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

Prepared For:
United States Army Corps of Engineers

Prepared By:
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November, 1997
CONTRACT NO. DACA87-92-D-0022

Delivery Order 0010

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable, or Relevant and Appropriate Requirement
AWQS	Ambient Water Quality Criteria
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
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.)

mg	milligrams
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
mL	milliliters
MSL	Mean Sea Level
NA	Not Available
NAE	National Academy of Engineering
NAS	National Academy of Science
NCP	National Contingency Plan
ND	Not Detected
NPL	National Priority List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules, Regulations
OB	Open Burning
OE	Ordnance and Explosive
O&M	Operations and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PAH	Polynuclear Aromatic Hydrocarbon
Parsons ES	Parsons Engineering Science, Inc. (formerly Engineering Science, Inc.)
PRAP	Project Remedial Action Plan
QA/QC	Quality Assurance/Quality Control
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RDX	Royal Detonation Explosive (a military high explosive compound)
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments Reauthorization Act
SC	Source Control

ACRONYMS AND ABBREVIATIONS
(Cont.)

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	Biokinetic Uptake 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 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.

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.

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:

____________________________ _________________

Raymond Fatz Date
Deputy Assistant Secretary of the Army for
Environment, Safety & Occupational Health

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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:

____________________________ ________________

Constantine Sidamon-Eristoff 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. A Class C water quality designation is intended to provide 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 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**. 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. Run-off on the site is generally to the east-northeast via a series of drainage ditches and culverts into Reeder Creek. There are several seasonally poor drainage areas where water collects. A total of 38 wetland areas have been identified in and around the OB grounds. A more comprehensive description of the site is presented in the Remedial Investigation (RI) Report (Parsons ES, 1994).

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 2-1
LOCATION MAP

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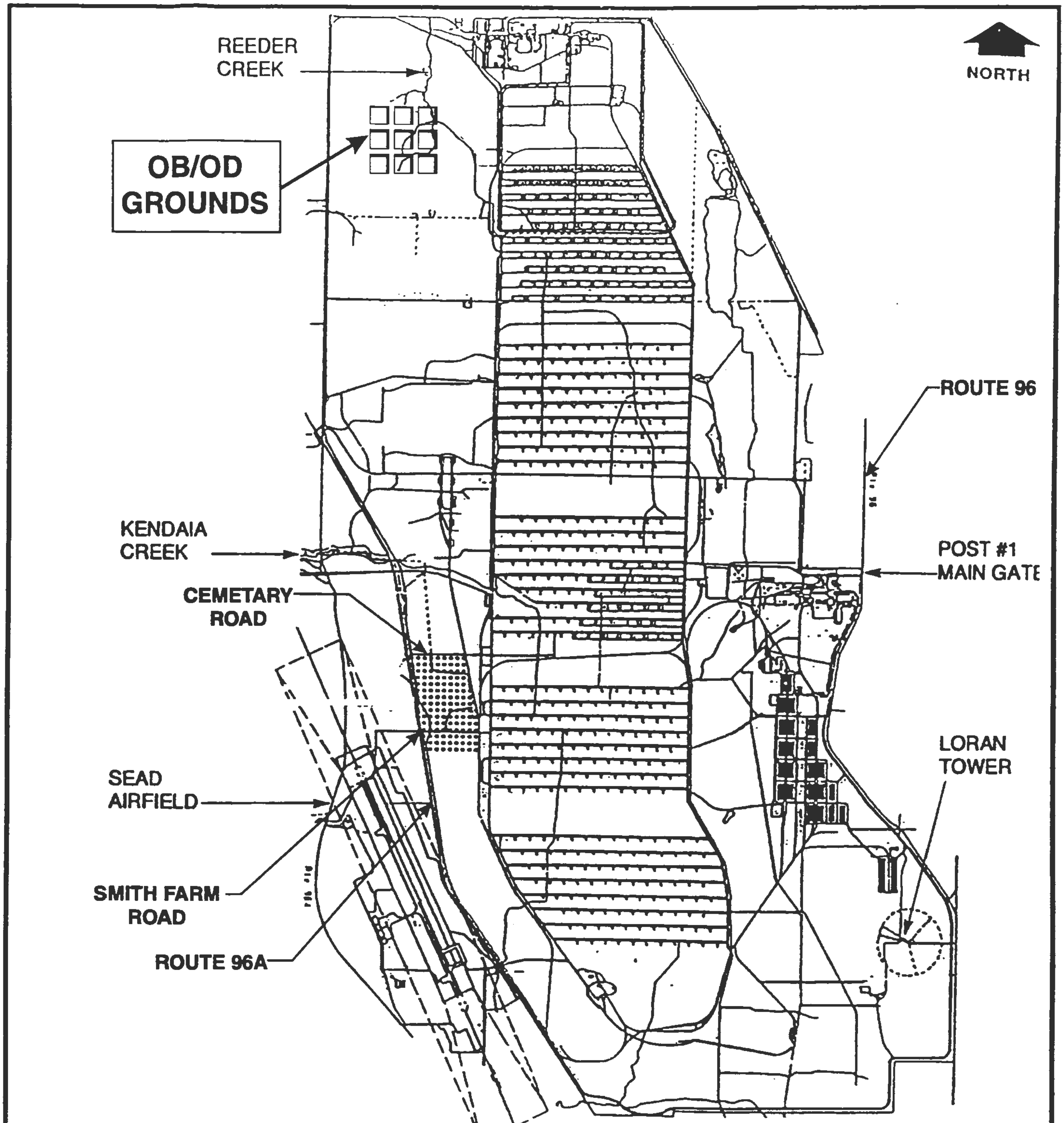

