA	
Lead	NA		NA		NA		B2	NA	
Magnesium	NA		NA		NA		NA	NA	
Manganese	5.00E-03	a	1.14E-04	a	NA		D	NA	
Mercury	3.00E-04	b	8.57E-05	b	NA		NA	NA	
Nickel	NA		NA		NA		NA	8.40E-01	
Potassium	NA		NA		NA		NA	NA	
Selenium	5.00E-03	b	NA		NA		NA	NA	
Silver	5.00E-03	a	NA		NA		NA	NA	
Sodium	NA		NA		NA		NA	NA	
Thallium	9.00E-05		NA		NA		NA	NA	
Vanadium	7.00E-03	b	NA		NA		D	NA	
Zinc	3.00E-01	a	NA		NA		D	NA	
Cyanide	2.00E-02	a	NA		NA		D	NA	

a = Taken from the Integrated Risk Information System (IRIS)
Online June 23-25, 1992
b = Taken from HEAST
c = Calculated using TEF
d = Calculated from proposed oral unit risk value
NA = Not Available

concern that were considered in the human health risk assessment and lists the exposure point concentrations used for the baseline risk assessment. Exposure point concentrations correspond to the applicable exposure pathways for the baseline risk assessment.
Based upon the current and future land use scenarios, the baseline risk assessment evaluated the health effects that may result from exposure for the following three receptor groups:

- Current on-site OB Grounds workers (Industrial Scenario);
- Current off-site residents (Residential Scenario); and
- Future on-site residents (Residential Scenario).

The following exposure pathways were considered :

1. Incidental ingestion and dermal contact to on-site soils (Current and Future Land Use Scenarios)
2. Inhalation of fugitive dust (Current and Future Land Use Scenarios)
3. Dermal contact to surface water and sediment while wading in on-site wetlands (Current and Future Land Use Scenarios).
4. Ingestion of and dermal contact with surface water and sediments while swimming or wading in Reeder Creek (Current and Future Land Use Scenarios)
5. Ingestion of groundwater (Future Land use Scenario only).
6. Dermal contact to groundwater while showering/bathing (Future Land Use Scenario only)

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and non-carcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and non-carcinogenic risks associated with exposures to individual compounds of concern were summed for each receptor group to indicate the potential risks associated with mixtures of potential carcinogens and non-carcinogens, respectively.

Non-carcinogenic risks were assessed using the standard EPA Hazard Index (HI), also known as the Hazard Quotient (HQ) approach, where HQ = CDI/RfD. The CDI is the chronic daily intake and RfD is the Reference Dose. This approach is based on a comparison of expected contaminant intakes and safe levels of intake reference doses. Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals).

Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HQ, (HQ=CDI/RfD and the CDI is the chronic daily intake and the RfD is the Reference Dose), is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HQ greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures. The HQ provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the chemicals of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has no greater than a one-in-ten-thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the site.

Since published risk factors are not available for lead, one of the main analytes of concern, a separate lead risk evaluation was conducted. The EPA Uptake Biokinetic Model (UBK), (Version 0.9), considers children's blood lead level as a function of exposure to environmental concentrations of lead in soil and groundwater, under a residential scenario. The model did not consider other, non-residential, exposure scenarios. The UBK model estimates a probability distribution of blood lead concentration(s) in a child/children. The EPA target level is to have not greater than 5% of the blood concentrations exceeding 10 ug/dL. The results of this analysis are detailed in Section 6.5.5 of the RI report and suggests that blood lead levels greater than the EPA target level of 10 ug/dL for a child receptor between the ages of 1 to 4 are possible, if residential exposure were to occur.

Table 7-3 summarizes the results for total carcinogenic and non-carcinogenic risks. The results of the risk assessment indicate that no media at the site pose an unacceptable risk to human health. The worst case exposure scenario involves the potential future residents at the site and resulted in an excess cancer risk of 1.0×10^{-5}. This risk number means that 1 additional person out of 100,000 are at risk of developing cancer if site conditions remain as is. The maximum HQ was estimated to be 0.33 for this same receptor. The exposure pathways for this scenario include all the pathways listed above.

The current on-site workers do not exhibit cancer or noncarcinogenic risk above the established EPA target risk ranges either. The carcinogenic risk level for this exposure group is 6.3×10^{-6}. This risk number means that 6 additional persons out of 1,000,000 are at risk of developing cancer if the site is not remediated. The HQ is 0.23 and is therefore below the EPA target level of 1.0.

Current off-site residents do not exhibit risk of cancer or noncarcinogenic health risks in excess of the EPA target risk ranges or adverse noncarcinogenic health threats. The carcinogenic risk is 3.9×10^{-7} which means that 4 additional persons out of 10,000,000 are at risk of developing cancer if the site is not remediated. The noncarcinogenic hazard index is 0.007 and is less than the EPA target level of 1.0. The exposure pathway for off-site residents is ingestion of and dermal contact with surface water and sediments while swimming or wading in off-site sections of Reeder Creek.

The current land use of this area is as an open burning ground for destruction of military ordnance. Unlike previous activities, burning is now performed in an aboveground steel tray, not on the ground. This use is anticipated to continue until the base is closed. Following base closure, the future intended land use, as presented by the Local Redevelopment Authority (LRA), is as a conservation/recreational area. The LRA has not identified housing/residential as the future land use for the OB Grounds and there are no plans to utilize this site for residential purposes. As a result, an on-site residential exposure scenario was not used as a basis for establishing remedial action goals even though this exposure scenario was considered in the baseline risk assessment. The OB Grounds will be remediated to meet ecological standards, which are more stringent than residential requirements.

TABLE 7-3

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
CURRENT INDUSTRIAL, CURRENT RESIDENTIAL, AND FUTURE RESIDENTIAL LAND USE

SENECA ARMY DEPOT
OB GROUNDS

RECEPTOR	EXPOSURE ROUTE	HAZARD INDEX	CANCER RISK
CURRENT INDUSTRIAL			
ONSITE WORKER	Inhalation of Fugitive Dust	2.0E-02	1.7E-07
	Ingestion of Onsite Soils	1.8E-01	6.0E-06
	Dermal Contact to Onsite Soils	5.8E-03	0.0E+00
	Dermal Contact to Surface Water while Wading	1.6E-02	1.6E-07
	Dermal Contact to Sediment while Wading	3.2E-03	0.0E+00
TOTAL RECEPTOR RISK (Nc & CAR)		2.3E-01	6.3E-06
CURRENT RESIDENTIAL			
CURRENT OFF-SITE RESIDENTS	Ingestion of Surface Water while Swimming	1.3E-03	1.3E-07
	Dermal Contact to Surface Water while Swimming	4.0E-04	4.1E-08
	Ingestion of Sediment while Swimming	4.7E-03	2.2E-07
	Dermal Contact to Sediment while Swimming	6.7E-04	0.0E+00
TOTAL RECEPTOR RISK (Nc & CAR)		7.1E-03	3.9E-07
FUTURE RESIDENTIAL			
ONSITE FUTURE RESIDENT	Ingestion of Surface Water while Swimming	1.3E-03	1.3E-07
	Dermal Contact to Surface Water while Swimming	4.0E-04	4.1E-08
	Ingestion of Sediment while Swimming	4.7E-03	2.2E-07
	Dermal Contact to Sediment while Swimming	6.7E-04	0.0E+00
	Dermal Contact to Surface Water while Wading	1.4E-03	1.7E-08
	Dermal Contact to Sediment while Wading	4.4E-04	0.0E+00
	Inhalation of Fugitive Dust	4.7E-02	4.8E-07
	Ingestion of Onsite Soils	2.4E-01	9.4E-06
	Dermal Contact to Onsite Soils	1.7E-02	0.0E+00
	Ingestion of Groundwater	1.5E-02	9.9E-08
	Dermal Contact to Groundwater	2.3E-05	1.5E-10
TOTAL RECEPTOR RISK (Nc & CAR)		3.3E-01	1.0E-05

7.2 Ecological Risk Assessment

A four step process was utilized for assessing site related ecological risks for a reasonable maximum exposure scenario: *Problem Formulation*--a qualitative evaluation of contaminant release, migration, and fate; identification of contaminants of concern, receptors, exposure pathways, and known ecological effects of the contaminants; and selection of endpoints for further study. *Exposure Assessment*--a quantitative evaluation of contaminant release, migration, and fate; characterization of exposure pathways and receptors; and measurement or estimation of exposure point concentrations. *Ecological Effects Assessment*--literature reviews, field studies, and toxicity tests, linking contaminant concentrations to effects on ecological receptors. *Risk Characterization*--measurement or estimation of both current and future adverse effects.

The ecological risk assessment for the OB Grounds began with evaluating the chemicals of concern associated with the site in conjunction with the site-specific biological species/habitat information. The risk assessment involved a qualitative and quantitative appraisal of the actual or potential toxic effects of hazardous waste sites on aquatic, wetland, and terrestrial biota. The risk assessment considered plant and animal exposures from acute chemical concentrations, chronic concentrations leading to potential lethal and sublethal effects, and food chain transfers of chemicals possessing biomagnification potential. Plants and animals that are or in the future could be experiencing lethal and sublethal effects from exposure to toxic substances were considered.

During Phase I and Phase II, field evaluations included fish trapping and counting, benthic macroinvertebrate sampling and counting and small mammal species sampling and counting. In addition, a vegetation survey was performed, identifying major vegetation and understory types. The conclusions determined from these field efforts indicated a diverse and healthy aquatic and terrestrial environment. No overt acute toxic impacts were evidenced during the field evaluation.

Quantitative soil, sediment and surface water analytical data were compared to New York State Department of Environmental Conservation (NYSDEC) guidelines for the protection of aquatic and macroinvertebrate life in sediments and surface water. Additionally, as a supplement to specific NYSDEC guidelines, criteria were presented from the literature which are considered to be protective of terrestrial wildlife and vegetation in soils. Soil concentrations were compared to guidelines developed to avoid phytotoxic effects to plants and to chemical concentrations known to be phytotoxic. Allowable concentrations in soils and sediments obtained as dietary components for terrestrial species such as small mammals and the mallard were developed from

literature references and used for comparison to actual soil concentrations. Surface water quality criteria for protection of terrestrial wildlife obtained from the New York State ambient water quality criteria and the National Academy of Science (NAS) and the National Academy of Engineering (NAE), were compared to on-site surface water and surface water collected from Reeder Creek. Surface water quality criteria for protection of aquatic receptors was evaluated by comparison of on-site surface water and surface water obtained from Reeder Creek to the New York State ambient water quality criteria. Reeder Creek has been reclassified by the State of New York as a Class C steam in 1993. During the preparation of the RI the stretch of Reeder Creek that is adjacent to the OB Grounds had been classified as Class D.

The quantitative evaluation, which involved comparison of the 95th Upper Confidence Limit (UCL) of the mean with the media specific criteria, suggested potential chronic risk from heavy metals, specifically lead and copper. The acute effects from these metals have not been observed during fieldwork, i.e., the ecological community appears diverse and normal, however long term chronic impacts are more subtle. The RI was completed in 1992 and issued final in 1994, therefore, the sediment guideline used during the RI was the 1989 version. NYSDEC updated the sediment guidelines in 1993. For completeness, both the 1989 and the 1993 versions of the sediment guidelines are presented.

For the protection of aquatic life in contact with contaminated sediments, the 95th UCL for both copper and lead exceeded both the 1989 NYSDEC sediment guidelines and the Limits of Tolerance (LOT) criteria for the protection of benthic macroinvertebrates. For copper, the 1989 NYSDEC "no effect" and "lowest effect" level, sediment guideline for protection of aquatic life that is in contact with sediments was 19 mg/kg. The 1993 NYSDEC, Lowest Effect Level (LEL) sediment guideline, for protection of aquatic life that is in contact with sediments containing copper is 16 mg/kg. The 95th UCL for copper in all sediments, including on-site areas and Reeder Creek, is 401 mg/kg. For lead, the 1989 NYSDEC "no effect" and "lowest effect" level, sediment guideline was 27 mg/kg. The 1993 NYSDEC, Lowest Effect Level (LEL) sediment guideline, for protection of aquatic life that is in contact with sediments containing lead is 31 mg/kg. The 95th UCL of the mean for all sediment samples, including on-site areas and Reeder Creek, is 652 mg/kg. Combining all sediment data was deemed to be appropriate as wildlife could consume species from both on-site areas as well as off-site areas.

Soil concentrations considered to be phytotoxic to terrestrial vegetation were obtained from the scientific literature. Copper and lead at the 95th UCL of the mean for all data exceeded the range of concentrations considered to be phytotoxic to vegetation in soils. Surface water criteria for the protection of aquatic life did not exceed the guidelines for copper and lead. However, the

maximum surface water concentration and the 95th UCL of the mean for aluminum and vanadium did exceed the NYSAWQCS for protection of aquatic species. For aluminum in Reeder Creek, the maximum surface water concentration was 300 ug/L; the 95th UCL of the mean for the samples collected in Reeder Creek is 139 ug/L. For aluminum, the NYSAWQCS for a Class C stream is 100 ug/L, there is no value for a Class D stream. For vanadium in Reeder Creek, the maximum surface water concentration was 39 ug/L; the 95th UCL of the mean is 19 ug/. For vanadium, the Class C NYSAWQCS designation for a Class C stream is 14 ug/L.

In summary, soils and sediment, in particular on-site soils and sediment in the on-site low lying wet areas, suggest that site conditions may pose an elevated ecological risk due to the presence of heavy metals, especially copper and lead. This risk is increased in the low lying areas where sediment from runoff accumulates. Sediments in Reeder Creek may also pose an elevated ecological risk due to the presence of heavy metals, such as copper and lead.

7.3 Uncertainty In Risk Assessments

The procedures and inputs used to assess the risks in this evaluation, as in all such assessments, are subject to a variety of uncertainties. These uncertainties can lead to overestimation and/or underestimation of risk. In general, risk assessments strive to provide a reasonable, yet conservative, estimate of risk. To minimize the underestimation of risk, the procedures and assumptions made during the assessment process followed guidelines provided by the EPA. Even with such guidelines, uncertainties remain. Section 6.7.1 of the RI discusses these uncertainties and are evaluated as to what affect these uncertainties have on the assessment. The main sources of uncertainty for the OB Grounds risk assessment include:

- Environmental chemistry sampling and analysis,
- Environmental parameter measurement,
- Exposure parameter estimation,
- Toxicological data and
- Risk characterization.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. The location and number of samples are limited by the time and costs involved in sampling. The goal of the sampling program is to collect the minimum amount of samples to accurately depict the conditions of the site. Large sites where releases are widespread will require a larger sampling effort. Geostatistical techniques were used during the initial planning phases of this program to support a sampling grid layout. This evaluation

provided a basis for establishing a required minimum number and location of sampling. Environmental sampling was performed at each open burning pad, including the surrounding berms, in the areas surrounding the pads, in the drainage areas and in the surface water bodies on and adjacent to the site. Approximately 250 soil and sediment samples and 50 groundwater and surface water samples were collected over the OB Grounds to establish site conditions. Although, uncertainty can remain as to the actual levels present overall conditions at the site are thought to be reasonably well represented.

Several techniques were implemented to ensure that the data collected provides a reasonable, yet conservative, understanding of site conditions. These techniques include :

1) Non-random samples were collected in areas associated with disposal activities so that the database is biased with samples that contained "hits",
2) Multiple samples of soil collected vertically at each boring location were "screened" prior to submission to the laboratory for analysis. Samples with the highest "screened" concentrations were selected and analyzed at the NYSDEC CLP approved laboratory. This biased the dataset with samples that are representative of the highest concentrations in the locations sampled.

As with any measurement technique, errors are inherent in the analytical methods utilized for this program. These errors can be increased if the characteristics of the matrix being sampled causes interference's with the analyses, leading to misrepresentation of the actual concentration of the components found at the site. To minimize this occurrence, soil samples that were used for the risk assessment were analyzed by state, federal and Army Corps of Engineers approved laboratories using sophisticated analytical protocols, i.e. NYSDEC CLP Level IV methods. These methods involve the use of mass spectrometers to detect and quantify organic compounds and inductively coupled plasma instruments to detect and quantify inorganic compounds. The analytical results were subjected to scrutiny by laboratory QA/QC staff prior to release. Once received, the data were then subjected to another independent validation, following established EPA validation protocols. Although uncertainties remain, these efforts minimize these uncertainties, to the extent practicable, to ensure that the compounds of concern are accurately detected and quantified.

The presence of organic compounds that are not part of the initial list of specific analytes are also detected by these analytical techniques. These compounds are called Tentatively Identified Compounds (TIC)s. TICs are similar in general composition to many of the compounds that are part of the normal list of compounds but have unique mass numbers. These compounds are

identified by the mass spectrometer by their unique mass number. The concentration of the TIC found in the sample is also estimated by comparison to a standard that is similar to the TIC. The presence of TICs increases the uncertainty of a risk assessment because, while the TIC is estimated as being present, it is not accurately quantified. Additionally, toxicity values for TICs are unavailable. The presence of TICs provides an indication as to the overall complexity of the matrix being evaluated. This can lead to a better understanding of the likelihood of matrix interference's causing uncertainties with the quantitation limits for the analytes that have been detected, quantified and included in the risk assessment.

The concentrations of constituents present established the exposure point concentration. This estimate represents the concentration that a theoretical receptor could be exposed to from contact with various media. Since only one value can be used as input to the risk assessment the value that best represents reasonable conditions at the site was selected. Following EPA guidance, the reasonable maximum exposure concentration represented by the 95th upper confidence limit (UCL) of the mean for each media was calculated and, in most instances, selected as the exposure point concentration. The 95th UCL of the mean represents an estimate of the mean where there is a 95 percent chance that the true mean would be less than the calculated 95th UCL. The more datapoints that are used to obtain the 95th UCL, the closer the 95th UCL is to the true mean. The 95th UCL provides a higher exposure point concentration than the simple arithmetic mean and is usually less than the maximum concentration detected. However, in some instances, the 95th UCL of the mean was determined to be higher than the maximum detected value. This can occur when elevated sample quantitation limits, i.e. non-detected datapoints, are presented in the dataset. In accordance with EPA risk assessment protocols, the compound in the sample associated with the elevated sample quantitation limit was eliminated from the database and the 95th UCL was recalculated. The process continued until the 95th UCL of the mean was less than the maximum value detected. This approach has the potential to underestimate the amount of the chemical present since the compound that was eliminated may exist but at a lower concentration than at the elevated detection limit. This process of eliminating data due to elevated detection was performed infrequently and only a small number of compounds, in a few samples were eliminated.

Another potential for uncertainty pertains to samples that have been identified by the laboratory at levels below the sample quantitation limit. EPA guidance for risk assessment suggests that if the concentration of a compound is not detected at the sample quantitation limit then it is acceptable to assume that the compound is at one-half of the sample quantitation limit. This assumes that the concentration of the component is between zero and the sample quantitation limit. The uncertainty associated with this approach is likely to overestimate the actual

concentration of the component present in the sample and therefore overestimate the risk associated with exposure to the media that the sample represents for a few reasons. Firstly, the techniques used to analyze the samples are capable of detecting compounds at levels below the reported analytical quantitation limits. In many instances the laboratory will report compounds below the sample quantitation limit but, for quality assurance purposes, will "flag" the datapoint as an estimated value. The actual limit of detection for a component is less than one-half the sample quantitation limit. Therefore, if a compound was actually present in a sample at one-half of the sample quantitation limit, the laboratory would detect it and would have reported this value as an estimated value. Secondly, for the purposes of the exposure point concentration estimation, all non-detected sample points have an assumed concentration of one-half the quantitation limit. Since datapoints with concentrations above one-half the sample quantitation limits would have a greater likelihood of being detected than concentrations that are less than one-half of the sample quantitation limits, this assumption would likely be an overestimation of the concentration in the sample. This is considered to be an overestimation of the concentration present since it is unlikely that the distribution of datapoints would all be at the same concentration.

As per EPA guidance for risk assessment, elimination of compounds from the risk assessment, is allowed if the frequency of detection is less than 5 percent. Our assessment also involved comparison between the maximum detected value and an appropriate regulatory guideline as an additional level of protection before eliminating a compound from the analysis. While this approach adds uncertainties by eliminating compounds from the assessment, this uncertainty was deemed acceptable. This is because the sampling effort was extensive and provided an thorough depiction of the site conditions. Thus, the likelihood that a location, such as a "hot spot", that could increase the risk was not sampled or was sampled at a frequency less than 5 percent is considered remote.

EPA guidelines also allows eliminating compounds from consideration by comparison to background concentrations. If the dataset used to evaluate risk can be shown to be the same as background concentrations then the additional risk afforded by the compound can be eliminated. Only metals in soil and groundwater were compared to background. This comparison eliminated numerous metals, including: aluminum, antimony, arsenic, barium (groundwater only), beryllium, cadmium (groundwater only), calcium (soils only), chromium (groundwater only), cobalt, copper (groundwater only), iron, lead (groundwater only), magnesium (soils only), manganese, nickel, potassium (groundwater only), selenium (groundwater only), silver, thallium (groundwater only), vanadium, zinc (groundwater only) and cyanide (groundwater only). Although removing datapoints from the analysis of risk can lead to uncertainties, possibly

underestimation of risk, the analysis that was performed to justify removing these compounds were based upon EPA approved techniques at the 95th confidence level. Therefore there would be a 5 percent chance that the data evaluation would eliminate a compound from the database when it should not have been.

Anthropogenic organic compounds, such as Polynuclear Aromatic Hydrocarbons (PAH)s were not compared to background and were not eliminated from the soil or groundwater database. By not comparing anthropogenic organic compounds to background, the estimation of risk would increase, as organic, as organic compounds, such as PAHs, are likely to be present in background soil, especially near roadways. Surface water samples were not compared to background as an insufficient number of background datapoints were available to be used to perform the comparison.

Uncertainties in the exposure assessment are also related to how often an individual would actually come in contact with chemicals of concern, which is the period of time over which such exposure would occur. Section 6.7.2 of the RI discusses uncertainty associated with: 1) future land use, and 2) exposure model assumptions. Future land uses at the time the RI was performed was uncertain. Since 1995, when the depot was listed final on the BRAC list, the issue of future land use has become clearer. The future land use for the OB Grounds is as a wildlife conservation/recreation area. Although a future recreator was not considered in the risk assessment, a future on-site residential scenario was considered. Even under this conservative scenario, the site risks did not exceed the EPA target ranges. Lead, not considered in the risk analysis because it lacks a reference dose, was considered separately. Models were used to estimate the concentrations of the chemicals of concern in dust at the point of exposure for current on-site workers and future residential on-site receptors. The models used were EPA approved models.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high doses 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 utilizing toxicity values that are derived by recognized agencies that have uncertainty factors incorporated into the value. These toxicity values are published and regularly updated by various health organizations. To ensure that accurate and updated toxicity information is used in assessing risks, toxicity information is obtained from recognized and pre-approved, databases such as the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST). These databases compile and maintain toxicity data when it is published and updated. This risk assessment utilized these databases as sources to obtain the current toxicity values used in the assessment.