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PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RECORD OF DECISION
OPEN BURNING GROUNDS

DEPT. ENVIRONMENTAL ENGINEERING	DWG NO. 720446-01026

FIGURE 2-2

SENECA ARMY DEPOT MAP

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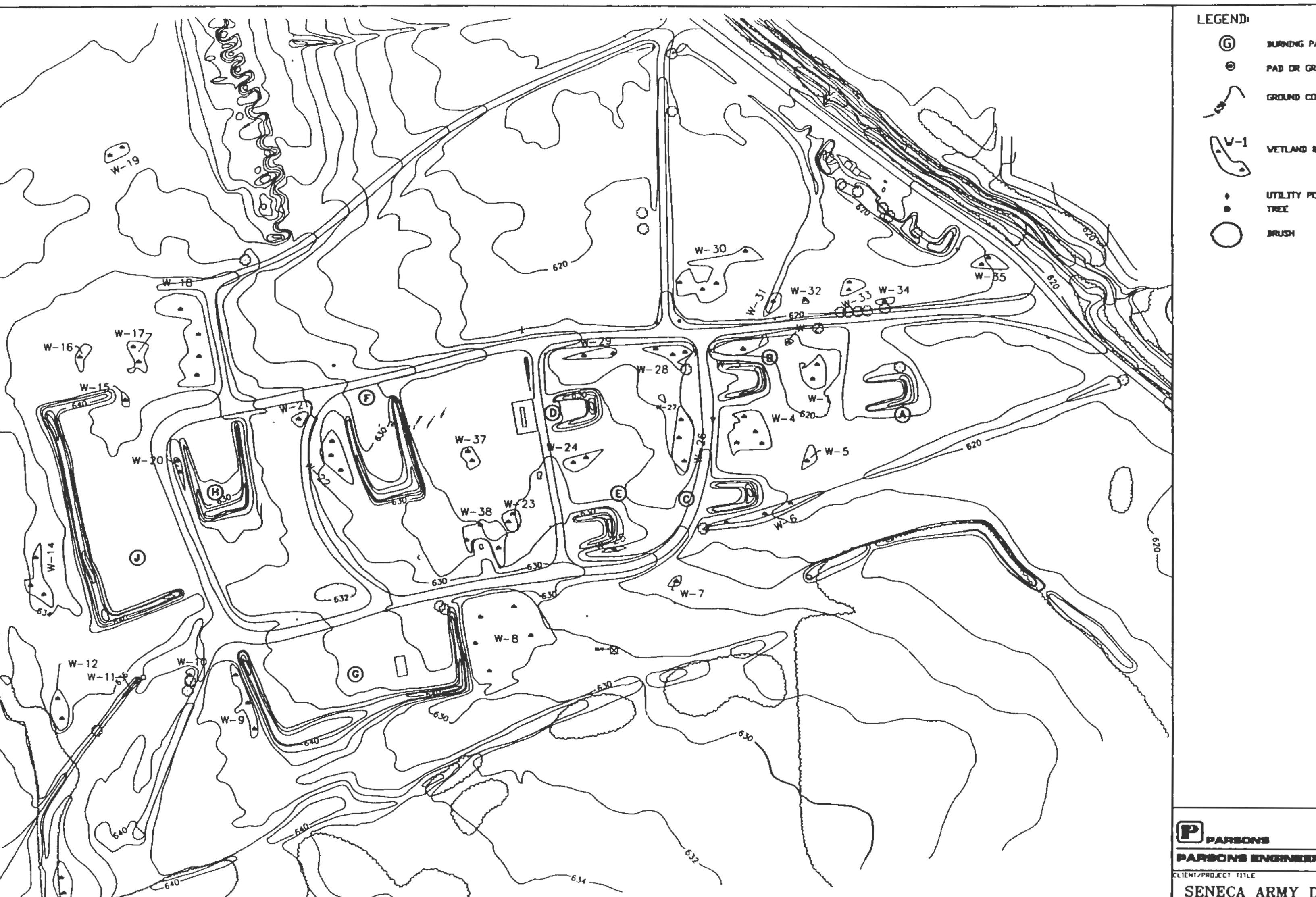
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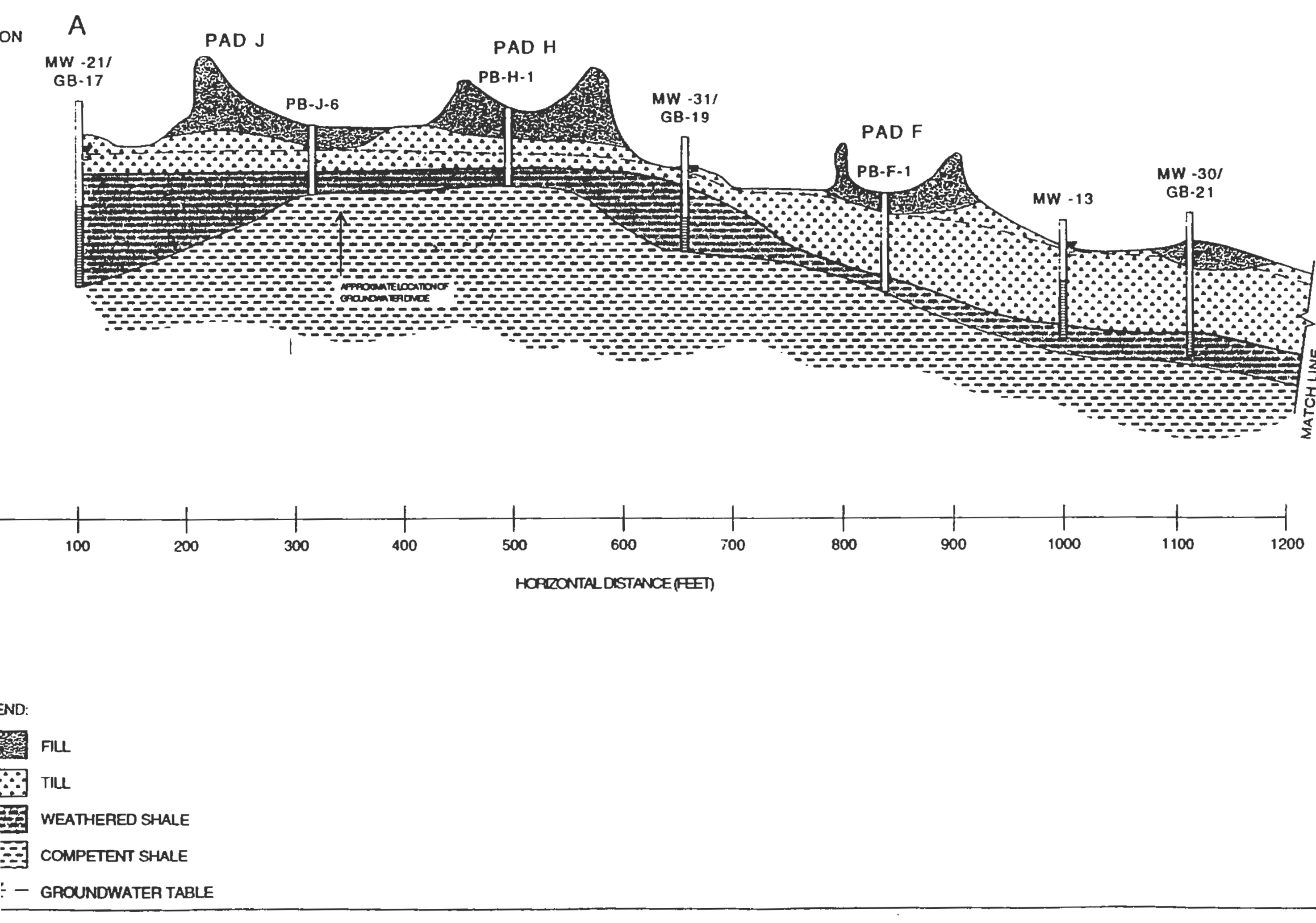