The toxicity values used represent conservative estimates of allowable doses for both non-carcinogenic and carcinogenic components. Assumptions concerning exposure parameters such as ingestion of soil or inhalation of particulate matter were obtained from the EPA guidance document Risk Assessment Guidance for Superfund, (RAGS). This document, along with various supplemental EPA guidance on estimating the exposure term for risk assessments are documented throughout the assessment. As a result, the risk assessment provides a reasonable yet upper-bound estimate of the risks the site poses. Section 6.7.3 of the RI discusses uncertainty associated in toxicity assessments

Uncertainties in the characterization of risk exist because of the assumption of dose additivity for multiple substance exposure (Section 6.7.4 of the RI). That assumption ignores the possible synergism and antagonisms among chemicals, and assumes similarity of mechanisms of action and metabolism. The synergistic or antagonistic effect of these chemicals that contribute to the estimated risk value are complex and has not been evaluated for conditions specific to the OB Grounds. Antagonistic effects of one compound with another would tend to reduce the overall effects that an individual chemical may exhibit. Synergistic effects would tend to enhanced the overall effect. Each chemical detected at the site is assumed to contribute to the total site risk in a manner that is independent of any other chemical. It cannot be determined if this assumption is conservative or not as the synergistic or antagonistic effects are not known.

More specific information concerning public health risks, including quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in Section 6.0, Baseline Risk Assessment, of the OB Grounds RI report.

8.0 REMEDIAL ACTION OBJECTIVES

8.1 General Remedial Action Objectives

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process considers risk reduction when establishing Remedial Action Objectives (RAO)s. It requires that the overall objective of any remedial response is to reduce the environmental and human health risks of the chemicals present in the various environmental media, to within established EPA target ranges. Additionally, the National Contingency Plan (NCP) requires that CERCLA remedial action objectives must comply with all ARARs. Finally, CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, requires that a CERCLA remedial action must be cost-effective and must use permanent solutions to the maximum extent possible. RAOs have been developed that consist of media-specific objectives for the protection of human health and the environment. These objectives are intended to reduce risks to acceptable levels, and, should a remedial action be required, comply with ARARs to the maximum extent possible.

8.2 Risk-Based Remedial Action Objectives

The primary threat at the OB Grounds under current and intended future site use is through exposure to on-site soils and sediments in the low-lying wet areas and sediments in Reeder Creek. The results of the baseline risk assessment completed as part of the RI concluded that site conditions do not pose a threat to human health. The highest risk was to a theoretical on-site resident, however, this risk was still within the EPA target range. Therefore, if risk-based health criteria are applied to the OB grounds, remedial objectives have been met with no further action. However, one facet of the risk assessment that was not considered is the risk posed to receptors from exposure to lead. Lead was determined to be present in numerous areas at the site and was recognized as a constituent of concern. Lead was not considered in the baseline risk assessment because the Reference Dose (RfD) for lead has been withdrawn for use by EPA and therefore lead was not carried through the entire risk assessment.

As a result, consideration was given to reducing lead concentrations to a predetermined level that would be considered to be protective of human health. EPA has provided guidance for protection of human health from lead by application of the UBK model. The model calculated blood lead levels in children. The allowable lead level in blood has been established at 10 ug/dL. Using standard exposure default values for soil, under residential conditions, EPA guidance

suggested that concentrations of lead in soil of approximately 400 mg/kg would provide reasonable levels for protection. While this guideline is not site-specific it provided a basis for establishing the OB Grounds clean-up value. The 400 mg/kg value of lead in soil was considered conservative, since it was considered protective to child receptors from a residential exposure scenario. This exposure scenario was considered unrealistic, since the Army initially intended to continue to use this site as a munitions destruction area, not as a residential area. A value of 500 mg/kg was established as the clean-up goal for the OB Grounds, based upon the future land use, which was industrial, i.e. munitions destruction. With the inclusion of SEDA on the BRAC95 list, future land use changed from industrial to a wildlife conservation/recreation area. Since the future land use did not involve residential exposures the 500 mg/kg value of lead in soil was deemed appropriate and remained.

Unlike the human health risk assessment, there are no allowable carcinogenic or non-carcinogenic target ranges established for protection of ecological receptors. Instead, the ecological risk analysis was based upon a comparison with available state and federal guidelines and supplemented with literature derived guidelines. This comparison suggested that there may exist a potential risk from the presence of heavy metals, specifically lead and copper. As a result of this comparison, it was determined that a remedial action would be appropriate for copper and lead, in order to assure the protection of the aquatic life and wildlife consumers of aquatic life. The remedial action objective for protection of ecological receptors was established as those presented in the NYSDEC guidance document "*Technical Guidance for Screening Contaminated Sediments*, November, 1993". For lead and copper, the values adopted by NYSDEC and referenced in the guidance were the Lowest Effect Level (LEL) presented by Persaud et al. (1992). In addition, since the OB Grounds will be utilized as a wildlife conservation area, the concentration of lead determined to be protective of terrestrial ecological receptors was also established. To protect ecological receptors, such as birds, from ingestion of lead during foraging activities all surface soil above 60 mg/kg will be covered with a vegetative cover. The value of 60 mg/kg was supported by soil lead levels considered to be protective of ecological receptors presented by the U.S. Fish and Wildlife Service in the publication, *Evaluating Soil Contamination, Biological Report 90, (2), July, 1990.*

8.3 ARAR-Based Remedial Action Objectives

The investigation and clean-up of the OB Grounds falls under the jurisdiction of both the State of New York regulations (administered by NYSDEC) and Federal regulations (administered by USEPA Region II). The categories of potentially applicable state and federal requirements are: chemical-specific, location-specific and action-specific.

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

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

Chemical-specific ARARs address certain contaminants or a class of contaminants and relate to the level of contamination allowed for a specific pollutant in various environmental media (water, soil, air). Location-specific ARARs are based on the specific setting and nature of the site. Action-specific ARARs relate to specific actions proposed for implementation at a site. Both location-specific and action-specific ARARs are independent of the media. In addition to ARARs, advisories, criteria or guidance may be evaluated as "To Be Considered" (TBC) regulatory items. CERCLA indicates that the TBC category could include advisories, criteria or guidance that were developed by EPA, other federal agencies or states that may be useful in developing CERCLA remedies. These advisories criteria or guidance are not promulgated and, therefore, are not legally enforceable standards.

8.4 Site Specific Cleanup Goals

Site-specific clean-up goals have been established between NYSDEC, the USEPA (Region II) and the Army for the OB Grounds. The cleanup goals are listed below:

- As an initial step in the remediation process, all Unexploded Ordnance (UXO) from areas of the site to be excavated will be removed. The Army will also conduct UXO detection and removal operations for the remaining portions of the site. The Army will conduct a UXO clearance and removal operation following approved techniques and procedures, however, there will always be a risk involved and the Army cannot certify that the site will be free of all UXOs.
- Remediate on-site soils with concentrations of lead greater than 500 mg/kg to protect human health. Although the current site hazard index (0.33) and total cancer risk (1×10^{-5}) for residential use are within the acceptable EPA risk range, lead was not considered as part of the risk assessment. The 500 mg/kg clean-up level for lead in soil was agreed to after consideration of the technical issues associated with protection for human health, potential leaching to groundwater, RCRA closure and background for lead in soil, which is approximately 23 mg/kg.
- Remediate sediment in Reeder Creek until the remaining sediment is below 31 mg/kg for lead and 16 mg/kg for copper, which is protective of the aquatic community in Reeder Creek. The remedial action goal for sediments in Reeder Creek was established as the concentrations of copper and lead presented in the NYSDEC "Technical Guidance for Screening of Contaminated Sediments". These values were established as maximum values that would be protective of the aquatic community in Reeder Creek.
- Conduct appropriate post-remediation groundwater monitoring to assure continued protection of groundwater. The EPA has required that the future use of the groundwater would be restricted until post remediation monitoring proves that there will be no risks to human health.
- Cover the areas of the OB Grounds with soils containing lead concentrations above 60 ppm with at least 9 inches of clean fill. The cover would prevent direct contact and incidental soil ingestion by terrestrial wildlife.
- Develop vegetative stabilization of the soil at the OB Grounds to minimize erosion and possible recontamination of Reeder Creek, and to prevent direct contact and incidental soil ingestion by terrestrial wildlife; and

- Conduct periodic monitoring of the sediments in Reeder Creek to ensure that they are not being recontaminated by the lead left in the soils at the site.

The site clean-up goals for the OB Grounds are presented in **Table 8-1**

8.5 General Response Actions

Appropriate response actions are those actions that involve control of inorganics in soil and sediment and removal of UXOs from the site. Controlling these materials will ensure that exposure to humans and ecological receptors are prevented and will accomplish the remedial action goals for soil and sediments. The initial response action for each alternative, except the No-Action Alternative, will be the removal of UXOs from the areas of the site to be remediated. Since groundwater, surface water and air are not a media of concern, other than preventing further degradation to the quality of these various media, general response actions for these media have not been considered. Unlike actions for organics compounds, response actions for inorganic constituents, do not involve breaking down the components, via a treatment process, to a less innocuous substance. Instead, the actions that are appropriate for metals are those that prevent exposure by isolation, such as within a landfill, or by chemically or physically binding the metals into a stabilized matrix. In some cases, if site conditions are favorable, it is possible to accomplish this in-situ, otherwise some excavation and consolidation of materials from disperse locations will be required prior to isolation or treatment.

General response actions for soil/sediment treatment at the OB Grounds are divided into the following groups:

- No Action,
- Containment Actions,
- Excavation/Ex-situ Treatment Actions and
- Excavation/Disposal Actions.

Technologies and processes associated with these actions are assembled into alternatives and presented in **Table 8-2**.

Table 8-1

SENECA ARMY DEPOT ACTIVITY
OPEN BURNING GROUNDS

SITE-SPECIFIC CLEANUP GOALS FOR MEDIA OF CONCERN

Environmental Media	Remedial Action Objectives	Clean-up Goals	Basis
On-site Soil & Sediment	1) Prevent leaching to groundwater	500 mg/kg lead	Protection of groundwater
	2) Prevent ingestion/direct contact with soil having lead in excess of 500 mg/kg,		Allow conservation/recreational land use
	3) Prevent soil loading to Reeder Creek,		Protect ecological receptors in Reeder Creek
	4) Meet RCRA requirements for closure,		Compliance with ARARs
	5) Prevent Ecologial receptors from ingesting soil with lead in excess of 60 mg/kg.	60 mg/kg lead	Protect ecological receptors at OB Grounds
Reeder Creek Sediment	6) Prevent bioaccumulation of copper and lead	16 mg/kg for copper and 31 mg/kg for lead	Protect ecological receptors in Reeder Creek

Table 8-2
SENECA ARMY DEPOT ACTIVITY
OPEN BURNING GROUNDS

ASSEMBLED REMEDIAL ALTERNATIVES

ALTERNATIVE	TECHNOLOGIES AND PROCESSES
1	No Action
4	Excavation/Solidification/Stabilization of soils exceeding TCLP/Off-site landfill - Unexploded Ordnance (UXO) Clearance - Excavation/Solidificaton of soils above TCLP criteria - Excavation of remaining soils with lead concentrations above 500 mg/kg; - Excavation of sediments in Reeder Creek that exceed NYSDEC sediment criteria for lead (31 mg/kg) and copper (16 mg/kg); - Disposal of all excavated soils/sediment in off-site Subtitle D landfill - Vegetative cover (9 inches) where lead in soil is greater than 60 mg/kg - Runoff control through site grading - Long-term groundwater and sediment monitoring
5	Excavation/Solidification/Stabilization of soils exceeding TCLP/ On-site landfill - Unexploded Ordnance (UXO) Clearance - Excavation/Solidificaton of soils above TCLP criteria - Excavation of remaining soils with lead concentrations above 500 mg/kg - Excavation of sediments in Reeder Creek that exceed NYSDEC sediment criteria for lead (31 mg/kg) and copper (16 mg/kg) - Disposal of all excavated soils/sediment in an on-site Subtitle D landfill - Vegetative cover (9 inches) where lead in soil is greater than 60 mg/kg - Runoff control through site grading - Long-term groundwater and sediment monitoring
6	Excavation/Soil Washing - Excavation of all soils with lead concentrations above 500 mg/kg, including soils above TCLP criteria - Excavation of sediments in Reeder Creek that exceed NYSDEC sediment criteria for lead (31 mg/kg) and copper (16 mg/kg); - Soil washing with coarse soil fraction backfilled and fine fraction to off-site treatment and landfill - Vegetative cover (9 inches) where lead in soil is greater than 60 mg/kg - Runoff control through site grading - Long-term groundwater and sediment monitoring

9.0 DESCRIPTION OF ALTERNATIVES

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

This ROD evaluates in detail the four remedial alternatives for addressing the contamination associated with the OB Grounds site. The time to implement a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate with the responsible parties, procure contracts for design and construction or conduct operation and maintenance at the site.

A detailed screening of the alternatives included an extensive ranking process on the nine evaluation criteria (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, short-term effectiveness, implementability, cost, state acceptance, and community acceptance). Overall protection of human health and the environment and compliance with Applicable or Relevant and Appropriate Requirements (ARARs) were considered threshold criteria because any alternative that did not meet these criteria was not considered further. The four alternatives described below were retained for a detailed screening analysis. These alternatives are discussed in detail in the FS.

The following remedial alternatives were evaluated:

Alternative 1 - The No-action Alternative: This alternative was evaluated in detail in the FS to serve as a baseline to other remedial alternatives under consideration, which is required by the Superfund program. There are no costs associated with No-Action Alternative. The No-Action Alternative means that no remedial activities would be undertaken at the site. No monitoring or security measures would be undertaken. Any attenuation of the threats posed by the site to

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

Alternatives 4 through 6: Common Components All of the remaining alternatives have five components in common. These components, that were developed to meet the remedial action objectives required by the Army, NYSDEC, and the USEPA, include groundwater monitoring, runoff control, site revegetation, protection of ecological receptors, ordnance clearance and periodic monitoring of the sediments in Reeder Creek. Each component is provided below:

- An appropriate site groundwater monitoring program will be developed.

- A 9 inch soil cover will be placed over areas of the OB Grounds with soils containing lead concentrations above 60 mg/kg. The area to be covered is estimated to be approximately 27.5 acres, which is most of the OB Grounds. Slope stabilization will also be provided near Reeder Creek, as necessary, to control soil runoff. The PRAP incorrectly identified the area to be covered as 43.8 acres.

- A cover of native vegetation will be established as an additional erosion control measure.

- Sediment sampling in Reeder Creek will be conducted on an annual basis at locations within the reach affected by the OB grounds. This reach includes the section of Reeder Creek adjacent to and downstream of OB Grounds.

- Unexploded Ordnance (UXO) will be cleared by a qualified UXO contractor.

Remediation of Ordnance and Explosives (OE) will be required for Alternatives 4 through 6, above. This will involve two different efforts. The initial effort will involve removal of OE from soils that will require treatment or disposal as part of the remedial program. Trained UXO technicians, working for a qualified UXO contractor, will be responsible for removing OE, OE-related scrap and scrap from those soils to be processed and treated/disposed. This will be necessary in order to protect any soil remediation contractor/landfill operator from harm during subsequent treatment/disposal operations. The second effort will require OE remediation over the remainder of the site after lead-contaminated soils have undergone treatment/disposal. This effort will involve the removal of OE, OE-related scrap and scrap from the surface and to a given

depth. For both efforts, any UXO found will be detonated on SEDA property and the resulting scrap will be disposed of as appropriate.

All OE efforts will be designed, carried out, reported and presented for public review and approval prior to initiation. All work involving OE will be performed in compliance with the regulations of the Department of Defense Explosives Safety Board (DDESE).

Because these alternatives would result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the lead agency review the remedial action no less than every five years after its initiation. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative 4 - The Off-Site Disposal Alternative: The off-site disposal alternative would involve excavation of the soils that are expected to exceed the Toxicity Characteristic Leaching Procedure (TCLP) limits; sediments from Reeder Creek with concentrations of copper and lead exceeding the 31 mg/kg limit for lead and the 16 mg/kg limit for copper; and soils from the low hill, berms, pads and hotspots between the pads with lead concentrations above the 500 mg/kg Remedial Action Objective for lead in soil. Excavated soil that exceed any of the TCLP regulatory limits for leaching cause the soil to be classified as a RCRA "characteristic" hazardous waste for the characteristic of toxicity. The EPA land disposal restriction (LDR) prohibits the land disposal of a hazardous waste unless, in the case of a "characteristic" hazardous waste, the characteristic has been removed. Removal of the "characteristic" can be accomplished by treatment prior to disposal. In the case of a metal component such as lead, this treatment involves solidification of the waste to eliminate the leaching of metals. The cumulative total volume of soil and sediment to be excavated is approximately 17,900 CY. The soils exceeding the TCLP regulatory limits would be processed by solidification/stabilization, which is a mechanical mixing operation where a solidifying agent, either pozzolan/portland cement or pozzolan/lime/fly ash, would be added in sufficient quantity to completely solidify the soils. The solidification/stabilization process would reduce the potential for leaching of lead so that the soils will not be characteristic hazardous waste and can then be disposed of as a solid waste. The volume that would be treated prior to disposal is approximately 3,800 CY. The solidification/stabilization treatment step could be accomplished either on or off-site. If treatment is conducted on-site, the cost is lower. The solidified soils and the remainder of the contaminated soil and sediment would then be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal.

The site would be regraded and clean fill would be backfilled wherever soil was removed. The topsoil cover would be vegetated with indigenous grasses as an erosion control measure.

Estimated Capital Cost: $3.6 (on-site treatment) to $5.2 million (off-site treatment)
Estimated O & M Cost: $45,300/year
Estimated Present Worth Cost (30 years): $4.1 to $5.7 million
Estimated Construction Time: Treatability testing for the solidification process would take two to three months. Remediation would take five to six months.

Alternative 5 - The On-Site Disposal Alternative: The On-Site Disposal Alternative involves excavation of soils that are expected to exceed the TCLP limits, sediments from Reeder Creek, and soils with exceedances of the 500 mg/kg Remedial Action Objective for lead in soil. The soils and sediment to be removed for this remedial action are described in more detail in Alternative 4. The cumulative total volume of soil and sediment to be excavated is approximately 17,900 CY. The soils exceeding the TCLP regulatory limits would be processed through a solidification/stabilization process which is described in detail in the description of Alternative 4. Approximately 3,800 CY would be solidified prior to landfilling. The solidified soils and the remainder of the contaminated soils and sediment would then be disposed of in an on-site Subtitle D, solid waste industrial landfill.

The on-site landfill would be constructed at the OB Grounds and would be sized to accept similar types of contaminated soil from this site and other SEDA sites. The landfill would meet the requirements of a Subtitle D landfill for the USEPA and the requirements of NYSDEC identified in 6 NYCCR Part 360 for landfill construction. The landfill would be located based on geological requirements and reuse impacts. The regulations require that post-closure care and monitoring be conducted for a minimum of thirty years. In general, the maintenance required is erosion control, pest control, and maintenance of the vegetative cover. Monitoring wells in the vicinity of the landfill would be sampled quarterly. Any releases from the landfill would be addressed accordingly.

After the excavation, the site would be regraded. Clean fill would be brought in to make up for the waste removed. The topsoil cover would be vegetated with indigenous grasses as an erosion control measure.

Capital Cost: $5.2 million
O & M Cost: $49,100/year
Present Worth Cost (30 years): $5.7 million

Construction Time: Treatability testing for the solidification process would take two to three months. Construction of the landfill should require one to three months. Closure of the landfill would take an additional two to three months.

Alternative 6 - The Innovative Treatment Alternative: The innovative treatment alternative would involve soil washing. For this alternative, the soils and sediment would be excavated and "washed" to separate the coarse fraction of soil from the fine fraction. The soils and sediment to be removed for this remedial action are described in detail in Alternative 4. The coarse fraction would be backfilled as clean fill provided that the requirements of the Remedial Action Objective are met. The fine fraction is expected to contain the majority of the target constituents of concern, i.e. lead and copper, and would be treated, either via solidification or acid leaching, to reduce the potential for leaching of lead so that they would not be characteristic hazardous waste. Following this treatment, the fine fraction would be disposed of off-site. If the fine fraction undergoes an acid extraction process and the process is successful at reducing the concentration of lead to below the 500 mg/Kg goal, it may be possible to minimize the volume of soils that would require off-site disposal. This would be accomplished by backfilling the remediated fine fraction with the clean coarse fraction or reusing it as daily landfill cover. The fine fraction which contains concentrations of lead above 500 mg/Kg would be further treated via technologies such as acid extraction or solidification. Soil washing is expected to be done at a rate of 25 tons/hour or about 17 cubic yards/hour. Treatability studies would be conducted prior to implementation of the technology to estimate the actual volume reduction achieved by the process.

The final step in the remedial action is site restoration. After backfilling the clean fraction, the site would be regraded. If necessary, clean fill would be brought in to make up for the waste removed. The topsoil cover would be vegetated with indigenous grasses as an erosion control measure.

Capital Cost: $10.6 million
O & M Cost: $45,300/yr
Present Worth Cost (30 years): $11.1 million
Construction Time: Remediation will take three to six months.

Because these alternatives would result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the lead agency review the remedial action no less than every five years after its

initiation. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

10.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

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

A detailed alternative analysis using the nine evaluation criteria was performed to select a site remedy. This section presents a summary of the comparison of each alternative's strengths and weaknesses with respect the nine evaluation criteria.

10.1 Summary Of Evaluation Criteria

The nine criteria are summarized as follows:

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

1. **Overall protection of human health and the environment** addresses whether or not remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether a remedy will meet all of the ARARs of other federal and state environmental laws and/or will provide grounds for invoking a waiver.

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

3. **Long-term effectiveness and permanence** addresses the criteria that are used to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.
4. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives use recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principle threats posed by the site.

5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until the cleanup goals are achieved.
6. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services to implement a particular option.
7. **Cost** includes estimated capital, operation and maintenance (O&M), and present-worth costs.