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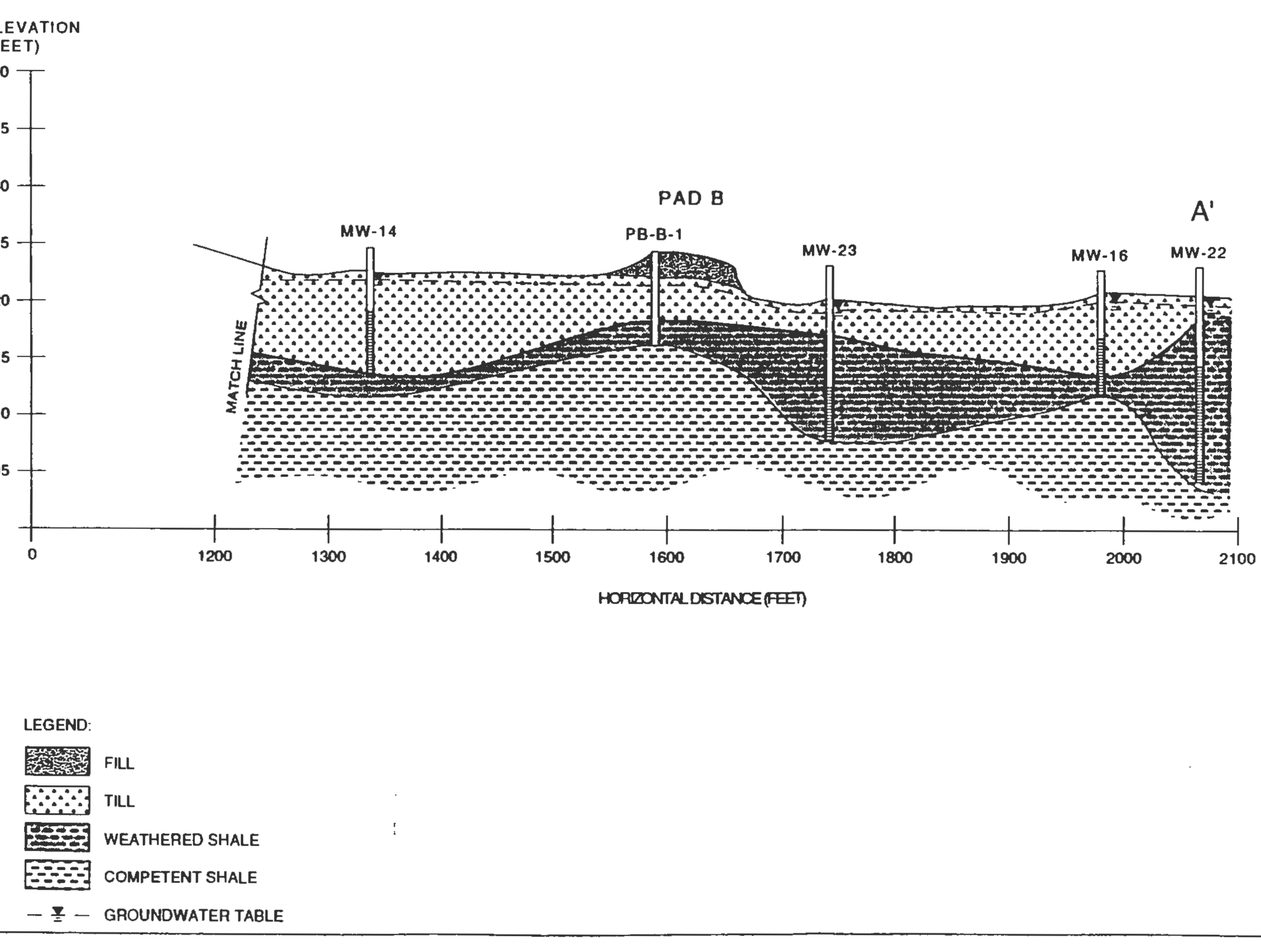

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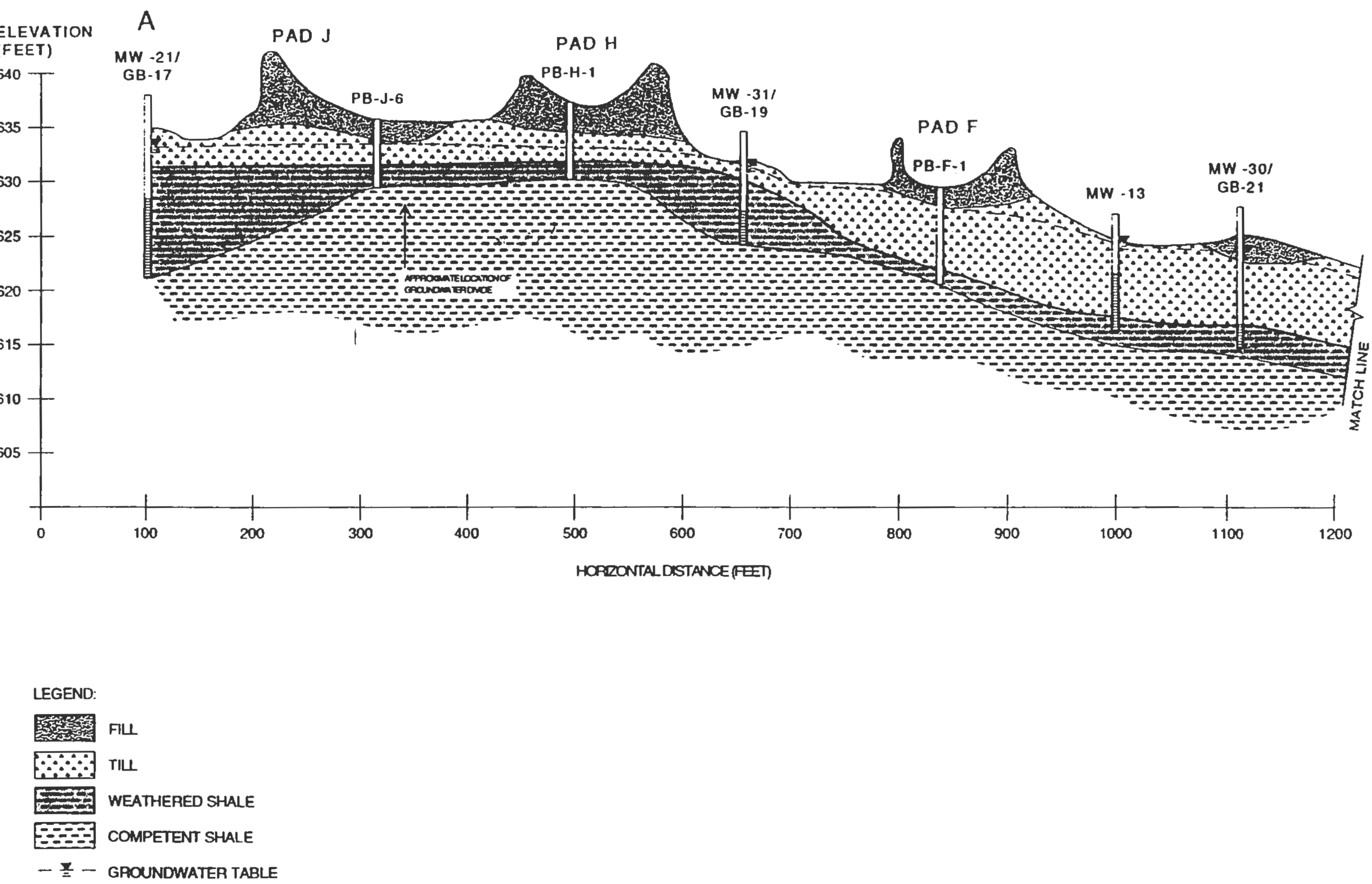