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

8. **State acceptance** addresses the state's position and key concerns related to the selected remedy and other alternatives, and the state's comments on ARARs or the proposed use of waivers.
9. **Community acceptance** addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS.

The assembled alternatives were screened as described in the EPA guidance. These alternatives, were evaluated against short-term and long-term aspects of three broad criteria: effectiveness, implementability and cost. Because the purpose of screening is to reduce the number of alternatives that will undergo detailed analysis, the screening conducted in this section is of a general nature. Although this is necessarily a qualitative screening, care has been taken to ensure that screening criteria are applied consistently to each alternative and that comparisons have been made on an equal basis, at approximately the same level of detail.

10.2 Comparison of the Alternatives

The following presents the nine criteria, summaries of the alternatives and identifies the relative advantages and disadvantages of each according to the detailed comparative analysis. A summary of the analysis of each alternative in terms of the criteria is presented in **Table 10-1**.

Overall Protection of Human Health and the Environment - The No Action Alternative is currently within the EPA target risk range for carcinogenic risk and below the target value for non-carcinogenic risk for the future on-site residential exposure scenario. The total site non-carcinogenic risk, HQ, for this scenario was determined to be 0.33, which is below the EPA target

SEDA - OB Grounds ROD

Table 10-1
Individual Evaluation of Alternatives

Criteria	Alternative 1 No Action	Alternative 4 Excavation/Solidification Off-site Landfill	Alternative 5 Excavation/Solidification On-site Landfill	Alternative 6 Excavation/Soil Washing
OVERALL PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT				
Human Health Protection (EPA target range is 1 x 10E-4 to 1 x 10E-6 for carcinogenic risk and an HI < 1.0 for noncarcinogenic risk)	Risk to future on-site residential exposure 1 x 10E-5 HI = 0.33	Risk to future on-site residential exposure 9 x 10E-6 HI = 0.11	Risk for future on-site residential exposure 9 x 10E-6 HI = 0.11	Risk to future on-site residential exposure 9 x 10E-6 HI = 0.11
Exposure Pathway - Direct Contact and Ingestion of Soils with concentrations >500 mg/kg for lead.	Not protective; Soils with lead concentrations >500 mg/kg remain in-place.	Protective of human health; Soils with lead concentrations >500 mg/kg removed.	Protective of human health; Soils with lead concentrations >500 mg/kg removed.	Protective of human health; Soils with lead conc.. >500 mg/kg removed
Protection of Ecological Receptors	Does not protect receptors in Reeder Creek; Sediments > NYSDEC Sediment Criteria Remain.	Protects ecological receptors; Sediments > NYSDEC Criteria removed from Reeder Creek.	Protects ecological receptors; Sediments > NYSDEC Criteria removed from Reeder Creek.	Protects ecological receptors; Sediments > NYSDEC Criteria removed from Reeder Creek.
COMPLIANCE WITH ARARs	Complies with all ARARs *	Complies with all ARARs *	Complies with all ARARs *	Complies with all ARARs *
LONG-TERM EFFECTIVENESS AND PERMANENCE				
Magnitude of Residual Risk	Sources have not been removed. Potential threat will remain.	No residual risk will exist as no impacted soils will remain on-site.	No residual risk will exist , providing landfill does not leak.	Treatment residuals consisting of coarse fraction will remain on-site but will be tested to assure that no unacceptable levels of lead remain.
Magnitude of Residual Risk				
Permanence	Not a permanent solution.	Once soils removed from site, remedial action considered permanent.	Once soils are placed in the on-site landfill, the remedial action would be permanent, providing no releases occur.	Upon completion this action will be considered permanent.

* The NYSDEC Class GA Standard and the Federal Action Level for Lead was exceeded in 2 wells during the RI program. Subsequent sampling of one of the two wells, performed as part of the quarterly groundwater moitoirng program did not confirm the exceedence. The Army believes that that exceedances are due to turbidity of the groundwater samples.

Table 10-1
Individual Evaluation of Alternatives

Criteria	Alternative 1 No Action	Alternative 4 Excavation/Solidification Off-site Landfill	Alternative 5 Excavation/Solidification On-site Landfill	Alternative 6 Excavation/Soil Washing
REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT				
Reduction of Toxicity, Mobility, or Volume	Little to none; Some attenuation is expected due to natural mechanisms.	Toxicity and mobility reduced through treatment and landfilling. Treated soil will have larger volume than untreated soil, but treated soil will not be a hazardous waste.	Very effective in reducing mobility and toxicity of constituents. Treated soil will have larger volume than untreated soil, but treated soil will not be haz. waste.	Very effective in reducing volume, toxicity, and mobility. Solidification reduces toxicity and mobility. Soil washing reduces the volume.
SHORT-TERM EFFECTIVENESS				
Community Protection	Most protective under current conditions; i.e., least short-term effects.	Least protective due to increase in dust and potential for vehicular accidents due to transportation of waste materials to an off-site landfill.	Most protective of remedial actions as no transportation of waste materials off-site will occur. Some dust will be produced during filling and construction of landfill.	Moderately protective as some transportation of waste materials off-site will occur. Hazardous materials (acids) may be transported on-site for extraction.
Worker Protection	Not applicable.	Least protective due to increase in dust and potential for vehicular accidents due to transportation of waste materials to an off-site landfill. Protection required from exposure.	Most protective of remedial actions as no transportation of waste materials off-site will occur. Some dust will be produced during filling and construction of landfill. Protection required from exposure.	Moderately protective ; Excavation and off-site transportation of waste materials increase potential for worker exposure and risk. Use of hazardous materials will also increase potential for worker exposure.
Environmental Impacts	Not applicable.	Excavation will increase potential for runoff to Reeder Creek.	Excavation will increase potential for runoff to Reeder Creek.	Least protective due to increased potential for spills during washing.
Time Until Action is Complete	Not applicable	Treatability studies: 2 to 3 months Remedial action: 1 to 3 months Quickest to attain remedial goals.	Permitting an on-site landfill will require substantial time. Once permitting is approved : Treatability studies: 2-3 months Remedial action: 2 to 3 months	Mob. & Prove-out: 1 to 2 months Soil Washing: 1 to 3 months Backfilling & Demob.: 1month. Moderate time required to attain goals, due to soil washing process rate.

Table 10-1
Individual Evaluation of Alternatives

Criteria	Alternative 1 No Action	Alternative 4 Excavation/Solidification Off-site Landfill	Alternative 5 Excavation/Solidification On-site Landfill	Alternative 6 Excavation/Soil Washing
IMPLEMENTABILITY				
Technical Feasibility	No obstacles.	Most feasible, standard excavation equipment required. Solidification is routinely applied technology.	Moderately feasible, due to the potential technical issues associated with landfill siting.	Soil washing is feasible but least feasible of the three remedial actions as this technology is considered the most innovative and least proven for OB site conditions.
Ease of Doing More Action if Needed	Least interference as nothing is to be done.	Least interference of remedial actions as no permanent structure left on-site	Most interference as on-site landfill will hamper any future actions.	Moderate level of interference as some equipment slabs and roadways may interfere with future actions.
Ability to Obtain Approvals and Coordinates with Other Agencies	No approval necessary	Landfill space is abundant in the region. Permitting will not be req. providing the waste meets the requirements of the landfill. Standard bill of lading required to transport waste materials to facility. Most likely to be approved.	NYSDEC permit req'd for Subtitle D landfill construction. Permitting may take 6 months to a year, or more. Least likely to be approved.	Moderately likely to be approved as this alternative will involve the construction of a waste treatment facility.
Availability of Services and Materials	No services or capacities required	Most available, Subtitle D landfills located nearby. Treatability studies will be req'd for stabilization process.	Moderately available, requires specialized materials and installation contractors.	Least available, as technology is available from small, specialized group of soil washing contractors.
COST				
Capital Cost	$0	$3.6 to $5.2 Million	$5.2 Million	$10.6 Million
Annual O&M Cost	$0	$45,300	$49,100	$45,300
30 Year Present Worth Cost	$0	$4.1 to $5.7 Million	$5.7 Million	$11.1 Million

value of 1.0. The total site carcinogenic risk for this scenario was calculated to be 1.0×10^{-5} which is within the EPA target range of 1×10^{-4} to 1×10^{-6}. Therefore, this alternative is considered to be protective of human health based on the calculate carcinogenic and noncarcinogenic risks.

However, lead is not included in these calculations and based on the results of the UBK blood lead model, this alternative does not protect against ingestion of and direct contact with soils having concentrations of lead above 500 mg/kg. All of the constituents of concern will remain in-place. The current SEDA security measures prevent public access to the site and there is currently little or no risk to the public because there is no exposure. However, since the depot is scheduled to be closed under BRAC95, these security measures will eventually be eliminated and the site could be considered for alternative future land uses.

This alternative does not provide long-term protection to ecological receptors in Reeder Creek because the sediments with concentrations of lead and copper above the NYSDEC criteria would remain. While no adverse effects were observed during the RI, there is a potential for long-term chronic effects. Further contamination of the creek by runoff from the site would not be prevented. Exposure of terrestrial ecological receptors due to ingestion of soils impacted with heavy metals, such as lead and copper, will also remain.

Alternatives 4, 5, and 6 would protect human health and the environment from lead exposure. These alternatives protect against ingestion of and direct contact with surface soils having concentrations of lead above 500 mg/kg by removing surface soils with concentrations of lead above 500 mg/kg. Removal of soils having concentrations of lead above 500 mg/kg would reduce the HQ from 0.33 to 0.11 and the total site carcinogenic risk would be reduced from 1×10^{-5} to 9×10^{-6}.

These alternatives also meet the soil clean-up criteria established for lead in on-site soils and the sediment clean-up criteria for copper and lead in Reeder Creek. The entire 17,900 CY of soil and sediment would be removed and disposed of in an on-site or off-site Subtitle D landfill or treated by soil washing, depending on the alternative.

Compliance with ARARs - Since the risks associated with the site are acceptable, with consideration being given to lead in soil, the need for remediation of groundwater is not a requirement in accordance with the requirements of CERCLA. ARAR compliance is a requirement should a remedial action be implemented. Since, based upon lead in soil, a remedial action is proposed, each alternative must comply with ARARs. Protection of groundwater from

future degradation is part of the remedial program. Monitoring of groundwater conditions is a part of the remedial action objectives and will be part of the selected alternative. The current quality of the groundwater at the site does not support the need for a groundwater remedial effort. Data collected from the RI indicates that the NYSDEC Class GA Groundwater Standard of 25 ug/L for lead was exceeded in groundwater samples from 2 of the 35 monitoring wells. The Federal Action Level for lead in drinking water of 15 ug/L was exceeded was also exceeded in only these same two wells. The remaining wells were all below both the state and federal groundwater quality protection levels. Filtering of the groundwater samples prior to laboratory analysis removes all lead from the samples. The Army believes that the exceedances are most likely attributed to residual turbidity of the groundwater samples. The Army also believes that because the Federal Action Level for lead in drinking water is not promulgated, only the NYSDEC Class GA Groundwater Standard is an ARAR. The federal action level is considered to be a non-ARAR guideline or a "To Be Considered". The EPA believes that the Federal Action Level is promulgated and is considered to be ARAR. All alternatives except the No Action Alternative include the remediation of soil which can be a potential source of groundwater contamination. Groundwater monitoring is currently being performed and will continue as part of the remedy selected.

Alternative 1, the No Action Alternative, was ranked the lowest for ARAR compliance since there would be no provisions to ensure that future leaching to groundwater would cause potential exceedances of the NYSDEC Class GA groundwater standards for lead and other metals. The remaining alternatives were ranked equally for compliance with ARARs, since monitoring will be part of each alternative.

All of the alternatives meet all of the other ARARs.

Long Term Effectiveness and Permanence - The assessment of the long-term effectiveness is an evaluation of the adequacy and reliability of the implemented solution to maintain protection of human health and the environment. For each landfill alternative, some waste materials will be solidified prior to disposal. Alternative 6 will also involve solidification of waste materials but only after the soil washing process. Permanence is enhanced by the use of solidfying agents, such as lime and cement. These agents react with the heavy metals to form insoluble carbonates and hydroxides, increasing the long term effectiveness and permanence of the solution. The solidified mass is less soluble than the unsolidified mass, and formation of a monolithic mass increases the resistance to weathering. Because Alternatives 4, 5 and 6 involve the use of solidifying agents, this benefit is constant for each alternative.

Alternative 6 is considered the best alternative for long term effectiveness and permanence because the amount of contaminated materials in the coarse soil is reduced through soil washing and the contaminated fines that would be separated out and treated, either via acid extraction or solidification, and disposed of off-site. Treatment is considered a permanent solution and therefore this alternative was ranked highest.

Alternatives 4 and 5 were ranked the next highest. A landfill would be considered permanent providing the landfill does not leak. These alternatives were ranked lower than Alternative 6 because they involved landfilling a larger volume than Alternative 6, with less treatment, thereby increasing the potential for future releases.

Alternative 1, the No Action Alternative, does not provide a permanent solution since no engineering or institutional solution is part of this alternative.

Reduction of Toxicity, Mobility, or Volume Through Treatment - The four alternatives have been compared relative to the decreases in the toxicity, mobility, and volume of the hazardous constituents present at the site.

Alternative 6 was considered the most effective in reducing the toxicity, mobility, and volume of the chemicals of concern present at the site. The primary goal of soil washing is volume reduction, and the process is expected to reduce the volume of contaminated soil to approximately 30 to 50 percent of the original volume. Solidification and landfilling of the washed material represents an additional reduction in mobility.

Alternatives 4 and 5 would also be effective in reducing the toxicity and mobility of the chemicals of concern by removing and isolating these items in a landfill. Although solidification would increase the volume of the waste that would be landfilled, the negative aspects associated with this increase is outweighed by the reduction in mobility and toxicity. Alternatives 4 and 5 are similar in nature and were ranked equally.

For Alternative 1, there would be little or no reduction in the toxicity, mobility, and volume of the wastes. Some natural attenuation would be expected, through chemical and physical changes of the heavy metals.

Short-term Effectiveness - Alternative 1, the No-Action alternative, has the least short-term effects because there are no risks to the community or workers. No remedial solutions will be conducted for Alternative 1. The other three alternatives involve excavation and transportation

which will decrease the short term protectiveness to human health by increasing the potential exposure to dust and physical accidents from heavy equipment traffic through adjacent neighborhoods.

The time to implement the remedial action solutions are similar and therefore, ranked equally. Of the alternatives, Alternative 5 would most likely require the greatest period of time to complete due to the permit equivalencies and approvals required for construction of an on-site landfill. However, once permitted, the actual remedial action (excavation and stabilization) should be completed within seven months. The initial treatability testing and vendor selection should take two to three months. Mobilization should be less than one month, since all of the equipment required is standard construction equipment. The remedial action is expected to take one to three months. Since there would be no off-site transportation of materials, the short term impacts to the local community would be small and therefore this alternative was ranked favorably over the off-site landfilling alternative, Alternative 4, and the innovative treatment alternative, Alternative 6.

Alternative 6 is expected to be completed in three to six months. Mobilization and prove-out testing would require approximately one to two months. Once the unit is fully operational, it would take one to three months to complete the soil washing step. Backfilling, transportation of wastes off-site, and demobilization would be expected to take another month. This alternative was ranked higher than the off-site landfilling alternative, Alternative 4, as there is less off-site disposal required to complete this solution and therefore there would be fewer short term impacts to nearby residences.

Alternative 4 can be completed within five to six months. Treatability testing should require approximately two to three months. Mobilization would be less than one month. The remedial action should be accomplished in one to two months. However, since it may also involve the off-site transport of hazardous waste to a treatment facility, this alternative was ranked the lowest for short term protectiveness.

Implementability - A discussion of implementability can be divided into three sections, technical feasibility, administrative feasibility, and availability of services and materials. Technical feasibility describes items such as construction and operation, technology reliability, and monitoring considerations. Administrative feasibility addresses issues such as permitting, interaction with NYSDEC and EPA, and community relations. Availability of services and materials describes the ease of obtaining vendors and equipment, and the availability of off-site disposal capacity.

All of the alternatives score well on implementability. Alternative 4, which relies on off- site disposal of soils scored the highest of the alternatives. Alternative 4 requires primarily standard earth moving equipment and would be easy to implement. Landfill space is readily available and would not limit the ability to implement this alternative. Alternative 4 ranks higher than Alternative 5 because it is easier to dispose of wastes off-site than to construct an on-site Subtitle D landfill. Alternative 6 is the most difficult to implement because of the need for specialized soil washing equipment.

The criterion of implementability is applicable to Alternative 1, the No Action Alternative, in that there are no implementation obstacles.

Technical Feasibility

Alternative 4, Off-Site Landfilling, was ranked the highest for technical feasibility. Solidification/stabilization is considered to be technically feasible since the materials and equipment used are all standard construction equipment. The excavation process is also considered technically feasible. As the waste materials are in shallow soils, excavation will be easy.

The technical feasibility of Alternative 5 was ranked the next highest. As with Alternative 4, solidification/stabilization will be used to treat waste that exhibit the characteristic of toxicity. This does not factor into the evaluation as it is constant for each alternative. The excavation process would also be identical to Alternative 4 and does not pose a technical feasibility problem. Unlike Alternative 4, there are a number of institutional issues that affect the technical feasibility of this alternative. Although landfill construction is technically feasible, the issues associated with landfill siting and permitting requirements of NYCCR 360 complicate the feasibility of Alternative 5 more than Alternative 4. In order to meet the NYSDEC requirement that the landfill be at least five feet above the seasonal high water table, the landfill would need to be located on high ground, on several feet of clean fill, and would need to have runoff to Reeder Creek controlled.

Alternative 6 was ranked the lowest for technical feasibility. Although soil washing has been used and has been demonstrated to be effective at sites with similar contamination, each is considered unique. Treatability studies would be necessary to confirm that the technology will be effective at the OB Grounds. Like the other alternatives, the excavation portion of the soil washing remedial action is technically feasible and readily implementable. The areas

demonstrating elevated concentrations of heavy metals have been delineated, and the excavation plan would ensure that all areas are removed.

Administrative Feasibility

The administrative feasibility of Alternative 6 is best of the alternatives. This option provides the most permanent solution via treatment. The treatment would be performed on-site and would reduce the volume of material that would be transported off-site for landfilling.

Since several permitted landfills, many of which are involved with expansion plans, are available in the area, Alternative 4 is attractive since there is no need to construct and permit an additional landfill.

The administrative feasibility of Alternative 5 would depend on the ability of site conditions to meet the requirements of the New York code of regulations for landfill construction and permitting. The unit to be constructed would be a Subtitle D solid waste landfill, requiring a NYSDEC permit equivalency. The regulatory requirements, described in 6 NYCRR Part 360 are broad, and include issues such as siting, design, closure, post closure, and monitoring. It would be necessary to obtain NYSDEC concurrence on the acceptability of a single composite liner system. Obtaining the necessary permit and concurrence could take six months to a year, or more, and would require engineering design and procurement.

Availability of Services and Materials

Alternative 4 ranked highest for availability of services and equipment because the equipment is standard and readily available in the Romulus area. The excavation would be accomplished with backhoes and scrapers, and the material would be transported in standard dump trucks. The on-site stabilization unit would consist of a standard pug mill, which is considered readily available construction equipment.

Alternative 5 was ranked lower than Alternative 4 because of the special materials that would be required to construct an on-site landfill. The construction materials include clay which would require that a source be identified and tested for quality and quantity prior to being brought to the site. It is anticipated that a local source would be available but it is possible that an acceptable source may not be found. Clean fill is readily available and could be obtained on the SEDA. The geomembrane and geosynthetic drainage layer are available from a limited number of vendors. While all these materials are available, some are not readily available. Because of this

restriction, Alternative 5 would rank lower in terms of availability of materials. This alternative would also require standard equipment, which is readily available in the Romulus area. The excavation would be accomplished with backhoes and scrapers, and the material would be transported in standard size dump trucks. The stabilization unit would consist of a standard pug mill, or the stabilization could be conducted in a cement truck.

Alternative 6 was ranked the lowest for availability, since this technology is specialized and available from a select number of companies. The number of specialized companies that have experience in implementing soil washing is limited.

Cost - The last criterion to compare is the present worth costs of the alternatives. The present worth costs for each alternative were obtained assuming a 30 year lifespan with a 5% average interest rate and a 3% average inflation rate. The present worth cost was calculated as the sum of the capital cost and the O&M cost adjusted for the conditions described above.

The present worth costs for Alternative 4 are estimated to range from $4.1 to $5.7 million. The present worth costs for Alternative 5 are estimated to be $5.7 million. The present worth costs for Alternative 6 are estimated to be $11.1 million.

The least costly alternative is Alternative 1, the No Action Alternative. Alternative 1 ranks the highest for cost as it is the lowest in cost, i.e. zero. Alternatives 4 and 5 ranked equal for cost since the estimated costs are similar. Alternative 6, soil washing, was ranked the lowest for cost because it is approximately twice as expensive as Alternative 4 and 5 and therefore the most expensive.

10.3 Summary of the Comparison of Alternatives

The baseline human health risk assessment indicates that under the current and future use of the site, the risk-based carcinogenic and noncarcinogenic human health risk values are within the EPA target ranges. Therefore if risk-based health criteria are applied to the OB Grounds, remedial objectives have been met with no further action. However, the risk analysis could not consider the presence of lead in the soils. From the results of the UBK model, it was determined that the range of allowable lead in soil would be approximately 500 mg/kg to 1000 mg/kg for a residential exposure scenario. Based on the results of this study, a site specific remedial action objective for lead in soil of 500 mg/kg was established for the OB Grounds as being protective of human health. Surface soils with concentrations of lead greater than 60 mg/kg will be covered with a vegetative cover to prevent ingestion of soils by terrestrial wildlife.

Based on the comparisons conducted for the ecological risk analysis, remedial actions for copper and lead in sediments were established in order to protect the aquatic life and wildlife consumers of aquatic life.