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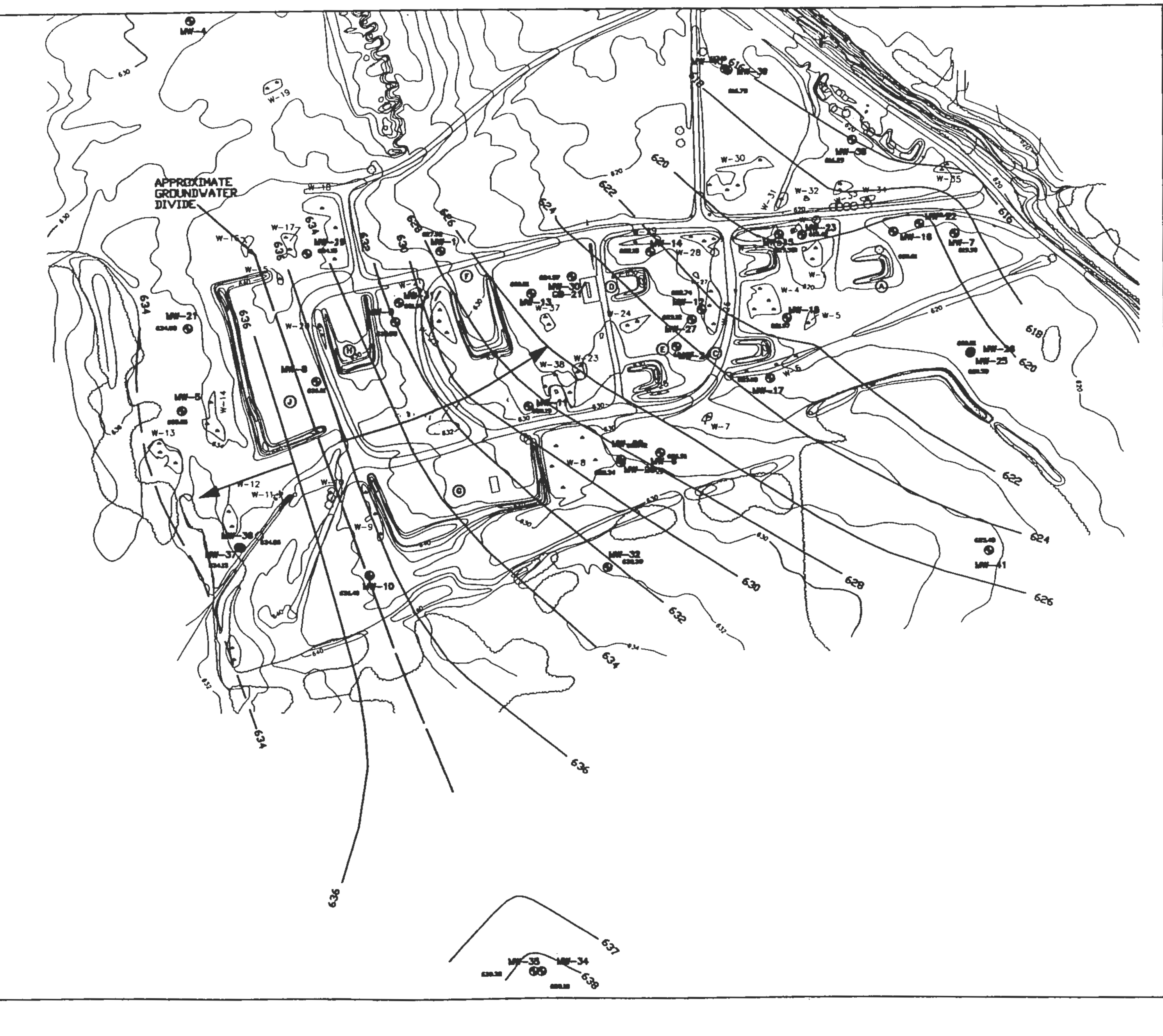

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FIGURE 2-5 GRO
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SCALE 1" = 250'

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 use 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.