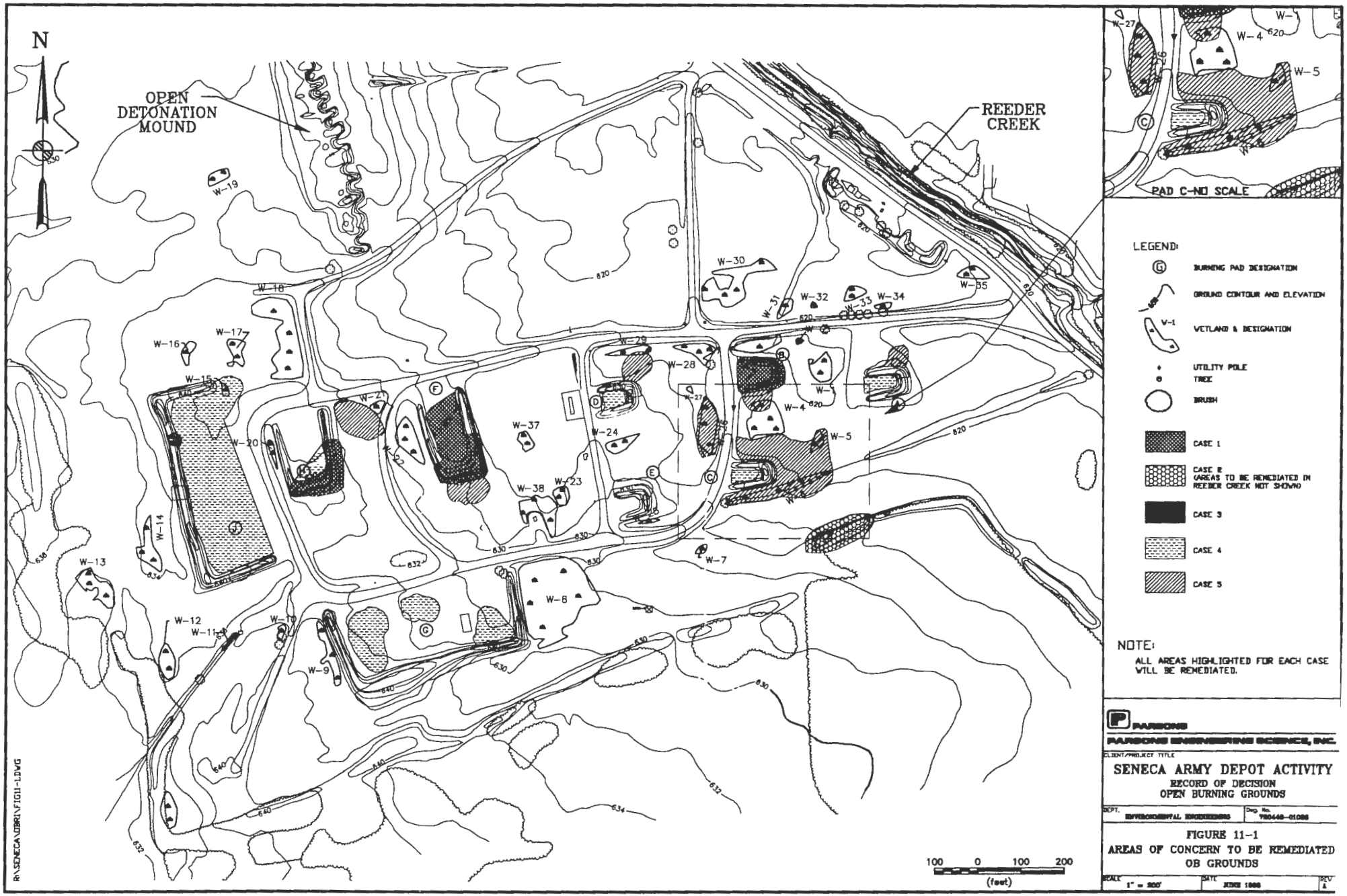
Alternatives 4, 5, and 6 were determined to meet the site specific clean-up objectives for soil and sediment. That is, they are protective against dermal contact with and ingestion of soils having concentrations of lead above 500 mg/kg; prevent leaching of lead from the soil into the groundwater above the NYSDEC groundwater criteria; and protect the ecological receptors within Reeder Creek.

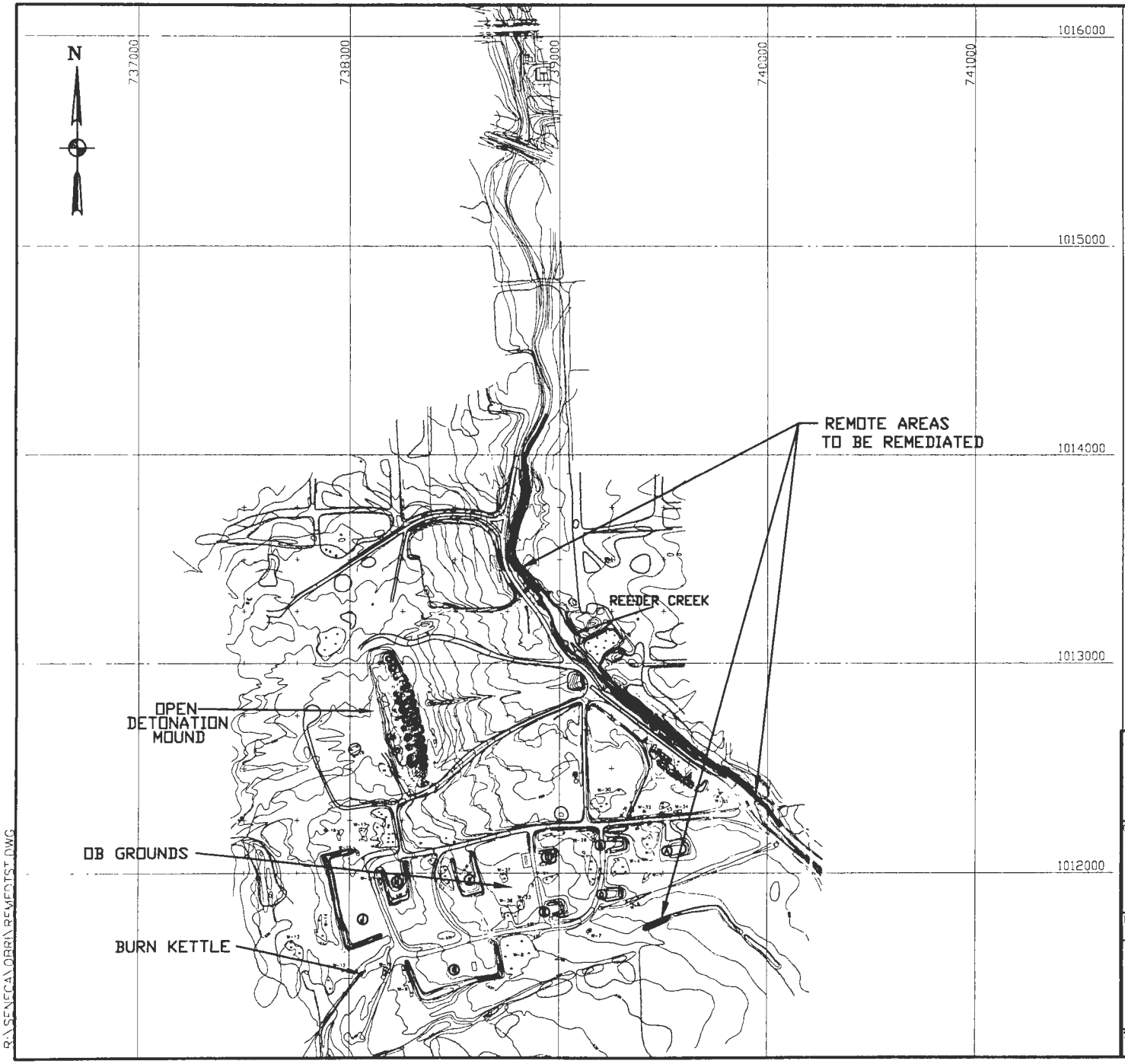
Alternative 6 ranks the highest for long-term protectiveness of human health and the environment, permanence, and reductions in toxicity, mobility, and volume of chemicals of concern. Alternative 4, which involves the off-site disposal of the materials, ranks highest for implementability and cost. Furthermore, Alternative 4 is far less costly than Alternative 6. However, Alternative 4 ranks lowest for short-term protectiveness because all of the soils are transported off-site for disposal while Alternative 5 ranks highest for short-term protectiveness because no hazardous materials are transported from the site.

11.0 THE SELECTED REMEDY

The selected remedy for soil and sediment remediation is Alternative 4, which involves excavation, treatment, and off-site disposal of the on-site soils and Reeder Creek sediments as shown in **Figure 11-1** and **Figure 11-2**. Cases 1 through 5 identified in **Figure 11-1** refer to areas of the OB Grounds where soils exceed the Remedial Action Goal and would be addressed by this action. The categorization of soils into Cases 1 through 5 were done to support an accurate volume estimate of material that would be excavated or distinguish soils that would require special handling or treatment. Case 1 delineates soil that are likely to exceed the TCLP limits for disposal, requiring solidification prior to off-site disposal. Case 2 identifies remote locations of soils and sediment in Reeder Creek that will require removal using sediment removal techniques. The soils and sediment locations for Case 2 are shown seperately on **Figure 11-2** because of the remoteness of these locations from the site. Case 3 identifies the berms on the burn pads that will require removal. Berms are irregularly shaped elevated areas, surrounding the pads that required individual consideration for estimating. Case 4 identifies the burn pads that will require removal. Each of the pads that required removal have different depths and had to be considered individually, separate from the berms because not every burn at every pad required removal. The last case, Case 5, identifies the remaining areas, adjacent to the burn pads that will also require removal. The sum of all of these areas constitute the areas that will be the focus of the remedial action. The remedy includes the following:

- Clearance of UXOs for use as a conservation/recreation area.
- Excavation of soils with lead concentrations above 500 mg/kg and sediments from Reeder Creek with concentrations of copper and lead above the NYSDEC criteria of the 16 mg/kg and 31 mg/kg, respectively.
- Soils exceeding the Toxicity Characteristic Leaching Procedure (TCLP), estimated to be approximately 3,800 CY of the excavated soil, via solidification /stabilization to remove the RCRA characteristic of toxicity. This will allow the soil to be landfilled, in accordance with the requirements of the Land Disposal Restrictions (LDR) of RCRA.
- Disposing of all the excavated and solidified soil in an off-site Subtitle D landfill. The total quantity of soil to be disposed of is 17,900 CY, including the 3,800 CY of solidified soil.


N
OPEN DETONATION MOUND
REEDER CREEK
W-1
W-2
W-4
W-5
W-7
W-8
W-9
W-10
W-11
W-12
W-13
W-14
W-15
W-16
W-17
W-18
W-19
W-20
W-22
W-23
W-24
W-27
W-28
W-29
W-30
W-31
W-32
W-33
W-34
W-35
W-37
W-38
620
630
632
634
640
100 0 100 200
(feet)
PAD C-NO SCALE
LEGEND:
BURNING PAD DESIGNATION
GROUND CONTOUR AND ELEVATION
WETLAND & DESIGNATION
UTILITY POLE
TREE
BRUSH
CASE 1
CASE 2 (AREAS TO BE REMEDIATED IN REEDER CREEK NOT SHOWN)
CASE 3
CASE 4
CASE 5
NOTE:
ALL AREAS HIGHLIGHTED FOR EACH CASE WILL BE REMEDIATED.
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
OPEN BURNING GROUNDS
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 7804A8-01088
FIGURE 11-1
AREAS OF CONCERN TO BE REMEDIATED
OB GROUNDS
SCALE 1" = 200'
DATE JUNE 1998
REV A
R:\SENECA\DBR\VFIG11-1.DWG



LEGEND:

- BURNING PAD DESIGNATION
- GROUND CONTOUR AND ELEVATION
- WETLAND
- UTILITY POLE
- TREE
- BRUSH
- CASE 2

-600 0 600 1200

(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY

RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT	Dwg No
ENVIRONMENTAL ENGINEERING	DRAWING No.

FIGURE 11-2

LICATION OF SOIL & SEDIMENT TO BE REMEDIATED AT REMOTE AREAS

SCALE	DATE	REV
1" = 600'	APRIL 1998	NA

R:\SENECA\OBBN\REMEDTST.DWG

- Construction of a soil cover of at least 9 inches of compacted soils in the areas of the OB Grounds with soils remaining on the site with lead concentrations above 60 ppm. The area to be covered is estimated to be approximately 27.5 acres, which encompasses most of the area of the OB Grounds. The PRAP incorrectly identified the area to be covered as 43.8 acres. The cap will be vegetated with indigenous grasses to prevent erosion and to prevent direct contact and incidental soil ingestion by terrestrial wildlife. The monitoring program will ensure that the 9-inch soil/vegetative cover is maintained after the remedy is complete.
- Control of surface water runoff, as necessary, to prevent erosion of the vegetative cover and solids loading to the creek. This will be accomplished with vegetation, regrading of site topography and drainage swales.
- Conducting a monitoring program for site groundwater and sediment in Reeder Creek. This program will monitor metals. For groundwater, the level of detection will be to below 15 ug/L, the federal action level for lead in groundwater. For sediment, the detection limit for lead will be to 10 mg/kg. Should a significant exceedance be noted, the exceedance will be confirmed through additional sampling and, if confirmed, appropriate corrective measures will be implemented to eliminate the threat posed by the exceedance. For groundwater, this may include metals removal via filtering. For a sediment exceedance observed in Reeder Creek, the source of the exceedance will be identified and confirmed. If the exceedance is determined to originate from the OB Grounds site, then maintenance of or improvements to the existing erosion control systems will be instituted to reduce the threat due to erosion of on-site soils to the Creek. This may include revegatation or the construction of drainage control swales or structures.

Alternative 4 is the most cost effective alternative and is effective in eliminating long-term threats with permanent remedial actions. Alternative 4 is the easiest to implement and will achieve the remedial action goals the quickest. Although Alternative 4 ranks low for short term protectiveness of human health due to increased dust and heavy equipment traffic, these negative components can be controlled through the use of dust suppressants and the construction of temporary haul roads away from congested areas.

Currently the NYSDEC promulgated GA groundwater standard and the federal action level, which EPA recognizes as an equivalent value to the GA standard, for lead was exceeded in one groundwater sample from the site. To ensure that there will be no further impacts, groundwater monitoring will continue and source materials will be removed. The preferred alternative will assure that ARAR compliance is maintained and at a cost lower than the other alternatives evaluated. Therefore, the preferred alternative will provide the best balance of trade-off's among alternatives with respect to the evaluating criteria.

The Army, EPA, and NYSDEC believe that the preferred alternative will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions and treatment technologies to the maximum extent practicable. The remedy also will meet the statutory preference for the use of treatment as a principal element through the use of stabilization of wastes.

12.0 STATUTORY DETERMINATIONS

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

For reasons discussed below, the remedial action selected for implementation at the OB Grounds site is consistent with CERCLA §121, 42 U.S.C. §9621 and, to the extent practical, the NCP. The selected remedy is protective of human health and the environment, attains ARARs, and is cost effective.

A. The Selected Remedy Is Protective of Human Health and the Environment.

The selected remedy is protective of human health and the environment through the use of a combination of treatment and disposal. Alternative 4 reduces acceptable human health risk by eliminating the highest levels of lead found in soils. Alternative 4 also provides long-term protection to ecological receptors by reducing the potential of exposure by wildlife to lead in surface soils by using a vegetative soil cap and by removing sediments in Reeder Creek with concentrations of lead and copper above NYSDEC criteria. This action also reduces the potential for these constituents to migrate to groundwater, even though their migration potential is considered very low in both the short-term and long-term. It reduces the carcinogenic risk to 9×10^{-6} and the non-carcinogenic risk (HQ) to 0.11 for current and future intended land use.

B. The Selected Remedy Attains ARARs.

Currently the NYSDEC GA Groundwater Standard for lead, which is an ARAR, was exceeded in a limited number of groundwater samples collected from the site. The Army believes that these exceedances are due to sample turbidity. To ensure that there will be no further impacts, groundwater monitoring will continue and source materials will be removed. The preferred alternative will ensure that ARAR compliance is

maintained. There are no action-specific ARARs. A list of the ARARs for this alternative are shown in **Appendix D.**

C. The Selected Remedy is Cost-Effective.

The selected remedy is the most cost-effective alternative of the three alternatives retained for detailed evaluation after the No-Action Alternative. This alternative is technically feasible, provides overall protectiveness to human health and the environment proportionate to its cost, and therefore, represents a reasonable value. The small incremental benefit that may be present in the evaluation criteria for the other alternatives is not proportionate to the costs and therefore does not justify using these alternatives.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable.

The selected remedy will be considered permanent when the concentrations of lead in soils are reduced to the site-specific cleanup level for soils. The selected remedy meets the statutory requirement for permanence by disposing of the excavated soils off-site in a secure, non-hazardous, Subtitle D landfill and by the construction and maintenance of a vegetative soil cap for areas with lead concentrations above 60 mg/kg. The selected remedy also meets the statutory requirement for utilizing alternative treatment or resource recovery technologies to the maximum extent practicable by weighing costs as a primary factor. The selected remedy affords the most cost-effective, and most easily implementable remedy while providing the required level of overall protectiveness of human health and the environment. Alternative treatment technologies such as Alternative 6 (soil washing and solidification) do not provide enough additional significant benefits to justify the high costs associated with this remedy.

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

The statutory preference for treatment as a principal element is satisfied by the selected remedy, which relies on solidification of waste materials and off-site disposal in a landfill. Although the selected remedy does not rely on treatment as the principal element, it does address the principal threats posed by soils. The selected remedy

provides the most cost-effective and easily implementable alternative that can achieve the maximum extent of overall protection of human health and the environment.

The selected remedy involves excavation of soils that are expected to exceed the TCLP limits and processing the soils with a solidification operation. Solidification reduces the potential for leaching of lead so that these soils would not be considered a characteristic hazardous waste.

13.0 DOCUMENTATION OF SIGNIFICANT CHANGES

(Reserved).

14.0 STATE ROLE

(Reserved).

APPENDIX A

ADMINISTRATIVE RECORD INDEX

DRAFT INDEX FOR THE OPEN BURNING (OB) GROUNDS

ADMINISTRATIVE RECORD FILE

PREPARED BY the Directorate of Installation Management, Engineering and Environmental Division, Seneca Army Depot Activity (SEDA), New York.

The Administrative Record File for the Open Burning (OB) Grounds Operable Unit and the associated Draft Index to the Administrative Record File has been developed in accordance with the public participation requirements of Sections 113 and 117 of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. §§9613 and 9617; Subpart I of the National Contingency Plan (NCP), 40 CFR 300.8; Final Guidance on Administrative Records for selecting CERCLA Response Actions, OSWER Directive #9833.3A-1; the Inter Agency Agreement (IAG) for SEDA; and Army Regulation 200-1, Section 9-11.

ORGANIZATION OF THE INDEX

This index has been developed to assist both the lead agency and members of the public in locating and retrieving documents included in the Administrative Record File. This Index also serves as an overview of the history of the response action at the site. The index is organized by subject according to the below listed categories:

CATEGORIES

OBG-01	Factual Information
OBG-02	Policy and Guidance
OBG-03	Public Participation
OBG-04	Other Party Information
OBG-05	Decision Documents
OBG-06	Other Information
OBG-07	Enforcement Documents

NOTE: Guidance Documents listed in a Bibliography to a document included in the Administrative Record File may not be listed in the Administrative Record File Index.

NOTE: Information relevant to more than one response decision is placed in the SEDA Multiple Site Information file.

NOTE: * Indicates that the document is maintained in the confidential portion of the OB Grounds Record File located in Building 123, Seneca Army Depot, Romulus, New York 14541-5001. These documents are considered confidential because they contain individual names and addresses of members of the general public. Disclosure of such information could result in a Privacy Act violation.

NOTE: ** Indicates that the file consists of one or more analytical laboratory reports. Upon request to Seneca Army Depot's Public Affairs Officer, groundwater monitoring analysis results will be furnished to any interested party for visual inspection at Seneca Army Depot Activity, Building 116, Romulus, New York.

SHORT INDEX

NUMBER	DOCUMENT NAME
OBG-01-001	Final OB Grounds Workplan.
OBG-01-002	OB Grounds EPA Approval Letter.
OBG-01-003	** Compilation of Groundwater Monitoring Data.
OBG-01-004	Draft OB Grounds Preliminary Site Characterization Summary Report for April 1992.
OBG-01-005	Seneca OBG Validated Data Tables Phase I and II, Aug 93.
OBG-01-006	Remedial Investigation Report at the Open Burning Grounds (and Appendices Vol I and II), Final
OBG-01-007	Feasibility Study Report at the Open Burning Grounds, Draft Final, June 1996
OBG-01-008	Work Plan for the Ordnance and Explosives Removal Action - Open Burning Gounnds Vol 1 and 2)
OBG-02	SEE SEAD-02
OBG-03-001	Proposed Remedial Action Plan (PRAP) for the Open Burning (OB) Grounds at the Seneca Army Depot Activity, Draft-Final, January 15, 1997
OBG-03-002	Public Meeting on OB Grounds PRAP
OBG-04	SEE SEAD-04
OBG-05-001	Record of Decision, Former Open Burning (OB) Grounds Site, Seneca Army Depot Activity, Romulus, NY (Draft)
OBG-06	SEE SEAD-06
OBG-07	SEE SEAD-07

DRAFT ADMINISTRATIVE RECORD FILE INDEX FOR THE
OPEN BURNING (OB) GROUNDS OPERABLE UNIT

SUBCATEGORY: FACTUAL INFORMATION (OBG-01)

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DOCUMENT NUMBER: OBG-01-001

DOCUMENT TYPE: Report

TITLE: Final Architect-Engineer Services for Performing a Remedial Investigation Feasibility Study (RI/FS) at the Open Burning (OB) Grounds.

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: November 1991. (The November 1991 OB Grounds Workplan is the August 1991 OB Grounds Workplan revised by addendums issued in October and November of 1991.)

AUTHOR: Chas. T. Main, Inc.

RECIPIENT: U.S. Army Corps of Engineers, Huntsville, AL

DATE DOCUMENT INCLUDED IN RECORD FILE: July 2, 1992

==========

DOCUMENT NUMBER: OBG-01-002

DOCUMENT TYPE: Correspondence

TITLE: OB Grounds Workplan Approval Letter

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: March 6, 1992

AUTHOR: US EPA

RECIPIENT: Randall W. Battaglia, Seneca Army Depot, Romulus

DATE DOCUMENT INCLUDED IN RECORD FILE: July 2, 1992

==========

DOCUMENT NUMBER: OBG-01-003

DOCUMENT TYPE: Report

TITLE: Compilation of Historical Groundwater (GW) Monitoring Data for Various Sampling Events Between October 1982 and April 1992 and subsequent testing for the Open Burning OB) Grounds Site (bound in three ring binders). Includes Qtrly GW Monitoring Reports for the Site

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: Various - Continuous Update

AUTHOR: Various Analytical Laboratories

RECIPIENT: Seneca Army Depot, Romulus, NY

DATE DOCUMENT INCLUDED IN RECORD FILE: July 2, 1992

==========

DOCUMENT NUMBER: OBG-01-004

DOCUMENT TYPE: Report

TITLE: Draft OB Grounds Preliminary Site Characterization Report for April 1992.