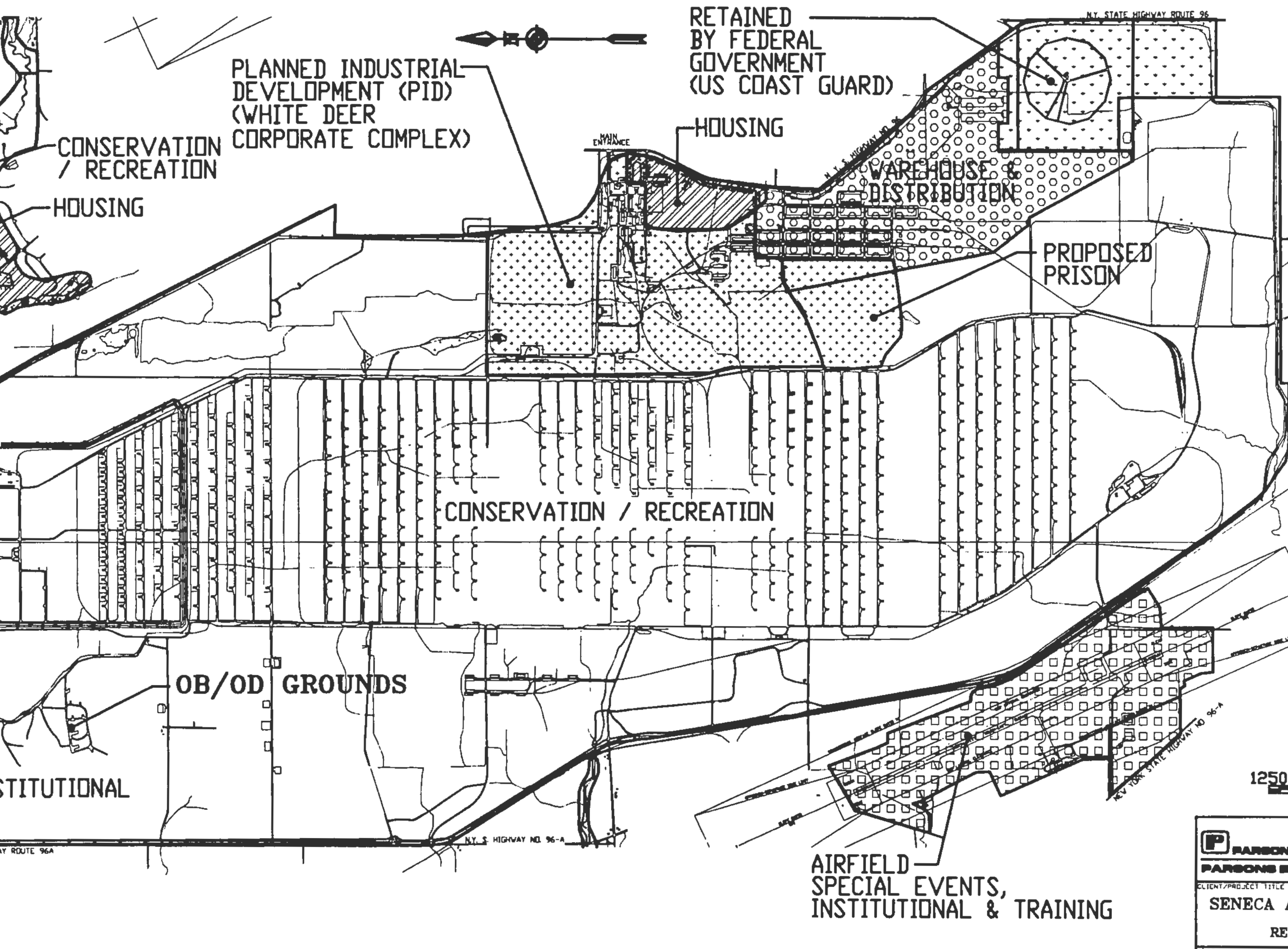
The open burning of waste munitions was identified as a Resource Conservation and Recovery Act (RCRA) regulated process. Due to the nature of the SEDA mission, it was necessary for the facility to treat, store and dispose of hazardous wastes including waste munitions. Consequently, a RCRA permit was 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 of 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 in 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 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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CONSERVATION / RECREATION
HOUSING
WAREHOUSE & DISTRIBUTION
PROPOSED PRISON
CONSERVATION / RECREATION
OB/OD GROUNDS
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CLIENT/PROJECT TITLE
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1" = 2500'

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 December 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 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 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 EPA Docket Room in Region II, New York and the information repositories at Building 116 within the Seneca Army Depot Activity. The notice of availability for the above-referenced documents was published in the (*document*) on (*date*). The public comment period on these documents was held from (*date*) to (*date*). On (*date*), EPA and NYSDEC conducted a public meeting at (*location*), 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 to exceed the RCRA toxicity limits due to metals.
- Post construction monitoring of on-site groundwater and sediment in Reeder Creek for 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 and 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.

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 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 groundwater conditions at the site does not require a remedial action. The future use of the OB Grounds, as a conservation area, does not involve exposure to groundwater, therefore groundwater remediation was not warranted. To ensure the future quality of groundwater, the remedial plan will include a continuation of the existing groundwater monitoring program. The preferred alternative will ensure that groundwater concentrations remain at or below the current levels.

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.

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 that were the most significantly impacted.

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. The chemicals of concern by media are presented in **Table 6-1**.