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: April 1992.

AUTHOR: Chas. T. Main, Inc.

RECIPIENT: U.S. Army Corps of Engineers, Huntsville, AL

DATE DOCUMENT INCLUDED IN RECORD FILE: July 12, 1993

==========

DOCUMENT NUMBER: OBG-01-005

DOCUMENT TYPE: Report

TITLE: Seneca OB Grounds Validated Data Tables, Phase I and II.

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: Aug 1993

AUTHOR: Engineering-Science, Inc., Boston, MA.

RECIPIENT: SEAD

DATE DOCUMENT INCLUDED IN RECORD FILE: 4 Apr 94

==========

DOCUMENT NUMBER: OBG-01-006

DOCUMENT TYPE: Report

TITLE: Remedial Investigation Report at the Open Burning Grounds (and Appendices Vol I and II), Final

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: October 1993

AUTHOR: Engineering-Science, Inc., Boston, MA.

RECIPIENT: SEAD

DATE DOCUMENT INCLUDED IN RECORD FILE: 4 Apr 94

==========

DOCUMENT NUMBER: OBG-01-007

DOCUMENT TYPE: Report

TITLE: Feasibility Study Report at the Open Burning Grounds (Draft Final)

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: June 21, 1996

AUTHOR: Engineering-Science, Inc., Boston, MA.

RECIPIENT: USACE (Huntsville Div)
DATE DOCUMENT INCLUDED IN RECORD FILE: 28 Jun 96

==========

DOCUMENT NUMBER: OBG-01-008

DOCUMENT TYPE: Plan

TITLE: Work Plan for the Ordnance and Explosives Removal Action - Open Burning Grounds (Vol 1 and 2)

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: November 1997

AUTHOR: EOD Technology, Inc.

RECIPIENT: USACE (Huntsville Div)

DATE DOCUMENT INCLUDED IN RECORD FILE: March 18, 1998

DRAFT ADMINISTRATIVE RECORD FILE INDEX FOR THE
OPEN BURNING (OB) GROUNDS OPERABLE UNIT

SUBCATEGORY: PUBLIC PARTICIPATION (OBG-03)

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DOCUMENT NUMBER: OBG-03-001

DOCUMENT TYPE: Plan

TITLE: Proposed Remedial Action Plan (PRAP) for the Open Burning (OB) Grounds at the Seneca Army Depot Activity, Draft-Final

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: January 15, 1997

AUTHOR: Engineering-Science, Inc., Boston, MA.

RECIPIENT: Members of the Public

DATE DOCUMENT INCLUDED IN RECORD FILE: March 13, 1997

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DOCUMENT NUMBER: OBG-03-002

DOCUMENT TYPE: Public Meeting

TITLE: Public Meeting on OB Grounds PRAP

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: December 17, 1997

AUTHOR: SEDA

RECIPIENT: Public

DATE DOCUMENT INCLUDED IN RECORD FILE: March 18,1998

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DRAFT ADMINISTRATIVE RECORD FILE INDEX FOR THE
OPEN BURNING (OB) GROUNDS OPERABLE UNIT

SUBCATEGORY: DECISION DOCUMENTS (OBG-05)

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DOCUMENT NUMBER: OBG-05-001

DOCUMENT TYPE: Decision Document

TITLE: Record of Decision, Former Open Burning (OB) Grounds Site, Seneca Army Depot Activity, Romulus, NY (Draft)

LOCATION: Seneca Army Depot, Building 116, Romulus, New York

DOCUMENT DATE: November 14, 1997

AUTHOR: Engineering-Science, Inc., Boston, MA.

RECIPIENT: Members of the Public

DATE DOCUMENT INCLUDED IN RECORD FILE: March 18, 1998

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APPENDIX B

NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION DECLARATION OF CONCURRENCE

APPENDIX C

RESPONSIVENESS SUMMARY AND PUBLIC COMMENTS

APPENDIX C.1

RESPONSIVENESS SUMMARY

OB GROUNDS SITE
SENECA ARMY DEPOT SUPERFUND SITE

INTRODUCTION

A responsiveness summary is required by Superfund policy. It provides a summary of citizen's comments and concerns received during the public comment period, and the Army's responses to those comments and concerns. All comments summarized in this document have been considered in Army's, EPA's and NYSDEC's final decision for selection of a remedial alternative for the OB Grounds site.

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 both the Technical Review Committee (TRC) and the recently formed Base Clean-up Team (BCT). During these meetings, representatives of the community, the Army and the regulators are brought together in an forum where ideas and concerns are voiced and addressed. Both groups, the TRC and the BCT, have 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 solidification/stabilization and Low Temperature Thermal Desorption, 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 are open to the public and are announced in the local newspaper and the radio. Following inclusion of the depot on the final BRAC closure list in late 1995, the Army transitioned from the TRC and formed the Base Clean-up Team (BCT). The BCT was comprised of several of the TRC members with the addition of additional Army and regulatory representatives. The BCT increased the frequency of the meetings to a monthly basis. Since the formation of the TRC and the BCT, the Army has met with the local community members on a regular basis and has discussed the finding of both the RI and the FS. In addition, the proposed plan has been presented to the BCT.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The RI report, the FS report and the Project Remedial Action Plan (PRAP) for the site have been released to the public for comment. These documents were made available to the public in the administrative record file at the information repositories at Building 116 within the Seneca Army Depot Activity, 5786 State Route 96, Romulus, New York, 14541-5001. The notice of availability for the above-referenced documents was published in the Finger Lake Times and the Seneca Citizen on November 23, 1997, November 30, 1997 and December 14, 1997. The public comment period on these documents was held from December 1, 1997 to January 10, 1998.

On December 17, 1997, the Army, the EPA and the NYSDEC conducted a public meeting at the Seneca County Board of Supervisors Room, located at the Seneca County Office Building in Waterloo, NY to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees.

SUMMARY OF COMMENTS AND RESPONSES

The correspondence received during the public comment period as provided in Appendix C.2, Letters Submitted During the Public Comment Period. A summary of the comments contained in the above letters and the comments provided by the public at the December 17, 1997 public meeting are provided, as follows:

- Comment Letter No. 1 - Mr. Kenneth C. Riemer submitted a letter, dated December 8, 1997, that identified concerns regarding the future problems associated with soils that would remain on-

site, future additional clean-up that might be required, the long term stability of solidified soils, the past environmental problems of the Seneca Meadows Landfill, the long term stability of landfills in general and the increase in dust that will be caused by the soil excavation and truck traffic.

- Comment Letter No. 2 - Ms. Lucinda Sangree submitted a letter, dated January 7, 1998, that agreed with the selection of Alternative 4, off-site disposal, but identified concerns regarding the potential selection of Seneca Meadows as the off-site disposal facility. Ms. Sangree's letter indicates that the landfill is not a "state of the art" landfill. Leachate is "drawn off" and treated at a local sewage treatment system in a process that does not remove heavy metals. The treatment effluent is then discharged into Seneca Lake. Heavy metals, such as lead and copper, could be released if the solidified material from the OB Grounds deteriorates over the long term and enters the leachate from Seneca Meadows. Ms. Sangree suggests that final selection of a landfill should be based upon the landfill's ability to protect resources, such as Seneca Lake and the ground and surface water of Montazuma swamp, not strictly on economic considerations.

The Army's responses to these comments, are as follows:
Response to Comment Letter No. 1. - The current plan addresses the soils that will remain on-site. The on-site soils will be at a concentration level that will not pose harm to human health or the environment. The remaining soils will be covered with a 9 inch vegetative cover to limit any future interactions with ecological species. Monitoring of the groundwater, the sediment and the cover will be conducted. Monitoring is intended to be a mechanism to ensure that the remaining on-site materials pose no risk to human health and the environment. If future clean-up is required then the Army will be required to conduct this activity.

Solidification of inorganic compounds has been identified by the EPA as the best alternative in rendering these materials inert. EPA states the following in the recent guidance document, *Engineering Bulletin; Technology Alternatives for the Remediation of Soils Contaminated with As, Cd, Cr, Hg and Pb; EPA/540/S-97/500, August 1997*, "Since metals cannot be destroyed, remediation of metal-contaminated soil consists primarily of manipulating (i.e. exploiting, increasing, decreasing or maintaining) the mobility of metal contaminant(s) to produce a treated soil that has an acceptable total or leachable metal content." Solidification/stabilization and/or capping was also identified in the same guidance document as applicable technologies. Solidification/stabilization has also been identified by EPA as the Best Demonstrated Applicable Technology (BDAT) for nonwastewater RCRA wastes containing lead.

Solidification is considered to be as permanent as can be expected. In addition to the physical barrier that solidification agents cause, heavy metals form permanent chemical bonds with solidification agents that will permanently limit the dissolution of metals.

Although the Seneca Meadows Landfill was one of two landfills that were solicited for a budgetary cost estimate for disposal, the plan does not specify one particular landfill over another one. Government procurement rules will apply to the actual bidding and selection of a final disposal site. However, if the Seneca Meadows Landfill is approved by the State of New York to accept these waste materials then there is no reason to exclude the landfill from the bidding process as this would be a potential violation of the federal acquisition regulations.

The plan recognizes the potential for an increase in dust caused by excavation activities and increased truck traffic. This was identified as a negative aspect of off-site disposal alternative but can be controlled by dust suppressants. Monitoring of dust during the excavation effort for compliance with all applicable NYSDEC requirements will also be part of the effort. Should dust levels become unacceptable, appropriate measures will be implemented.

Response to Comment Letter No. 2. - The Army appreciates the acceptance and support of this remedial action provided by Ms. Sangree in her letter. We recognize the concerns raised by Ms. Sangree in utilizing the Seneca Meadows Landfill as the possible disposal facility but must also consider the need to be fair regarding the the procurement process. This process cannot exclude one particualr landfill from bidding if the landfill is permitted by the State of New York to accept this material. The government procurement rules prohibit unfair treatment to a qualified bidder. As government agencies, the Seneca Army Depot Activity and the Corps of Engineers must follow these rules in selecting a final disposal landfill.

Ms. Sangree also raised concern that the leachate treatment system currently utilized by the Seneca Meadowns Landfill is ineffective in removing heavy metals. Since we have not evaluated the current leachate treatment process used by the landfill we cannot adequately comment on the effectiveness of the system in removing metals. However, if the landfill is operating, as permitted by the State of New York, the Army would not be able to disqualify the landfill from the opportunity of bidding. Operation of the landfill would most likely include provisions for a leachate treatement and discharge system. If the effluent stream from the treatment process is within acceptable levels, as described in the permit, then the treatment process is acceptable.

APPENDIX C.2

LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

THE VILLAGE GREENHOUSE
47 Congress Street
Trumansburg, New York 14886
Kenneth C. Riemer
(607)387-5797;532-4455

December 8, 1997

Lieutenant Colonel Donald Olson
United States Army Commanding Officer
Seneca Army Depot Activity
5786 State Route 96
Romulus, New York 14541-5001

Dear L.T.C. Olson,

Thank you for your letter of notification regarding the public meeting to be held on December 17, 1997. The third Wednesday of each month is the Town of Romulus regularly scheduled board meeting, which is an obligation I must meet as an elected official; therefore I will not be able to attend your meeting. I do, however, have some very deep concerns regarding your letter, the study, and the RAB committee.

In your letter, you assume a forgone conclusion that, as an RAB member, I will simply support and endorse the clean-up plan. I do not feel comfortable with the plan and the manner in which it was presented. As an RAB member, I see only one choice to be accepted in its entirety. Please do not expect that with this proposal, or any in the future, as an RAB member, I will blindly endorse the Army's proposals. I do not believe that the position of an RAB member is to wholeheartedly endorse a proposition- no matter what its merits and consequences. At this point in time, I plan to live here; represent the people that have elected me; keep an open mind and a watchful eye out to preserve and protect the environmental and economic basis of our community. To put it simply, this is my home. The Army is an entity, which does not share that attachment.

Unfortunately, by not being able to attend your meeting, I will be unable to express my concerns in person; therefore, I would like to share a few thoughts which seem appropriate. Please refer to the Superfund Proposed Plan, page six, left column, second paragraph, beginning with "Because these alternatives..." I do not accept this premise. I would hope that work done once, and properly, would greatly reduce the necessity for that statement. Further, what guarantees do we have that a second clean-up will be done, if deemed necessary. The statement is scary. "...above levels that allow..." makes one wonder if its even worth trying to cleanup the area with the present technology, and whether it will ever be clean for use again.

. Concerning the disposition of the solidified soils and sediments, no matter what was endorsed by your engineers. After years concrete does deteriorate-especially when exposed to multitude of leaching substances that exist in the landfill. We already have far too many environmental problems with the Seneca Meadow Landfill, and under no circumstances will I endorse the disposal of the excavated material there. There must be more solid, less environmentally sensitive licensed landfills. As state by a New York State D.E.C. Official, the landfills of today are only a temporary licensed facility; many are due to fail in the near future-especially Seneca Meadows.

How is the Army going to accomplish this project? Will it be done "in house", or subcontracted? Again, referring to the Superfund Proposed Plan, page twelve, right column, third paragraph, beginning with, "Alternative 4 is..." I've observed the problems associated with smoke and airborne particles, where they translocation off the depot and the associated human health problems. My thoughts are simple - enough is enough. We need no more of this type of pollution. Maybe this is the best solution to the problem that present technology has to offer, but that does not relieve my concerns.

I would like to suggest that the RAB committee meet on its own, without representatives of the Army, for an informal and open discussion of its function in this process. This would give members and opportunity to express their concerns and function of the RAB committee.

These are my primary concerns regarding the proposal. Thank you for the opportunity to express my thoughts on this subject.

Sincerely,

Kenneth Riemer

Kenneth Riemer
Owner
KR/ajg

LUCINDA SANGREE, Ph.D
55 Laconia Parkway
Rochester, New York 14618
716-256-1822

Mr. Stephen Absolom
BRAC Environmental Coordinator
Seneca Army Depot Activity
5786 State Route 96, Building 123
Romulus, NY 14541 – 5001

January 7, 1998

Dear Stephen Absolom,

I am responding to the call for comments on the Proposed Remedial Action Plan (PRAP) for the Open Burning Grounds (OBG)

I agree with the proposed choice of Alternative 4. This alternative provides for a solidification/stabilization procedure being applied to soil at the OBG, which is contaminated with lead, copper, zinc, and barium. It also provides for the removal of the resulting blocks to an off-site landfill. There will be monitoring of groundwater and the sediments of Reeder Creek. I believe that this is a feasible and affordable alternative given that there are economic as well as time constraints. I personally favor Alternative 6 as it "provides the most permanent solution via treatment. The treatment would reduce the volume of material that would be transported off-site for landfilling." "Alternative 6 is considered the best alternative for long term effectiveness and permanence because the amount of contaminated materials in the coarse soil is reduced through soil washing and the contaminated fines that were separated out are treated, either via acid extraction or solidification and disposed of off-site. " (The quotations are from the report handed to RAB members and dated November 1997) Alternative 6 would offer some recovery of contaminants such as lead. Also, Alternative 6 would not, if I understand the report correctly, require quarterly monitoring of groundwater and sediments of Reeder Creek as will be the case in Alternative 4.

If Alternative 4 or Alternative 6 is implemented, I have one major concern, however, and that is the quality of the environmental protection at a selected off-site landfill.

It is my understanding that Seneca Meadows will be one of the landfills considered in the bidding process. I am aware that the tipping fee at Seneca Meadows is likely to be lower than that at other conveniently located facilities so the likelihood that the solidified OBG waste material will be taken there is fairly strong.

It is also my understanding that Seneca Meadows is a legal facility but that were the operator to apply for a license for that facility under current regulations he would probably be refused as Seneca Meadows has only one liner and possibly other defects as well. In other words, Seneca Meadows is not a "state of the Art" landfill. Placing OBG waste there would be legal, possibly economical, but would it be **wise**?

It is also my understanding that leachate is regularly drawn off from the Seneca Meadows landfill and is funneled into the regular sewage waste stream. There it is treated and then released as a component of the waste that goes into Seneca Lake. Such treatment does a number of useful things but it does not remove metals such as lead, copper, zinc, and barium. So, given that eventually (after some decades?) there will be, in my opinion, some leaching of these metals from the solidified/stabilized blocks transported to the Seneca Meadows landfill from OBG, the very materials that were to be prevented from entering Seneca Lake via Reeder Creek will be released into Seneca Lake via the sewage treatment plant(s).

In addition to the above, as the Seneca Meadows landfill is not adequately lined there may be discovery in future of contamination of the ground water in the Seneca Meadows area. This area is very near the Montazuma swamp region. Ground water monitoring wells have been placed around Seneca Meadows by

at least one government agency (Department of Health? Department of Environmental Conservation?). These wells might discover the contamination and then a clean up would have to be initiated at the expense of local people – either the owner of the landfill if he is still around and has the money or (more likely) local taxpayers. The Army would no longer be responsible for this material.

To conclude, I suggest that a thorough investigation of the proposed receiving facilities be made and that only the wisest choice be made, not the cheapest. By wisest I am suggesting that priority be given to the protection of Seneca Lake water quality, protection of local ground water including the ground and surface water of Montazuma swamp, and the prevention of future clean-up expenses to the local citizens .

Sincerely,

Lucinda Sangree

Lucinda Sangree, Ph.D.

APPENDIX D

SUMMARY OF ARARS FOR SELECTED REMEDY

D.1 APPLICABLE, RELEVANT and APPROPRIATE REQUIREMENTS (ARARs) and TO BE CONSIDERED (TBCs)

Pursuant to Section 300.400(g) of the NCP, the lead and support agencies shall identify applicable or relevant and appropriate requirements (ARARs) for the remedial action. ARARs are used to identify remedial action objectives, formulate remedial action alternatives, govern the implementation and operation of a selected remedial action, and evaluate the appropriate extent of site cleanup.

In New York State, the acronym ARARs is not used, but is replaced with the term New York State Standards, Criteria, and Guidelines (SCGs), as presented in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #HWR-90-4030. The removal action must be compatible with long-term remedial objectives at the site.

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

Any standard, requirement, criterion, or limitation under any federal environmental or state environmental or facility siting law may be either applicable or relevant and appropriate to a specific action. The only state laws that may become ARARs are those promulgated such that they are legally enforceable and generally applicable and equivalent to or more stringent than federal laws. A determination of applicability is made for the requirements as a whole, whereas a determination of relevance and appropriateness may be made for only specific portions of a requirement. An action must comply with relevant and appropriate requirements to the same

extent as an applicable requirement with regard to substantive conditions, but need not comply with the administrative conditions of the requirement.

Three categories of ARARs have been analyzed: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs address certain chemicals or a class of chemicals and relate to concentrates of constituents allowed in various environmental media (water, soil, air). Location-specific ARARs are based on the specific setting and nature of the site. Action-specific ARARs relate to specific remedial actions proposed for a site. In addition to ARARs, advisories, criteria or guidance may be evaluated as "To Be Considered" (TBC) regulatory items. CERCLA indicates that the TBC category could include advisories, criteria or guidance that were developed by EPA, other federal agencies or states that may be useful in developing CERCLA remedies. These advisories, criteria or guidance that were developed by EPA, other federal agencies or states that may be useful in developing CERCLA remedies. These advisories, criteria or guidance are not promulgated and therefore are not legally enforceable standards such as ARARs.

Chemical-specific ARARs are usually health or risk-based standards limiting the concentration of a chemical found in or discharged to the environment. This type of ARAR governs the extent of site remediation by providing actual cleanup concentrations, or the basis for calculating such concentrations for specific media. These requirements may apply to air emissions during the removal action. A number of federal and state regulations have been identified for this site.

Location-specific ARARs govern natural site features such as wetlands, floodplains, and sensitive ecosystems, and manmade features such as landfills, disposal areas, and places of historic or archaeological significance. These ARARs generally restrict the concentration of hazardous substances or the conduct of activities based solely on the particular characteristics or location of the site.

Action-specific ARARs are usually technology- or activity-based limitations that control actions at hazardous waste sites. Action-specific ARARs generally set performance or design standards, controls, or restrictions on particular types of activities. To develop technically feasible alternatives, applicable performance or design standards must be considered during the development of all remedial alternatives. Action specific ARARs are applicable to this site. The action-specific ARARs that have been used have been determined by the Army based upon the technology chosen.

SOURCE CONTROL ARARS

D.2 CHEMICAL-SPECIFIC ARARS AND TBCs

These include the following:

Air Quality

Remedial alternatives proposed for this site will not involve emissions, however, fugitive dust may be encountered during excavation and construction.

- NYSDEC TAGM HWR-89-4031 (TBC): Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program. The TAGM references the 40 CFR Par 50.6, Ambient Air Quality Standard for PM-10.

- CFR Part 50.6 (Applicable): Ambient Air Quality Standard for PM-10. PM-10 concentrations in the ambient air shall not exceed the following: 24-hour average, 150 micrograms per cubic meter of air; annual average, 50 micrograms per cubic meter of air.

Soil Quality

- CFR parts 264.552 and 264.553: (Relevant and Applicable): Corrective Action for Solid Waste Management Action for Solid Waste Management Units. Allows for the consolidation of wastes, or the replacement of remediated wastes in land based units without invoking the RCRA land-disposal requirement of 40 CFR 268.

- CFR Part 264, Subpart X - Miscellaneous Units: (Relevant and Applicable) RCRA Closure and Post-Closure Requirements.

- NYCRR subpart 375 (Relevant and Appropriate): This subpart contains the New York State rules for inactive hazardous waste disposal sites.

- NYSDEC TAGM HWR-94-4046 (TBC): Specifically, cleanup concentrations for hazardous constituents in soil have been proposed by the State of New York through

Technical and Administrative Guidance Manuals (TAGMs). Any soil or sediment that is treated for re-use on-site as backfill must meet TAGM concentrations.

D.3 LOCATION-SPECIFIC ARARS

Endangered Species

- CFR Part 257.3-2 (Relevant and Appropriate): Facilities or practices shall not cause or contribute to the taking of any endangered or threatened species.

Location Standards

- Wetlands Executive Order (EO1199) (Applicable): Under this regulation federal agencies are required to minimize the destruction, loss, or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands. Consideration: Remedial alternative that involve construction must include all practical means of minimizing harm to wetlands.

Antiquities

- USC Part 469a-1 (Applicable): The Archaeological and Historic Preservation Act requires that action be taken to recover and preserve artifacts.

- CFR Part 800 (Relevant and Appropriate): Action must be taken to preserve historic properties. Actions must be planned to minimize harm to national historic landmarks.

D.4 ACTION-SPECIFIC ARARS

Federal and State regulations which may apply include the following:

Solid Waste Management

- Part CFR 241.100 (Relevant and Appropriate): Guidelines for the Land Disposal of Solid Wastes. These regulations are geared specifically toward sanitary landfills; however, they are applicable to all forms of land disposal and land-based treatment.

- CFR Part 241.204 (Applicable): Water Quality. The location, design, construction, and operation of land disposal facilities shall protect water quality.

- CFR Part 241.205 (Applicable): The design, construction, and operation of land disposal facilities shall conform to air quality and source control standards.

- CFR Part 257.1 (Relevant and Appropriate): This part establishes the scope and purpose of criteria for use in assessing the possibility of adverse effects on health or the environment from solid waste disposal operations.

- CFR Part 257.3 (Relevant and Appropriate): This part establishes criteria to assess the impact of disposal operations, including such considerations as floodplains, endangered species, air, surface water, groundwater, and land used for food-chain crops.

- CFR Part 243.202 (Relevant and Appropriate): This part specifies the requirements for transporting solid waste, including provisions to prevent spillage.

- NYCRR Part 360 (Applicable): This part specifies the requirements for solid waste management facilities in New York.

Hazardous Waste Management

- CFR 261 (Applicable): Standards for the Identification and Listing of Hazardous Waste are applicable to the proper characterization of solid waste generated as a result of the remedial actions.

- CFR 262.11 (Applicable): This regulation requires a person who generates a solid waste to determine if that waste is a hazardous waste.

- CFR 262 Subparts B, C, and D (Applicable): These regulations apply to off-site disposal actions for hazardous wastes.

- CFR Part 263.30 and 263.31 (Relevant and Appropriate): These regulations set forth the standards and requirements for action in the event of a release during transport.

- CFR Part 264 (Relevant and Appropriate): This part establishes hazardous waste management facility standards and requirements. The onsite disposal areas used for stockpiling, mixing, and extended bioremediation of wastes must meet the substantive requirements of 40 CFR subparts B (general facility standards), E (manifest system, record keeping, and reporting), F (releases from solid waste management units), G (closure and postclosure), L (waste piles), M (land treatment), N (landfills) and X (Miscellaneous Units). These regulations are applicable for hazardous wastes and are also relevant and appropriate for certain wastes which are not hazardous wastes.

- CFR Part 268 (Relevant and Appropriate): Land Disposal Restrictions. Restricts the disposal of listed and characteristic hazardous waste which contain hazardous constituents exceeding designated concentrations. Only applies when the waste is "placed" on the land. There are indications from previous study of the site that some of the soil and sediment may be hazardous due to toxicity characteristic. Land Disposal Restrictions (LDR) mandate treatment of contaminated soils, which are removed, to eliminate this characteristic prior to any disposal.

- CFR Part 270 subpart C (Relevant and Appropriate): This regulation establishes permit conditions, including monitoring, recordkeeping requirements, operation and maintenance requirements, sampling, and monitoring requirements. Although no permit is required for activities conducted entirely on site, the substantive requirements of these provisions are relevant and appropriate.

- CFR Part 270 subpart B (Relevant and Appropriate): This part defines the required contents of a hazardous waste management permit application. The substantive requirements of these provisions are relevant and appropriate.

Occupational Health and Safety Administration

- CFR Part 1910.50 (Applicable): Occupational Noise. No worker shall be exposed to noise levels in excess of the levels specified in this regulation.

- CFR Part 1910.1000 (Applicable): Occupational Air Contaminants. The purpose of this rule is to establish standards for air contaminants called permissible exposure limits (PELs), which are legally enforceable, 8 hour time weighted averages of which no

employees' exposure may exceed in any 8 hour shift of a 40 hour work week. Threshold Limit Values (TLVs), on the other hand, are not legally enforceable, but are considered to represent conditions under which it is believed all workers may be repeatedly exposed without adverse effect. In some instances, there may be disparity in the PELs and TLVs. It is the Army Corps of Engineers policy that the most stringent of the exposure limits should be used.

- CFR Part 1910.1025 (Applicable): This section applies to occupational exposure to lead.

- CFR Part 1910.1200 (Applicable): This part requires that each employer compile and maintain a workplace chemical list which contains the chemical name of each hazardous chemical in the workplace, cross-referenced to generally used common names. This list must indicate the work area in which each such hazardous chemical is stored or used. Employees must be provided with information and training regarding the hazardous chemicals.

- CFR Part 120 (Applicable): This part applies to employers and employees engaged in sites that have been designated for cleanup, and other work related to RCRA and CERCLA. The regulation establishes proceedings for site characterization and control, and requirements for employee training and medical monitoring.

- CFR Part 1926 (Applicable): Construction safety standards. 49 CFR Part 1926.62 (applicable): Applies to all construction work where an employee may be occupationaly exposed to lead.

Transportation of Hazardous Waste

- CFR Part 171 (Applicable): General information, regulations, and definitions. This regulation prescribes the requirements of the DOT governing the transportation of hazardous material.

- CFR Part 172 (Applicable): Hazardous materials table, special provisions, Hazardous Materials Communications, Emergency Response Information, and Training requirements. This regulation lists and classifies those materials which the DOT has designated to be hazardous materials for the purpose of transportation and prescribes the

requirements for shipping papers, package marking, labeling and transport vehicle placecarding applicable to the shipment and transportation of those hazardous materials.

- CFR Part 173 (Applicable): General DOT requirements for shipment and packaging.

- CFR Part 177 (Applicable): Carriage by Public Highway. This regulation prescribes requirements that are applicable to the acceptance and transportation of hazardous materials by private, common, or contract carriers by motor vehicle.

- NYCRR Chapter 364 (Applicable): New York Waste Transport Permit Regulation. This regulation governs the collection, transport, and delivery of regulated waste originating on terminating within the state of New York.

- EPA/DOT Guidance Manual on hazardous waste transportation (TBC)

MIGRATION CONTROL ARARS

D.5 CHEMICAL-SPECIFIC ARARS AND TBCs

Water Quality

There are a number of water quality standards which are potential ARARs for this remedial action, described as follows:

- CFR Part 131 (Applicable): Water Quality Standards. This part implements Section 101 of the Clean Water Act (CWA), which specifies the national goals of eliminating the discharge of pollutants, prohibiting the discharge of toxic pollutants in toxic amounts, and implementing programs for control of non-point sources.

- CFR Part 131.12 (Applicable): Anti-degradation Policy. Establishes standards to prevent a body of water which has an existing high standard from degrading to a lower standard.

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

- CFR Part 141.11 (Applicable): Maximum Inorganic Chemical Contaminant Levels. This section establishes maximum contaminant levels (MCLs) for inorganic chemicals.

- CFR Part 141.12 (Applicable): Maximum Organic Chemical Contaminant Levels. This section establishes MCLs for organic chemicals

- CFR Part 264 Subpart F (Relevant and Appropriate): Releases from Solid Waste Management Units. Standards for protection of groundwater are established under this citation.

- NYCRR Chapter X (Relevant and Appropriate): This chapter establishes the requirements of the State Pollutant Discharge Elimination System (SPDES).

- NYCRR Subparts 701 and 702 (Applicable): These subparts establish surface water standards for protection of drinking water and aquatic life.

- NYCRR Subpart 703 (Applicable): This subpart establishes groundwater standards specified to protect groundwater for drinking water purposes.

- NYCRR Subpart 375 (Relevant and Appropriate): This subpart contains the New York State rules for inactive hazardous waste disposal sites.

- NYCRR subpart 373-2.6 and 373-2.11 (Applicable): This regulation requires groundwater monitoring for releases from solid waste management units.

- NYCRR subpart 373-2 (Relevant and Appropriate): This regulation establishes postclosure care and groundwater monitoring requirements.

- NYCRR Part 5 (Relevant and Appropriate): This regulation establishes criteria for drinking water supplies.

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

RESPONSE TO NYSDEC COMMENTS TO THE DRAFT ROD

RESPONSE TO COMMENTS
FROM
New York State Department of Environmental Conservation (NYSDEC)
DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
Comments Dated December 19, 1997

Comments by Mr. James Quinn, Project Manager, NYSDEC

General Comments:

General Comment #1

The Proposed Remedial Action Plan (PRAP) for this site, currently subject to public comment, states that a (proposed) drainage swale will be constructed to prevent surface water runoff form the Open Burning Grounds to Reeder Creek. The Draft ROD doesn't mention a drainage swale. Also, the PRAP states in Alternative 4 (the preferred remedy) that "the topsoil cover will be vegetated with indigenous grasses as an erosion control measure." While this is listed in the draft ROD as a remedial action goals, it is not detailed in the selected remedy (Section 11.0). Are these two measure to be replaced by, or is this what is meant by, "regrading" and "slope stabilization?" If the remedy includes a swale, to where will this surface water be redirected? Please explain these facets of the remedy in more detail.

Response to General Comment #1

Agreed; The ROD and the PRAP both describe control of surface water as part of the remedy to prevent erosion and maintain slope stability. Drainage swales, regrading and vegatative covering will be used in order to maintain slope stabilization and prevent erosion. Surface water from the site will discharge to Reeder Creek after surface water velocities have been reduced to prevent scouring of the vegatative cover or the slopes adjacent to Reeder Creek. This will also encourage settling of any solids. Since all areas with lead greater than 60 mg/kg will be covered with a vegatative cover, the soilds that will be removed prior to discharge to Reeder Creek will not represent contaminated material as this material will have been removed from the site or covered with the vegatative cover. To provide clarification bullet Numbers 6 and 7 of Section 11.0 has been reworded to address this comment.

General Comment #2

The discussion on analytical results for metals in the groundwater (Section 6.2) is confusing and a bit tortured. Although we have some text-specific comments about the discussion, we reserve them and request that the approach to this section be reconsidered. Rather than attempting to plead a case within the ROD, the document might simply state that Army's belief that excess turbidity is causing a falsely high analytical result of dissolved metals in the groundwater, and that future groundwater sampling using certain methods will alleviate this outstanding issue. Accordingly, the ROD should discuss action which will be taken should future sampling indicate that there is in fact a contravention of ARARs not addressed by the selected remedy.

Response to General Comment #2

Agreed; The discussion refered to in the first paragraph of Section 6.2 has been eliminated and reworked to clarify and simplify. However, the discussion pertaining to

factual information in the subsequent paragraphs of this section remain in order to support the position of the Army that the observed exceedances of lead are most likely a result of increased turbidity of the samples. This has been a concern to EPA requiring supporting documentation. The end of the third paragraph states that "The Army believes that elevated turbidity of these two groundwater samples contributed to the elevated concentrations." The following has been added to the fifth bullet: "Should a significant exceedance be noted, the exceedance will be confirmed through additional sampling and, if confirmed, appropriate corrective measures will be implemented to eliminate the threat posed by the exceedance. For groundwater, this may include metals removal via filtering. For a sediment exceedance observed in Reeder Creek, the source of the exceedance will be identified and confirmed. If the exccedance is determined to originate from the OB Grounds site, then maintenance of or improvements to the existing erosion control systems will be instituted to reduce the threat due to erosion of on-site soils to the Creek. This may include revegatation or the construction of drainage control swales or structures."

Specific Comments

Specific Comment #1

Section 2.0 - Site Name, Location and Description: The groundwater divide noted on Figure 2-4 should be discussed in the text, and its impact on this study, if any, should be noted.

Response #1

Agreed; The following text has been added to describe the significance of the groundwater divide to the site: "A possible groundwater divide has been noted during various monitoring episoides. The location of the divide, near Pad J, is highlighted on **Figure 2-5** and represents a high point of the upgradient groundwater flow regime. The divide divertes a portion of the groundwater to the west, away from Reeder Creek to the east. The flow regime of groundwater flowing to the west is not completely known, however, a series of monitoring wells, MW-21, MW-5, MW-36 and MW-37, are situated such that the quality of groundwater downgradeint of the groundwater divide can be monitoried. The sampling results from these wells do not suggest that the quality of groundwater has been impacted and therefore the significance of the divide is minimal."

Specific Comment #2

Section 2.0 - Site Name, Location and Description: Figure 2-3 or a similar figure should show the location of the cross section depicted in Figure 2-4.

Response #2 Agreed, Figure 2-3 has been modified to identify the location of the geological cross-section depicted as Figure 2-4. Reeder Creek and the nearby Open Detonation Mound have also been located on Figure 2-3.

Specific Comment #3

Section 3.1 - Land Use and Response History : A description of the membership of the Local Redevelopment Authority (LRA) emphasizing community participation should follow the first reference of the LRA in the last paragraph on page 3-2.

Response #3 Agreed; The following text has been added to the paragraph: "The LRA is a voluntary committee comprised of select community leaders that represent the interests of the local

community in determining the future reuse of the Seneca Army Depot Activity. The LRA community membership includes persons with a broad range of backgrounds including local businesspersons, native americans, community-at-large representatives and local and county government representatives."

Specific Comment #4

Section 3.2 - Enforcement History : Our copy of the Final Feasibility Study for the Open Burning Grounds is dated June, 1996. Please Correct #19 of forward the later edition.

Response #4 Agreed; The reference to the Final Feasibility Study has been changed to June, 1996.

Specific Comment #5

Section 4.0 - Community Participation : The Acronym PRAP standards for Proposed Remedial Action Plan. Also, this section should mention the public meeting is also intended to solicit input and gauge community acceptance of the proposed plan.

Response #5 Agreed; The changes have been made.

Specific Comment #6

Section 5.0 - Scope and Role of Response Action :

- For clarity, the third and fourth bullets of the ROD text should be switched so that post-construction monitoring is described last. Also, *see* General Comment 1 of this letter.
- Discussion of the response action in terms of risk to wildlife should be included in this section.
- The second sentence of the (incomplete) last paragraph should be altered; the proposed future uses of the OB Grounds is as a conservation/recreation area.

Response #6 Agreed. The third and fourth bullets have been switched and a new bullet has been added that indicates that erosion control meausres will also be enacted.

The comment pertaining to the risk to wildlife has been addressed by adding the following statement: "The remedial action will decrease future exposure of wildlife from direct ingestion of and/or direct contact to contaminated soil and sediment via removal to an off-site landfill. The action will also include the construction of a nine (9) inch vegatative cover over any remaining on-site soil as an additional protective measure from exposure."

The changes, identified as part of the final comment, have been made

Specific Comment #7

Table 6-1 - Chemicals of Concern : Lead should be included as a Chemical of Concern in the groundwater unless and until the future proposed groundwater monitoring determines otherwise. Also, please define and explain the significance of "count".

Response #7 Agreed; The former Table 6-1 has been renamed as Table 7-1. Table 6-1, Table 6-2, Table 6-3 and Table 6-4 have been added to Section 6 to identify lead and other compounds detected during the RI. The tables added to Section 6 provide a

summary of the data gathered during the RI. Table 7-1 provide a summary of the risk assessment analysis that involved identifying Chemicals of Concern. The column, previously shown in Table 6-1 now presented in Table 7-1, as "Count" has been changed to "Sample Population". The term "count" and "sample population" represent the number of samples used in the risk assessment to determine the exposure point concentration.

Specific Comment #8

Section 7.1 - Human Health Risk Assessment : The last sentence of the second full paragraph on page 7-6 seems to end without completing a thought. The sentence indicates that an elevated blood lead level in children between the ages of 1 and 4 is possible but it does not indicate under what exposure scenario this may happen. Also, for consistency, please replace "maximum value" with "target level" in the last sentence on this page.

Response #8 Agreed; The sentence has been reworded to provide greater clarification. The term maximum has been replaced with target level.

Specific Comment #9

Section 7.2 - Ecological Risk Assessment : The discussion in the third paragraph on page 7-9 appears to contradict a discussion on page 6-9 (Section 6.3). Is there surface water on site other than in Reeder Creek that was compared to New York State ambient water quality criteria?

Response #9 Agreed; Section 6.3 and Section 7.2 have been revised to be more specific regarding the comparisons that were performed to evaluate ecological risk. Surface water from only Reeder Creek were compared to NYSAWQCS. Section 6 of the Draft-final ROD describes the comparisons to the NYSAWQCS that were made between on-site surface water and Reeder Creek. At the time the RI was conducted, in 1992, surface water from Reeder Creek were compared with Class D surface water standards since Reeder Creek was classified as a Class D stream. The intent of this effort was to identify compounds that may contribute to an increased risk. The risk evaluation was described in a separate section of the RI report and is summarized in Section 7 of the Draft-final ROD. For the ecological risk assessment, comparisions were made between the 95th Upper Confident Limit (95th UCL) of the mean for surface water in Reeder Creek against both Class D and Class C NYSAWQCS. For aquatic species only the data from Reeder Creek was used since only aquatic species were determined to be present in Reeder Creek. For terrestrial wildlife, comparisons were made to criteria developed by the NYSDEC and the National Acadamey of Sciences (NAS). The NYSDEC critieria for protection of wildlife was obtained from the 1989 Sediment Criteria Guidance document. The 95th UCL of the mean of all the data, on-site surface water and surface water from Reeder Creek were compared to these wildlife criteria to determine if ecologial impacts could be possible.

Specific Comment #10

Section 7.3 - Uncertainty in Risk Assessments : The second to last paragraph of this section contains a discussion regarding the uncertainties that result form a lack of full understanding of the antagonistic and synergistic effects chemicals may have on each

other in a mixture. The terms antagonistic and synergistic as they apply to chemical effects should be defined in this section.

Response #10 Agreed; The terms have been defined in the document, See Page 7-23.

Specific Comment #11

Section 8.4 - Site Specific Cleanup Goal : The statement in the first bullet on page 8-4 regarding the potential for unexploded ordnance (UXO) clearance and removal operation is conducted in commendable. It is very important in the context of protection the health of future users of this site to remember that even after the remedy is successfully completed, UXO may remain on site. Measure may have to be taken to warn of and prevent exposure to this potential hazard.

Response #11 Agreed; UXO clearance will be an essential aspect of this plan. The initial step of the process involves a clearance of all UXO from the site.

Specific Comment #12

Section 9.0 - Description of Alternatives : The first sentence of the last paragraph on page 9-2 refers to Alternatives 2 through 6. Alternatives 2 and 3 were screened out in the June 1996 Feasibility Study report for this site. Therefore, this sentence should refer to Alternatives 4 through 6 only.

Response #12 Agreed; The change has been made.

Specific Comment #13

Section 9.0 - Description of Alternatives : The term Toxicity Characteristic Leaching Procedure (TCLP) should be defined and its significance explained where it first appears in this document.

Response #13 Agreed; The following text has been added : "Excavated soil that exceed any of the TCLP regulatory limits for leaching cause the soil to be classified as a RCRA "charateristic" hazardous waste for the charateristic of toxicity. The EPA land disposal restriction (LDR) prohibits the land disposal of a hazardous waste unless, in the case of a "charateristic" hazardous waste, the characteristic has been removed. Removal of the "charateristic" can be accomplished by treatment prior to disposal. In the case of a metal component such as lead, this treatment involves solidification of the waste to eliminate the leaching of metals."

Specific Comment #14

Section 11.0 - The Selected Remedy : The last two sentences in the fifth bullet of this section could be eliminated for clarity. The sampling specifics will be detailed in the remedial action design. If left, this discussion should specify that 15 ug/L is the federal action level for *lead* in groundwater.

Response #14 Agreed; The bullet has been changed to indicate that the detection limit will for lead in groundwater and lead in sediment.

Specific Comment #15

Figure 11-1 : This map is confusing to the uniformed viewer as it shows with highlighting the various areas of contaminated soils that were considered for removal under five different cases in the June of 1996 Feasibility Study. Furthermore, the text of this document gives no explanation of how these five cases were used to determine the areas and volume of soil that required remediation. This map should identify with consistent notation the areas to be remediated. Also, Reeder Creek should be located on this figure.

Response #15 Agreed; A note has been added to Figure 11-1 to indicate that the remedial action will include all areas described as Case 1 thru Case 5. The text in Section 11 has been modified to explain the derivation of each of the five areas.

Typographical Errors:

Typographical errors and/or sentence construction problems were found in the following locations:

Page 2-1, Third-to-last sentence of first paragraph; Agreed; This sentence has been reworded.

Page 3-2, Second sentence of first full paragraph; Agreed; the sentence has been changed to indicate that interim status allows the facility to operate as a TSD facility.

Page 3-2, Second sentence of third full paragraph; Agreed; "in" has been removed from the sentence.

Page 5-1, Second bulleted sentence; Agreed; The repetition of the phrase "to exceed" has been deleted.

Page 6-1, Third sentence of fourth paragraph; Agreed; The sentence has been divided into to sentences, one pertaining to the the PAH compounds and the other pertaining to the metals compounds.

Page 7-8, The second full paragraph of this section is a duplication of the third paragraph on page 7-6. Please delete; Agreed; This paragraph has been deleted.

Page 7-12, Last sentence of second paragraph; Agreed; The phrase "the were non-detected" has been deleted.

Page 7-15, Second-to-last sentence of the first full paragraph; Agreed; This sentence has been modified.

Please correct the above, and re-check the accuracy of the Table of Contents references.

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RESPONSE TO COMMENTS
FROM
New York State Department of Environmental Conservation (NYSDEC)
DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
Comments Dated January 28, 1998

Comments by Mr. James Quinn, Project Manager, NYSDEC

Comment #1 Michael O'Toole, Jr., Director, Division of Environmental Remediation, will be signing the final ROD indicating NYSDEC concurrence. Please change Page 1-9.

Response #1 Agreed, Mr. Raymond Fatz has been replaced with Mr. Michael O'Toole, Jr.

Comment #2 The statement on Page 5-1 that ground water remediation is not warranted because the future proposed use does not involve exposure should be removed.

Response #2 Agreed, The statement referring to ground water remediation has been deleted.

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RESPONSE TO EPA COMMENTS TO THE DRAFT ROD

RESPONSE TO COMMENTS
FROM
United States Environmental Protection Agency (US EPA)
DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
Comments Dated January 23, 1998

General Comments

Comment #1 The document should indicate a table of toxicity values (i.e., Slope Factors and Reference Doses).

Response #1 Agreed; A table of the toxicity values used during the risk assessment has been added as Table 7-2.

Comment #2 There are numerous errors of punctuation, grammar and spelling throughout the draft ROD. These errors should have been corrected by the Army before the EPA received the document. We have noted some of these in our comments below, but the Army should reread the document thoroughly and make any appropriate corrections.