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 screen site conditions. Concentrations above these guidance values imply that conditions at the site that may pose a threat to human health and the environment. The analytes that exceeded these guidance values are the PAH compounds benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene and the metals barium, copper, lead, and zinc.

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 Pads B and C.

TABLE 6-1

CHEMICALS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
GROUNDWATER SAMPLES

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	COUNT	MAXIMUM	95th UCL of the mean	MEAN	NY AWQS[1] GA Std.	EXPOSURE POINT CONC.
Volatile Organics							
Acetone	ug/L	28	15	3.7	2.9	50	3.7
Semivolatiles							
Di-n-butylphthalate	ug/L	27	5.0	5.0	4.7	50	5.0
Di-n-octylphthalate	ug/L	27	5.0	5.1	4.8	50	5.0
Explosives							
RDX	ug/L	27	0.1	0.1	0.1	5	0.1
2,4,6-Trinitrotoluene	ug/L	27	0.1	0.1	0.1	5	0.1
2,6-Dinitrotoluene	ug/L	27	0.1	0.1	0.1	5	0.1

TABLE 6-1 (Continued)

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

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	COUNT	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	10.4
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	COUNT	MAXIMUM	95th UCL of the mean	MEAN	NY AWQC[2]	EXPOSURE POINT CONC.
Volatile Organics							
1,2-Dichloroethane	ug/L	11	5.0	3.7	3.1	NA	3.7
Trichloroethene	ug/L	11	5.0	3.8	3.2	NA	3.8
Explosives							
RDX	ug/L	12	0.7	0.2	0.1	NA	0.2
Tetryl	ug/L	12	0.2	0.1	0.1	NA	0.1
Metals							
Aluminum	ug/L	9	300	139	93	100	139
Arsenic	ug/L	11	1.9	1.4	1.2	190	1.4
Barium	ug/L	11	67	58	52	NA	58
Beryllium	ug/L	5	1.4	6.7	0.5	1,100	1.4
Chromium	ug/L	11	4.8	4.3	3.4	367	4.3
Copper	ug/L	11	10	8.9	6.9	22	8.9
Lead	ug/L	11	2.2	1.0	0.7	7.8	1.0
Manganese	ug/L	10	236	130	88	NA	130
Nickel	ug/L	11	18	15	11	162	15
Vanadium	ug/L	11	39	19	14	14	19

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

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	COUNT	MAXIMUM	95th UCL of the mean	MEAN	NYSDEC SEDIMENT CRITERIA[3]	EXPOSURE POINT CONC.
Semivolatiles							
2-Methylnaphthalene	ug/kg	17	500	363	312	NA	361
Phenanthrene	ug/kg	20	600	395	331	1,390	394
Benzo(a)anthracene	ug/kg	18	500	367	311	NA	365
Benzo(b)fluoranthene	ug/kg	18	500	367	312	NA	365
benzo(k)fluoranthene	ug/kg	18	500	367	312	NA	365
Benzo(a)pyrene	ug/kg	18	500	367	311	NA	365
Indeno(1,2,3-cd)pyrene	ug/kg	18	500	367	311	NA	365
Explosives							
4-amino-2,6-Dinitrotoluene	ug/kg	22	160	72	65	NA	72
2-amino-4,6-Dinitrotoluene	ug/kg	22	180	76	67	NA	76
Metals							
Aluminum	mg/kg	22	25,800	17,743	16,486	NA	17,714
Antimony	mg/kg	12	28	11	7.3	NA	10
Arsenic	mg/kg	19	10	5.7	4.9	5.0	5.6
Barium	mg/kg	19	1,780	366	272	NA	366
Beryllium	mg/kg	18	2	1.1	1.0	NA	1.1
Cadmium	mg/kg	22	10	3.4	2.6	0.8	3.4
Chromium	mg/kg	19	42	27	25	26	27
Cobalt	mg/kg	19	18	13	12	NA	13
Copper	mg/kg	22	3,790	489	288	19	489
Lead	mg/kg	22	7,400	1,675	526	27	1,675
Manganese	mg/kg	22	1,520	598	502	428	595
Mercury	mg/kg	20	2.0	0.9	0.3	0.1	0.9
Nickel	mg/kg	19	64	40	37	22	40
Selenium	mg/kg	18	1.8	0.9	0.7	NA	0.9
Vanadium	mg/kg	19	38	27	25	NA	27
Zinc	mg/kg	21	1,200	446	273	85	447