Response #2 Agreed; The errors of punctuation, grammar and spelling have been corrected.

Specific Comments

Statement of Purpose and Basis

Comment #1 Contrary to what is stated in the last sentence, there is no Administrative Record Index included in Appendix A of the Draft ROD.

Response #1 Agreed; The Administrative Record Index has been included.

Assessment of the Site

Comment #1 The first sentence should read, "The goal of the selected remedy...".

Response #1 Agreed; The phrase "The goal of the selected remedy" has been added to the first sentence.

Description of the Selected Remedy

Comment #1 This section should also state that the remedy includes a monitoring program for groundwater and creek sediments, and ensures that the 9-inch soil/vegetative cover is maintained.

Response #1 Agreed; A sentence has been added at the end of the Description of the Selected Remedy paragraph that states that the selected remedy will include a groundwater and sediment

monitoring program and will ensure that a 9-inch soil/vegetative cover will be maintained.

Declaration

Comment #1 The need for a review of the remediation action five years after its commencement was discussed in the proposed plan for the OB Grounds and should be discussed in this section of the ROD as well.

Response #1 Agreed; The following statement, as stated in the PRAP, has been added at the end of the Declaration Section: "Because these alternatives would result in hazardous substances, pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the lead agency review the remedial action no less than every five years after its initiation. If justified by the review, remedial actions may be implemented to remove or treat the wastes."

Comment #2 Page 1-7: The Regional Administrator of the USEPA Region II is now Jeanne M. Fox.

Response #2 Agreed; Jeanne M. Fox has replaced the previous Regional Administrator.

2.0 Site Name, Location, and Description

Comment #1a a) Paragraph 1: Sentence 3 - should be corrected to read, "SEDA is located ... approximately 600 feet above Mean Sea Level (MSL)."

Response #1a Agreed; This sentence has been revised to read that SEDA is 600 feet above MSL.

Comment #1b b) Sentence 10 - This sentence makes no sense and should be revised.

Response #1b Agreed; This was a typographical error. The phrase "A Class C water quality designation is intended to provide" has been removed. The sentence now reads "Seneca Lake is located approximately 10,000 feet west of the site and is used as a source of drinking water for SEDA and surrounding communities".

Comment #2 Paragraph 2: Sentence 10 - What does the term "seasonally poor drainage areas" mean?

Response #2 Agreed; The term seasonally poor drainage areas has been deleted. Instead the following has been added: "Surface water run-off is to the east-northeast via a series of drainage ditches and culverts into Reeder Creek. The ditches and culverts were created during the construction of the burn pads and access roads. The construction of the pads also resulted in the formation of areas where surface water collects. These areas drain slowly due to the clay content in the soil and have resulted in the formation of low lying wet areas."

3.0 Site History and Enforcement Activities

3.1 Land Use and Response History

Comment #1 Page 3-1, Paragraph 1, sentence 3 should read "The land at the OB Grounds has been used for..."

Response #1 Agreed; The sentence has been changed.

Comment #2a a) Page 3-2: First full paragraph, sentence 2 - should read "Interim status allows a facility to operate.."

Response #2a Agreed; The sentence has been changed.

Comment #2b Paragraph 3, sentence 2 - should read "This recommendation was approved by Congress on..."

Response #2b Agreed; The sentence has been changed.

4.0 Community Participation

Comment #1a a) Page 4-1: Paragraph 2, sentence 4 - The term BCT should be defined here.

Response #1a Agreed; The acronym, BCT, has been defined as the Base Clean-up Team.

Comment #1b b) Paragraph 4: Sentence 1 - should read "The RI report, the FS report and the Proposed Remedial Action Plan..."

Response #1b Agreed; The sentence has been changed to include a comma after the RI report.

Comment #1c c) Second sentence: There is no administrative record file at the EPA Docket Room in Region II for SEDA. Reference to this should be deleted.

Response #1c Agreed; The reference to the EPA Docket Room in EPA Region II has been deleted.

Comment #1d d) The last sentence should state, "..., the Army, EPA and NYSDEC conducted..."

Response #1d Agreed; The sentence has been changed include the Army.

5.0 Scope and Role of Response Action

Comment #1a a) Page 5-1: Bullet 3 should be revised to read, "Post remediation monitoring of on-site groundwater...for metals, and ensures that the 9-inch soil/vegetative cover is maintained."

Response #1a Agreed; The bullet has been modified to: "Post remediation monitoring of the on-site groundwater and sediment in Reeder Creek for metals will be conducted to ensure that the remedial action is effective in preventing future impacts to groundwater and Reeder Creek. Monitoring of the 9-inch soil/vegetative cover will be performed to ensure that the cover is maintained."

Comment #1b b) Bullet 4, sentence 3 - The area mentioned here, 27.5 acres of soil cover, contradicts the 43.8 acres discussed in the Proposed Plan. The draft ROD should be corrected or the discrepancy should be explained.

Response #1b Agreed; The following has been added to the end of the 4th Bullet : "The area to be covered is approximately 27.5 acres. This area includes area of all the pads and an area near Reeder Creek. This area was incorrectly identified as 43.8 acres in the Proposed Remedial Action Plan (PRAP)."

Comment #1c c) Paragraph 2 - A discussion of the selected remedial action's protection of the environment is missing.

Response #1c Agreed; The following paragraph has been added after Paragraph 2 : "The selected remedy also includes provisions for the protection of the environment. The vegetative cover will prevent direct ingestion of soil by wildlife, such as foraging birds, and will prevent soil from eroding into Reeder Creek. Aquatic receptors will be protected by the removal of sediments from Reeder Creek."

Comment #1d d) Last paragraph: Sentence 1 - should read, "The groundwater conditions at the site do not require remedial action."

Response #1d Agreed; The sentence has been changed from ...does not require..., to ...do not require...

Comment #1e e) The second sentence should be revised to read, "The future use of the OB Grounds, as a conservation/recreation area,..".

Response #1e Agreed; A sentence has been added after the second sentence that reads : "The future use of the OB Grounds, is as a conservation/recreation area."

Comment #2 Page 5-2: After the first sentence at the top of the page, the following sentence should be added: "Should such conditions change, additional remedial actions to address the groundwater will be considered."

Response #2 Agreed; The following sentence has been changed at the end of the paragraph : "Should such conditions change, additional remedial actions to address the groundwater will be considered."

6.0 Summary of Site Characteristics

6.1 Impact to Soils

Comment #1 In order to be consistent with the proposed plan, the text should mention that lead was found at a maximum concentration of 56,700 mg/Kg.

Response #1 Agreed; The following sentence has been added to the second paragraph : "Lead was found at a maximum concentration of 56,700 mg/Kg in soil."

Comment #2 Paragraph 1, last sentence - According to Table 6-1 page 6 of 6, the following analytes also exceeded the NYSDEC TAGM: 3-nitroaniline, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, dieldrin, 4-DDT, cadmium, chromium, and thallium. The discrepancy should be corrected.

Response #2 Agreed; The additional compounds have been added to the sentence.

Table 6-1

Chemicals of Concern and Exposure Point Concentrations

Comment #1 Due to differences in its toxicity assessment, (i.e., application of biokinetic modeling) the exposure point concentration for lead should be the mean concentration (1,888 ppm), not the 95% UCL or the value 3,185 which appears as the exposure point concentration

in the table and represents neither the mean, the 95th UCL nor the maximum concentration. The 95% UCL would be the appropriate value for all other contaminants of concern.

Response #1 Agreed; Table 6-1 in the Draft ROD has been renamed and moved as Table 7-1. The previous information presented in Table 6-1 is presented in Table 7-1. The value used in the risk assessment to evaluate lead in soil was the mean of the surface soil/on-site sediment data, See Table 6-7 of the RI. The risk assessment assumed that since many of the on-site wetland areas and ditches are dry during most of the year, that these data should be included as part of the exposure. The value of 3,185 mg/Kg, shown previously in Table 6-1, Exposure Point Conc. for Surface Soil/Sediment Samples, was the 95th UCL for surface soil only, See Table 6-3 of the RI. The exposure point concentration used in the BKU model and shown in the new table, Table 7-1 has been changed to 1,888 mg/Kg, which is the value used in the BKU model.

Comment #2 Also relating to Table 6-1, some of the listed exposure point concentrations are greater than the 95% UCL values but less than the maximum detected hit. Such an exposure point concentration seems to be at odds with Superfund guidance which recommends using the lower value of either the 95% UCL or maximum detected hit, but not some value in between.

Response #2 Agreed; As previously described in response to Comment #1, Table 6-1 previously shown in the Draft ROD has been renamed as Table 7-1. The new table, Table 7-1, includes the values that were used as the exposure point concentrations in the risk assessment for the RI, See Table 6-7 of the RI. Changes have been made to Table 6-1 of the Draft ROD, shown in Table 7-1 of the Draft-final ROD, for the 95th UCL for bis (2-Ethylhexyl)phthalate. The previous value for the on-site surface water data was 10.4 ug/L and has been changed to 9.4 ug/L. Changes to the new Table 7-1 of the Draft-final ROD have been made to the exposure point conc. for sediment data for on-site wetlands for the semi-volatiles. The exposure point concentration is now the 95th UCL. Another change was made for Antimony where the exposure point conc. was changed from 10 mg/Kg to 11 mg/Kg. The sediment data for Reeder Creek has also been changed to be consistent with Table 6-7 of the RI. The exposure point conc. for surface soils/sediment, shown previously in Table 6-1, was incorrect. The values previously shown was only surface soils, See Table 6-3 of the RI. The changes have been made to be consistent with Table 6-7 of the RI. The column that presents the NYSDEC TAGM for soils or NYSDEC water quality values for groundwater and surface water has been deleted. This column has been added to the tables presented in Section 6.

Comment #3 The Proposed Plan states that mercury in soil exceeded the TAGM, but mercury is not listed here and in Table 6-1.

Response #3 Although mercury was detected in on-site soil at concentrations exceeding the TAGM guidance value of 0.1 mg/Kg, it was eliminated as a chemical of concern during the screening process of the risk assessment, See Table 6-5 of the RI. Table 7-1 lists the chemicals of concern and the exposure point concentrations. A new set of tables, Tables 6-1 through 6-4, have been added in Chapter 6 of the Draft-final ROD to provide information regarding exceedances of various chemicals over the appropriate criteria, such as the NYSDEC TAGM for soils. Mercury, along with other chemicals, were

eliminated as compounds of concern during the comparison to background, the frequency of detection or the concentration-toxicity screening. These techniques are allowable per the EPA Risk Assessment Guidance for Superfund (RAGS) guidance. Mercury was eliminated as a chemical of concern during the toxicity screening because the product of the maximum detected value, (1.1 mg/Kg), and the Reference Dose (RfD) value, 3.0 E-04 mg/Kg/day contributed only 0.1% of the total non-carcinogenic screening risk, therefore, mercury was not a chemical of concern and was not listed in the previous Table 6-1 of the Draft ROD nor is mercury listed in Table 7-1 of the Draft-final ROD. The summary data that includes mercury in on-site soil is presented in the new Table 6-1 of the Draft-final ROD. Table 6-1 of the Draft-final ROD indicates that mercury was detected in soil above the TAGM value of 0.1 mg/Kg a total of 68 times.

The text in Section 6.1 has been revised to add mercury to the list of metals that exceeded the TAGM guidance value. Text has been added to explain that comparison to TAGM values was not the criteria for obtaining chemical of concern. The following sentence was added to the third paragraph of Section 6.0 : "Chemicals of concern have been selected following a screening process during the risk assessment." The following sentence has been added to the second paragraph of Section 6.1 : "Following a comparison to TAGM guidance values, a risk assessment was conducted in accordance with the requirements of CERCLA. During the risk assessment process, compounds detected at the site were screened to determine their significance in contributing to the overall site risk. The compounds that remain are considered to be the chemicals of concern that are used in assessing the risk for the site. The results of this analysis is described in Section 7 of the ROD."

Comment #4 If "COUNT" refers to frequency of detection, the number of detection's and total number of samples taken should be indicated.

Response #4 COUNT is the number of valid datapoints (samples) used in the risk assessment to calculate the required statistical terms such as the 95th UCL, the mean and the exposure point concentration. The heading in the Table 7-1, formerly Table 6-1 of the Draft ROD, has been changed from COUNT to SAMPLE POPULATION to clarify what the term COUNT referred to. The frequency of detection and the number detected above the TAGM value or other criteria is now presented in Tables 6-1 through 6-4. Tables 6-1 through 6-4 present a summary of the data for each media. The heading for these tables include number of analyses, the number of detections, the frequency of detection, the maximum detected value, the criteria used to compare the data to and the number of times a chemical was detected above a criteria. The value shown in the Number of Analyses column in Tables 6-1 through 6-4 will not always match the number shown in the SAMPLE POPULATION of Table 7-1 because the sample dataset is not always the same. For example, the soil summary table, Table 6-1 of the Draft-final ROD, lists the number of analyses for all soil but does not include the on-site sediment. Table 7-1 of the Draft-final ROD, includes surface soil and on-site sediment. The difference between how the data was combined has to do with what data was needed to evaluate the exposure routes in the risk assessment.

Comment #5 Page 1 of 6: Groundwater Samples: Why are there no metals data? Lead was detected in groundwater above state and federal groundwater criteria. If the column heading, "MAXIMUM" stands for maximum concentration detected, all the values for

Semivolatiles and Explosives contradict the Remedial Investigation (RI) Report. The Army should have made the necessary changes for submitting the draft ROD to the EPA. The draft ROD should be corrected.

Response #5 a) The previous Table 6-1 of the Draft ROD listed only the chemicals of concern as described in the baseline risk assessment of the RI Report. The table was not intended to be a listing of all compounds that exceeded a criteria. Metals in groundwater were considered as potential chemicals of concern during the risk assessment. However, no metals were retained as chemicals of concern in groundwater during the screening portion of the risk assessment. Comparison to background, i. e. upgradient conditions, involved comparing datasets, not individual well samples and resulted in all but three metals being eliminated as chemicals of concern. The process used to compare a dataset to either background or upgradient conditions was consistent with both CERCLA guidance and RCRA guidance. The remaining metals were eliminated as chemicals of concern since they are essential human nutrients. Therefore, no metals were listed in Table 6-1.

The tables in Section 6, SUMMARY OF SITE CHARACTERISTICS, have been revised to reflect the tables that were originally presented in Chapter 4 of the RI. The previous Table 6-1 has been moved to Section 7, SUMMARY OF SITE RISKS, and has been renamed as Table 7-1. A new table, Table 6-2, has been added to Section 6 that includes the summary of metals in the Phase 2 sampling data. The table only includes the Phase 2 sampling results as only the Phase 2 sampling data was collected without filtering and considered valid to use for comparison to NYSDEC GA criteria. This new table also presents the two criteria that are used to compare results to and the number of times samples exceeded these criteria.

The MAXIMUM column originally presented in Table 6-1 of the Draft ROD represented the maximum value of a chemical of concern that was used to evaluate risk. The maximum "hit" of a metal over a state of federal criteria, as shown in Table 4-19 of the RI, but was not used as the basis for evaluating the need to implement a remedial action. The data presented in Chapter 4 of the RI was a summary of all the data collected during the RI. Chemicals detected above a criteria were then retained as potential chemicals of concern. The MAXIMUM column of Table 6-1 of the Draft ROD has been renamed to read "MAXIMUM DETECTED" in Table 6-2 of the Draft-final ROD to help clarify what was intended. Metals have also been added to Table 6-2 of the Draft-final ROD.

We are not sure what values the comment are comparing. We believe that the comment is referring to the tables in the risk assessment, i.e. Chapter 6, and the data tables presented in Chapter 4 of the RI. The three tables in the RI that involve groundwater data are: Table 4-19, Table 6-3 and Table 6-7. Table 4-19 includes all groundwater samples collected from both Phase 1, filtered and non-filtered, and Phase 2, unfiltered only. The maximum values presented in Table 4-19 for the semi-volatiles and explosives happened to have occurred from the Phase 1 data. This information was used to identify what chemicals are a concern. Table 6-3, in the risk assessment presents the chemicals that remained following a comparison to background, which is why only three metals are presented, for only the Phase 2 data. The Phase 1 data was eliminated for inclusion in the risk assessment due to the filtering that was performed. EPA identified that filtered data would not be acceptable, as filtering altered the chemical composition

of the data. The comparison to background and the use of Phase 2 data is discussed in the text of the RI and identified in the titles of Table 6-3 and Table 6-7. Since the maximum values presented in Table 4-19 were from Phase 1 data, the data presented in Table 6-3 of the RI, are different than the maximum values that are presented in Table 4-19 of the RI because one table considered all the groundwater data and the other considered only the Phase 2 data. The explosive compounds were detected in Phase 1 data but were not detected in Phase 2 data. A decision was made to retain explosive compounds for evaluation in the risk assessment since these compounds were detected in Phase 1. As part of the risk assessment, all non-detected values were transformed to real values at half of the detection limit. This is standard procedure for a risk assessment. The maximum values for the Phase 2 data, presented in Tables 6-3 and 6-7, are the higher of either the actual "hit" or half of the maximum detection limit. The difference between Table 6-3 and Table 6-7 is the number of compounds that remained following the screening process allowed by RAGS. The maximum values for the semi-volatile compounds and explosives presented in Table 6-7 and Table 6-3 of the RI are identical because the dataset was the Phase 2 data with non-detects transformed to actual values at half the detection limit. The value selected to evaluate risk was the lesser of either the 95^{th} UCL or the maximum value, which in some instances was half the detection limit. The actual detected values and the detection limits are listed in Table 4-19 of the RI Report. Table 6-1 of the Draft ROD and Table 6-7 and Table 6-3 of the RI have the same maximum values. The values shown in Table 6-1 of the Draft ROD are slightly different due to rounding. The maximum values shown in Table 6-1 of the Draft ROD is different than Table 4-19 of the RI because the data sets are different and Table 4-19 identifies only actual "hits" not half the detection limit. There is no discrepancy between these tables.

The new Table 6-2 of the Draft-final ROD will not agree with either the maximum values presented in Table 4-19 of the RI or 6-3 (Potential Chemicals of Concern) of the risk assessment of the RI or the maximum values presented in Table 6-7 (Chemicals of Concern) in the risk assessment of the RI report because the data presented in Table 6-2 of the Draft-final ROD is the actual maximum value detected in the Phase 2 data only. Explosive compounds were not detected during the Phase 2 sampling round and the maximum value is therefore zero. We used only the Phase 2 sampling data for Table 6-2 of the Draft-final ROD because that is the data set used as the basis for Table 7-1 of the Draft-final ROD.

Comment #6 Page 2 of 6: Surface Water Data for On-Site Wetlands: Why was iron omitted from this table? According to the RI report, NYSDEC standards were exceeded.

Response #6 The previous Table 6-1 of the Draft ROD listed only the chemicals of concern remaining after the risk assessment screening process as described in the baseline risk assessment in the RI Report. Iron was eliminated as a chemical of concern for all media in the baseline human health risk assessment because it is considered an essential human nutrient. A new table, Table 6-3, in the Draft-final ROD has been added that includes all the metals, including iron. However, iron has not been added to Table 7-1 of the Draft-final ROD since it was eliminated as a chemical of concern.

Comment #7 Page 3 of 6: Surface Water Data for Reeder Creek: Why was iron omitted from this table? According to the RI report and proposed plan, NYSDEC standards were

exceeded. According to the RI report, trichloroethene, tetryl, arsenic, chromium and copper were not detected in samples from Reeder Creek surface water. Why are they included in this table? The Army should have made the necessary changes before submitting the draft ROD to the EPA.

Response #7 a) Iron was eliminated as a chemical of concern for all media in the baseline human health risk assessment because it is considered an essential human nutrient. Therefore, iron was not listed in Table 6-1of the Draft ROD. A new table, Table 6-3, has been added that includes iron. This table compares data from Reeder Creek and on-site surface water to the NYSDEC criteria and includes the number of times that surface water samples were detected above the standard. Table 7-1 of the Draft-ROD lists chemicals of concern in surface water from Reeder Creek and on-site areas but does not compare the maximum values to the NYSDEC criteria as this has already been presented in Table 6-3 of the Draft-final ROD.

b) Trichloroethene, tetryl, arsenic, chromium, and copper were not detected in surface water samples collected from Reeder Creek as discussed in Section 4 of the RI Report. However, surface water samples collected from on-site tributaries adjacent to Reeder Creek influenced the decisions in establishing the chemicals of concern for both on-site surface water bodies and Reeder Creek. The procedures used to establish the database for the risk assessment involved retaining compounds that were detected at least once as potential chemicals of concern. This list was then further refined to obtain the final list of chemicals of concern. During the evaluation of the data, the decision was made to include compounds that were not actually measured in Reeder Creek but were measured in nearby tributaries from the site that are directly adjacent to Reeder Creek. As a result of the proximity of these tributaries to Reeder Creek, it was determined that these compounds will, within a short timeframe, flow into Reeder Creek. Unlike other media such as groundwater or soils, the database for Reeder Creek was smaller, so a conservative assumption was made to include those compounds as potential chemicals of concern for Reeder Creek, although they were not actually detected in Reeder Creek. Sampling location was considered in the decision to expand the list of chemicals of concern in Reeder Creek to include compounds that were never actually detected in Reeder Creek. These locations were SW-160, SW-170 and SW-197. Each of these locations are adjacent to Reeder Creek and were where the maximum concentration of the explosive compounds tetryl and RDX were detected. As a result, it was decided to retain these compounds as chemicals of concern for Reeder Creek. These compounds were then evaluated during the risk assessment even though they were never actually detected in this media. Since none of these compounds were actually detected in Reeder Creek the maximum values and the 95^{th} UCLs are one-half the detection limit. Potential exposure to locations adjacent to Reeder Creek was a conservative assumption in the risk assessment.

Comment #8 Page 4 of 6, Page 5 of 6, and Page 6 of 6: Considering the errors included on the previous pages of this table, the Army should review and revise these pages as necessary to ensure their accuracy,

Response #8 The "errors" which the reviewer has found in Table 6-1 of the Draft ROD are a result of an EPA misunderstanding regarding the intent of the data that is presented in the table. The title of the table is "Chemicals of Concern and Exposure Point Concentrations".

This table lists the compounds that were identified in the risk assessment as chemicals of concern. These chemicals were used to assess the site risk and did not always include all compounds that exceeded a guidance value. Table 6-1 of the Draft ROD is similar to Table 6-7 of the risk assessment section of the RI. The intent was to present a combination of the chemicals of concern that were used as the basis of the risk assessment and any guideline that was used in determining the list of potential chemicals of concern. Comparisons between Table 6-1 of the Draft ROD and the data tables presented in Chapter 4 of the RI are not valid because the datasets are different. The datasets are different due to the process of developing the list of chemicals of concern, performed during the risk assessment.

A new set of tables have been added to Section 6 of the Draft-final ROD that are similar in nature to the tables presented in Chapter 4 of the RI. These new tables, Table 6-1, 6-2, 6-3 and 6-4, are presented in Section 6 of the ROD, the Summary of Site Characteristics. Any standard, criteria and guidelines, previously presented in Table 6-1 of the Draft ROD, has been deleted to avoid comparing this data to a standard, criteria or guideline. The previous Table 6-1 of the Draft ROD has been moved to Section 7, the risk assessment section of the Draft-final ROD. With minor changes Table 6-1 of the Draft ROD is the same as Table 7-1 of the Draft-final ROD. However, the new Table 7-1 does not include all the compounds presented in Tables 6-1, 6-2, 6-3 and 6-4 as the list of compounds represents only those chemicals that were determined to be a chemical of concern, as discussed in the risk assessment of the RI.

Comment #9 Page 6 of 6: footnote 1 should indicate NYSAWQS, Class GA Standards for Groundwater.

Response #9 Agreed. The typographical error has been corrected.

6.1 Impacts to Groundwater

Comment #1 The first paragraph should be deleted. The general discussion of turbidity is not relevant to the ROD.

Response #1 Agreed; This discussion has been removed.

Comment #2 The draft ROD should be revised to be consistent with the proposed plan. The proposed plan discusses iron, manganese, aluminum and magnesium, but the draft ROD has omitted this information

Response #2 Agreed. The discussion of the four metals in groundwater was added to the PRAP in a later draft that was not included in this version of the ROD. The following paragraph from the PRAP has been added to the ROD in Section 6.2:

"Iron and manganese were also detected in groundwater above the NYS GA classification for protection of groundwater as a source of drinking water. Aluminum and magnesium were detected above the NYS guidance values. Iron, manganese, and aluminum were also evaluated according to secondary federal standards intended to establish reasonable goals for aesthetic quality for drinking water such as odor, taste, and color."

6.3 Impacts to Surface Water

Comment #1 The draft ROD should be revised to be consistent with the proposed plan. The proposed plan discusses the concentrations of aluminum and iron in Reeder Creek that exceed NYSDEC Class C water quality criteria standards, but the draft ROD states that no analytes exceed the Class C AWQS for Reeder Creek.

Response #1 Aluminum and iron were detected in surface water samples from Reeder Creek at concentrations exceeding the NYSDEC Class C water quality criteria standards, see Table 6.3 in the RI Report. The text in the ROD in Section 6.3 has been revised to state this. Additional text has been added regarding exceedances of Class D designation. At the time of the RI this stretch of Reeder Creek was classified as Class D.

Comment #2 Although the NY Ambient Water Quality Concentrations may not apply, any contamination detected in the on-site surface water samples should be mentioned. The text should also mention how the final remedy at the OB Grounds will improve the on-site surface water quality.

Response #2 The NY Ambient Water Quality Concentrations do not apply and any comparison between these standards and on-site surface water would be inappropriate. On-site surface water has been adequately addressed through the risk assessment process where on-site surface water concentrations were incorporated as part of a wading scenario. Discussions have been added that identify the concentrations of chemicals detected above AWQCs. The following text has been added : "The selected remedial action will improve the quality of the on-site surface water by preventing interactions with any remaining on-site soils, thereby minimizing the potential for exposure. Erosion will also be controlled during construction activities and as part of a permanent design."

Comment #3 The last sentence contradicts Table 6-1 page 3 of 6. According to the table, aluminum and vanadium exceed AWQC. The discrepancy should be corrected.

Response #3 Agreed. The concentrations of aluminum and vanadium that exceeded the respective AWQC have been added to the text.

6.4 Impacts to Sediment

Comment #1 Page 6-10: Sentence 2 - Arsenic, cadmium, manganese, mercury, nickel, and zinc also exceed the NYSDEC Sediment Guidelines.

Response #1 Agreed. Text regarding the exceedances of the NYSDEC Sediment Guidelines have been added. The referenced text in Section 6.4 of the ROD has been revised.

Comment #2 A discussion of the on-site sediments should be included in this section.

Response #2 Agreed; A discussion regarding the on-site sediments have also been added to this section. Exceedances of the maximum concentrations of on-site sediments over the NYSDEC Sediment Guidelines have been described. Text has also been added stating that the impacts from the sediment have been determined from a risk assessment and the

chemicals listed in the previous Table 6-1 of the Draft ROD are the list of chemicals of concern that were used in the evaluation. A new table, Table 6-4, has been added that identifies the chemicals that exceeded the NYSDEC Sediment Guidelines. At the time of the RI, the NYSDEC Sediment Guidelines were from 1989. These guidelines were updated in 1993 and 1994. Table 6-4 indicates that the sediment guidelines were from 1989.

7.0 Summary of Site Risks

7.1 Human Health Risk Assessment

Comment #1 a) Page 7-4: It would be helpful if the Hazard Quotient (HQ) was represented in the form of an equation (i.e., HQ = CDI/RfD; where CDI is the chronic daily intake and RfD is the Reference Dose).

Response #1 a) Agreed; The text has been changes as appropriate to reflect the change from Hazard Index to Hazard Quotient (HQ).

Comment #1 b) There is a break in the text that needs to be corrected.

Response #1 b) The break has been removed.

Comment #2 Figure 7-2: What does the term "pathway discounted as significant risk" mean?

Response #2 This phrase means that the pathway was eliminated from further consideration as it is not a realistic pathway that would contribute to the overall site risk. The determination was based upon professional judgment. For example, ingestion, inhalation and dermal contact from groundwater to site workers was eliminated as there are no on-site groundwater wells that are available for site worker to use for this purpose. The phase has been modified to "PATHWAY DISCOUNTED AS NOT BEING APPLICABLE TO RECEPTOR" to help clarify.

Comment #3 a) Page 7-6: Second full paragraph, sentence 2 - the model is called the Uptake Biokinetic Model (UBK).

Response #3 a) Agreed; The reference to the UBK model has been revised.

Comment #3 b) The Uptake Biokinetic Pb Model specifically estimates a probability distribution of blood lead concentration(s) in a child/children. Also, the EPA target level is to have not greater than 5% of the blood concentrations exceeding 10 ug/dl.

Response #3 b) Agreed; The text has been added to the portion of Section 7 that discusses the use of the UBK model.

Comment #4 Page 7-8: Paragraph 2 - The last sentence is not a complete sentence. This paragraph was already presented on page 7-6 of this document. See comments above pertaining to Page 7-6.

Response #4 Agreed; This sentence has been added as a phrase to the previous sentence. The discussion of the use of the UBK model has been consolidated to one paragraph on the previous page. The paragraph on this page referring to the UBK model has been deleted.

Comment #5 a) Paragraph 3: The last sentence should read, "As a result, an on-site residential..."

Response #5 **a)** Agreed; The word "an" has been added to the sentence.

Comment #5 b) The following sentence should be added to the end to this paragraph: "The OB Grounds will be remediated to meet ecological standards, which are more stringent than residential requirements."

Response #5 **b)** Agreed; The sentence has been added to the end of the paragraph.

7.2 Ecological Risk Assessment

Comment #1 Page 7-9, Paragraph 3, sentence 2 should read, "Additionally,... literature which are considered..."

Response #1 Agreed; The word "is" has been changed to the word "are" in the sentence.

Comment #2 a) Page 7-10, Paragraph 1, Where do the 95th UCL values of 401 mg/kg copper and mg/kg lead come from? They are not listed on Table 6-1, pages 4 of 6 or 5 of 6.

Response #2 a) The 95^{th} UCL values for copper and lead were obtained from Table 6-3 of the RI. This table lists the summary data for all sediment samples collected from both on-site and Reeder Creek locations. Consideration of all sediment data was deemed appropriate for ecological receptors since, unlike humans, exposure for ecological receptors to all sediment locations are equally likely. These values were not listed in Table 6-1 of the Draft ROD because these tables were for human exposure. For brevity, ecological exposure was discussed in the text but not in separate tables.

The following text has been added to clarify the values used in assessing ecological risk : "For the protection of aquatic life in contact with contaminated sediments, the 95th UCL for both copper and lead exceeded both the 1989 NYSDEC sediment guidelines and the Limits of Tolerance (LOT) criteria for the protection of benthic macroinvertebrates. For copper, the 1989 NYSDEC "no effect" and "lowest effect" level, sediment guideline for protection of aquatic life that is in contact with sediments was 19 mg/kg. The 1993 NYSDEC, Lowest Effect Level (LEL) sediment guideline, for protection of aquatic life that is in contact with sediments containing copper is 16 mg/kg. The 95th UCL for copper in all sediments, including on-site areas and Reeder Creek, is 401 mg/kg. For lead, the 1989 NYSDEC "no effect" and "lowest effect" level, sediment guideline was 27 mg/kg. The 1993 NYSDEC, Lowest Effect Level (LEL) sediment guideline, for protection of aquatic life that is in contact with sediments containing lead is 31 mg/kg. The 95th UCL of the mean for all sediment samples, including on-site areas and Reeder Creek, is 652 mg/kg. Combining all sediment data was deemed to be appropriate as wildlife could consume species from both on-site areas as well as off-site areas."

Comment #2 b) Where do the NYSDEC sediment guideline values of 19 mg/kg copper and 27 mg/kg lead come from? Remedial action objectives for these metals in sediment are 16 mg/kg and 31 mg/kg, respectively.

Response #2 b) The 19 mg/kg value for copper and the 27 mg/kg value for lead were the 1989 sediment criteria that was referenced in the RI. NYSDEC updated the sediment criteria in 1993. The 1993 values were incorporated into the later documents, such as the FS and the PRAP. For clarity, both the 1989 and the 1993 values were identified in the ROD.

Comment #2 c) Last sentence - Aluminum and vanadium are above the surface water criteria.

Response #2 c) Agreed; The following has been added at the end of this paragraph: " Surface water criteria for the protection of aquatic life did not exceed the guidelines for copper and lead. However, the maximum surface water concentration and the 95th UCL of the mean for aluminum and vanadium did exceed the NYSAWQCS for protection of aquatic species. For aluminum in Reeder Creek, the maximum surface water concentration was 300 ug/L; the 95th UCL of the mean is 139 ug/L; the NYSAWQCS for aluminum is 100 ug/l. For vanadium in Reeder Creek, the maximum surface water concentration was 39 ug/L; the 95th UCL of the mean is 19 ug/L; the NYSAWQCS for vanadium is 14 ug/L."

Comment #2 d) Paragraph 2 - This paragraph is missing a discussion of the sediments of Reeder Creek posing potential elevated ecological risk due to the presence of several metals.

Response #2 d) Agreed; The following sentence has been added : "Sediments in Reeder Creek may also pose an elevated ecological risk due to the presence of heavy metals, such as copper and lead."

7.3 Uncertainty in Risk Assessments

Comment #1 a) Paragraph 1 - Sentence 2 should read "These uncertainties can lead to overestimation and/or..."

Response #1 a) Agreed; The word "/or" has been added.

Comment #1 b) Sentence 4 should read "To minimize the underestimation of risk..."

Response #1 b) Agreed; The word "underestimate" has been changed to "underestimation".

Comment #1 c) Sentence 5 should read "Even with such guidelines, uncertainties remain."

Response #1 c) Agreed; The sentence has been changed to include a comma.

Comment #2 a) Page 7-11: Paragraph 1, second full sentence should read, "Geostatistical techniques were used during the initial planning phases..."

Response #2 a) Agreed; The sentence has been changed to delete two commas.

Comment #2 b) Last paragraph, sentence 6 should read, "Once received, the data...validation following...."

Response #2 b) Agreed; The sentence has been changed to include a comma.

Comment #3 Page 7-12: last paragraph, sentence 2 should read, "EPA guidance for risk assessment suggests..."

Response #3 Agreed; The sentence has been changed to delete a comma and add an "s" after suggest.

Comment #4 Page 7-13, first full paragraph, sentence 1 should read, "As per EPA... allowed if the frequency of detection is less than 5 percent."

Response #4 Agreed; The sentence has been changed from "the number of times the compound has been detected" to "the frequency of detection".

Comment #5 Page 7-14, first full paragraph, sentence 2 should read, "By not comparing anthropogenic organic compounds to background, the estimation of risk would increase, as organic..."

Response #5 Agreed; The phrase "Not comparing anthropogenic organic compounds to background would increase the estimation of risk" has been changed to "By not comparing anthropogenic organic compounds to background, the estimation of risk would increase,"

Comment #6 Page 7-15, first full paragraph, sentence 4 - This sentence should be revised.

Response #6 Agreed; This sentence has been modified as "Each chemical detected at the site is assumed to contribute to the total site risk in a manner that is independent of any other chemical."

8.0 Remedial Action Objectives

8.1 General Remedial Action Objectives

Comment #1 a) Page 8-1: Paragraph 1, sentence 1 - This statement contradicts the 1st full paragraph on page 7-10 that states that the on-site soils and sediments in the low-lying wet areas pose an elevated ecological risk.

Response #1 a) We assume the comment is referring to the first paragraph of Section 8.2 of Page 8-1 that states that the primary threat at the OB Grounds is through exposure to on-site soils and sediments in Reeder Creek. Although we do not believe that there is any contradiction between the two statements, the term "and sediments in the low-lying wet areas" has been added to clarify that on-site soils also include sediments.

Comment #1 b) Paragraph 2, sentence 1 should read, "As a result... human health."

Response #1 b) Agreed; The phrase "and the environment" has been deleted from the sentence.

Comment #2 a) Page 8-2: The fourth sentence should be revised to state, "A value of 500 mg/kg was established...".

Response #2 a) Agreed; The phrase "compromise" has been deleted from the sentence.

Comment #2 b) Paragraph 1, sentence 7 should read, "In addition... the concentration of lead determined to be protective of terrestrial..."

Response #2 b) Agreed; The phrase "determined to be protective" has been added to the sentence.

8.4 Site Specific Cleanup Goals

Comment #1 Page 8-4: Bullet 2, sentence 3 should be revised to read, "The 500 mg/kg clean-up level for lead in soil was agreed to after consideration of the technical issues...".

Response #1 Agreed; The phrase "a negotiated value that was" has been deleted from the sentence.

9.0 Description of Alternatives

Comment #1 Page 9-1, paragraph 3, sentence 2 should read, "Overall protection of human health and the environment and compliance..."

Response #1 Agreed; The changes have been made to the sentence.

Comment #2 a) Page 9-2: Bullet 2 - The 27.5 acre area of 9-inch soil cover mentioned here is not consistent with the 43.8 acres discussed in the proposed plan. If the actual estimate is 27.5 acres, the ROD should discuss the discrepancy with the proposed plan.

Response #2a) The area to be covered has been refined during the design phase to be 27.5 acres. The 43.8 acre includes the entire OB Grounds area beyond the boundaries of the pads. This change was not made to the PRAP but been added to the ROD. The following sentence has been added : "The PRAP incorrectly identified the area to be covered as 43.8 acres."

Comment #2 b) Paragraph 2, sentence 1, should read "Remediation of.... Alternatives 4 through 6..."

Response #2 b) Agreed; Alternative 2 has been changed to Alternative 4.

10. Summary of the Comparative Analysis of Alternatives

Table 10-1 Individual Evaluation of Alternative Compliance with ARARs

Comment #1 Footnote: We do not agree with the first sentence of the footnote and it should be deleted. The footnote should be moved to the bottom of page 1 of 3.

Response #1 Agreed; The first sentence of the footnote has been removed and the footnote has been moved to the bottom of Page 1 of 3.

Comment #2 Page 10-6, paragraph 2 - There should also be a sentence stating that terrestrial ecological receptors would be exposed to high metals concentrations in on-site soils.

Response #2 Agreed; An additional sentence regarding terrestrial ecological receptors has been added.

Comment #3 Page 10-7: It is our understanding that the Federal Action Level has been promulgated and the EPA treats it as an ARAR. The text should be corrected.

Response #3 Federal Action Levels for lead and copper are described in 40 CFR Part 141.80, Subpart I - Control of Lead and Copper. The regulations are intended to provide protection for water systems and are to be measured at the tap. Further, the action level is exceeded if the concentration of lead in more than 10 percent of the tap water samples collected during any monitoring period is greater than 15 ug/L. The calculation of the 90th percentile is described in Part 141.80 and involves multiple measurements and considers the size of the population that the water system services. At the insistence of EPA we have reluctantly included the New York State Drinking Water value, since this value is a state promulgated value. However, we feel that direct comparisons to this number is a misrepresentation of the procedures that are stated in Part 141.80. The State of New York has also promulgated ambient water quality standards for protection of groundwater that is a source of drinking water, i.e. the Class GA standard. We believe that the more appropriate standard for comparison is the Class GA value. Since the data that is being compared is groundwater data, not drinking water at the tap. A statement have been added indicating that the EPA considers that the Federal Action Level is an ARAR. The following statement has been added: "The EPA believes that the Federal Action Level is promulgated and is considered to be ARAR."

Comment #4 Page 10-11, last paragraph, sentence 2 should read, "The construction ... identified and tested ..."

Response #4 Agreed; The comma after identified has been changed to "and".

Comment #5 a) Page 10-12: First full, last sentence should read, "The number ... washing is limited."

Response #5 a) Agreed; "and" has been changed to "is".

Comment #5 b) Cost section sentence 2 should read "The present worth costs for each alternative were obtained..."

Response #5 b) Agreed; "was" has been changed to "were".

11.0 The Selected Remedy

Comment #1 a) Page 11-1: The text refers the reader to Figure 11-1. Which case(s) in the legend apply to the selected remedy? Case 2, Remediation of Reeder Creek, is not shown.

Response #1 a) The final volume of soil and sediment to be removed is the sum of all the cases. Each case was developed individually because that is how the data was organized. Case 1 through 5 are described in detail in the FS. The following text has been added : "Cases 1 through 5 described in **Figure 11-1** refer to various soils in areas of the OB Grounds that are similar. Case 1 refers to soil that are likely to exceed the TCLP limits for disposal. These soils will require solidification prior to off-site disposal. Case 2 identifies remote locations of soils and sediment in Reeder Creek that will require removal. These soils and sediment locations are shown on **Figure 11-2.** Case 3 identifies the berms on the burn pads that will require removal. Case 4 identifies the burn pads that will require removal. Case 5 identifies the areas surrounding the burn pads that will require removal."

An additional figure, Figure 11-2, has been added to identify the additional locations of soil and sediment that will be removed.

Comment #1 b) The first bullet should read, "... for use as a conservation/recreation area."

Response #1 b) Agreed; The word "recreation" has been added.

Comment #1 c) Bullet 5 should read "Conducting a monitoring program for site groundwater and sediment in Reeder Creek."

Response #1 c)Agreed; The phrase "Conducting site groundwater and sediment in Reeder Creek monitoring program" has been changed to "Conducting a monitoring program for site groundwater and sediment in Reeder Creek."

Comment #1 d) Bullet 6 - The area mentioned here, 27.5 acres of soil cover, contradicts the 43.8 acres discussed in the Proposed Plan. The draft ROD should be corrected or the discrepancy should be explained.

Response #1 d)Agreed; This change was not made to the PRAP but has been added to the ROD. The following sentence has been added : "The PRAP incorrectly identified the area to be covered as 43.8 acres."

Comment #1 e) This section should also state that the monitoring program will ensure that the 9-inch soil/vegetative cover is maintained after the remedy is complete.

Response #1 e) Agreed the following sentence has been added to the end of Bullet 6 : "The monitoring program will ensure that the 9-inch soil/vegetative cover is maintained after the remedy is complete."

Comment #2 a) Page 11-2: First sentence: If the data show that only one of the 35 wells exceeds groundwater standards for lead, the text should be revised to make this point.

Response #2 a) Agreed; The sentence has been changed to indicate that only one well exceeds the groundwater standard for lead.

Comment #2 b) The text from page 11-4 should be include with the three lines of text on this page.

Response #2 b) Agreed; The blank lines have been combined with the previous page.

Appendix C.1 - Responsiveness Summary

Introduction

Comment #1 As lead agency, the Army will be preparing responses to the comments and concerns received during the public comment period, not EPA and NYSDEC. The text should be corrected.

Response #1 Agreed; The text has been changes to reflect this.

Comment #2 The last sentence should be revised to read, "All comments... have been considered in the Army's, EPA's and NYSDEC's...".

Response #2 Agreed; The "Army" has been added to the sentence

Summary of Community Relations Activities

Comment #1 First paragraph: There is no administrative record file at the EPA Docket Room in Region II for SEDA. Reference to this should be deleted. The actual location should be included in this section.

Response #1 Agreed; Reference to the EPA Docket Room has been deleted and the following has been added to the paragraph : "The Administrative Record is available for public review at the Seneca Army Depot Activity, 5786 State Route 96, Building 116, Romulus, New York, 14541-5001. The Administrative Record Index identifies each of the items considered during the selection of the remedial action."

Comment #2 The second paragraph, first sentence should be revised to read, "...,the Army, EPA and NYSDEC conducted...".

Response #2 Agreed; The following text has been added : "On December 17, 1997, the Army, the EPA and the NYSDEC conducted a public meeting at the Seneca County Board of Supervisors Room, located at the Seneca County Office Building in Waterloo, NY to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees."

Summary of Comments and Responses

Comment #1 As lead agency, the Army will be preparing responses to the comments received during the public comment period, not EPA and NYSDEC. The text should be corrected.

RESPONSE TO ARMY COMMENTS TO THE DRAFT ROD

RESPONSE TO COMMENTS
FROM
United States Army Engineering and Support Center, Huntsville
DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
Comments Dated February 6, 1998

General Comments

Comment #1 **Tate - CENWO-HX**
10.0 Summary of Comparative Analyssis of Alternatives, Page 10-11 Availability of Services and Materials. Alternative 5. 4 and 5 should be ranked equally. None of the landfill components is more difficult to obtain than a pug mill.

Response #1 Disgree; Construction of an on-site landfill would require materials such as clay and/or geosynthetic materials, that are not as readily available compared to the standard excavation equipment that would be required to excavate soils. Clean fill will be required for Alternative 4 but Alternative 4 will not require an impereable cap, like a landfill would. The amount of clay and/or fill materials that would be required to construct a landfill are not known to be available in the Romulus Area. We believe that although the differences are slight the availability of materials, such as clay, in the Romulus Area makes Alternative 5 slightly more favorable than Alternative 4.