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

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	COUNT	MAXIMUM	95th UCL of the mean	MEAN	NYSDEC SEDIMENT CRITERIA[3]	EXPOSURE POINT CONC.
Semivolatiles							
2-Methylnaphthalene	ug/kg	8	490	412	315	NA	406
Phenanthrene	ug/kg	8	490	397	269	1,390	389
Benzo(a)anthracene	ug/kg	8	490	408	336	NA	403
Benzo(b)fluoranthene	ug/kg	8	490	408	336	NA	403
benzo(k)fluoranthene	ug/kg	8	490	408	336	NA	403
Benzo(a)pyrene	ug/kg	8	490	408	336	NA	403
Indeno(1,2,3-cd)pyrene	ug/kg	8	490	408	336	NA	403
Explosives							
4-amino-2,6-Dinitrotoluene	ug/kg	9	60	60	60	NA	60
2-amino-4,6-Dinitrotoluene	ug/kg	9	60	60	60	NA	60
Metals							
Aluminum	mg/kg	10	15,600	12,203	10,105	NA	12,095
Antimony	mg/kg	4	4.1	4.1	3.7	NA	4.0
Arsenic	mg/kg	6	7.4	6.7	5.3	5.0	6.5
Barium	mg/kg	6	95	66	47	NA	65
Beryllium	mg/kg	5	0.7	0.7	0.5	NA	0.0
Cadmium	mg/kg	10	3.4	2.3	1.7	0.8	2.2
Chromium	mg/kg	6	25	23	18	26	22
Cobalt	mg/kg	6	11	10	8.0	NA	10
Copper	mg/kg	10	2,380	1,033	263	16	1,033
Lead	mg/kg	10	332	419	94	31	332
Manganese	mg/kg	10	596	475	420	428	472
Mercury	mg/kg	7	0.7	1.2	0.2	0.1	0.7
Nickel	mg/kg	6	42	38	30	22	37
Selenium	mg/kg	6	1.4	1.0	0.6	NA	1.0
Vanadium	mg/kg	6	20	18	14	NA	18
Zinc	mg/kg	6	497	900	148	85	497

TABLE 6-1 (Continued)

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

SENECA ARMY DEPOT
OB GROUNDS

COMPOUND	UNITS	COUNT	MAXIMUM	95th UCL of the mean	MEAN	NYSDEC TAGM	EXPOSURE POINT CONC.
Semivolatiles							
2-Methylnaphthalene	ug/kg	208	1,300	300	284	36,400	299
3-Nitroaniline	ug/kg	209	2,950	1,270	1,188	500	1,248
2,4-Dinitrotoluene	ug/kg	216	33,000	698	849	50,000	736
Phenanthrene	ug/kg	213	2,600	319	292	50,000	317
Benzo(a)anthracene	ug/kg	207	3,900	349	313	220	325
Chrysene	ug/kg	209	8,900	351	340	400	353
Benzo(b)fluoranthene	ug/kg	207	11,000	353	353	1,100	354
Benzo(k)fluoranthene	ug/kg	207	4,500	334	318	1,100	334
Benzo(a)pyrene	ug/kg	207	3,700	350	314	61	335
Indeno(1,2,3-cd)pyrene	ug/kg	206	2,300	327	305	3,200	326
Dibenz(a,h)anthracene	ug/kg	201	670	301	290	14	299
Benzo(g,h,i)perylene	ug/kg	202	960	302	294	50,000	305
Pesticides/PCBs							
Dieldrin	ug/kg	211	50	12	11	44	12
4,4'-DDE	ug/kg	214	830	18	17	2,100	18
4,4'-DDT	ug/kg	215	2,800	19	26	2,100	19
Explosives							
RDX	ug/kg	217	4,800	91	121	NA	94
1,3,5-Trinitrobenzene	ug/kg	217	7,800	110	173	NA	117
Tetryl	ug/kg	217	1,000	150	138	NA	154
2,4,6-Trinitrotoluene	ug/kg	217	80,000	131	607	NA	142
4-amino-2,6-Dinitrotoluene	ug/kg	217	8,900	130	182	NA	140
2-amino-4,6-Dinitrotoluene	ug/kg	217	11,000	143	212	NA	156
Metals							
Barium	mg/kg	194	34,400	1,446	1,479	300	1,693
Cadmium	mg/kg	217	28	5.7	3.5	1.8	6.1
Chromium	mg/kg	198	1,430	32	36	27	32
Copper	mg/kg	211	38,100	678	797	25	762
Lead	mg/kg	208	56,700	2,836	1,888	30	3,185
Thallium	mg/kg	214	38	0.3	0.5	0.3	0.3
Zinc	mg/kg	216	127,000	884	1,318	89	987

NA = not applicable
1. New York State Ambient Water Quality Standards, Class GS Standards for Groundwater, 6 NYCRR Part 700-705
2. New York State Ambient Water Quality Standards and Guidelines for Class C surface waters.
   Selected metals values are based on a hardness of 201.
3. Technical Guidance for Screening Contaminated Sediment, NYSDEC, July, 1994.

6.2 Impacts to Groundwater

Groundwater was found to be minimally affected by metals. However, issues related to how to best obtain a representative groundwater sample have been on-going. These issues are not unique to this site but are of particular concern due to the high content of clay in the soils at the OB Grounds. Soils with high clay content typically yield groundwater samples with higher turbidity levels. Filtering can remove these particles but may yield a sample that is not representative of the true conditions in the saturated soil. Turbidity is caused by the suspension of solids, usually clay sized particles, from the soil matrix surrounding the well and has a tremendous effect on the concentration of metals. Samples that are collected in a manner that suspends clay materials yields samples that are artificially high in metals. This effect is important as the groundwater standards that are being used for comparison are in the low part-per-billion range. The first round of groundwater sampling, performed in January, 1992, involved both non-filtered and filtered samples. The concentration of metals, most notably lead, in the filtered samples were all below detectable limits. However, the concentration of lead was above the GA standard in 15 of the 28 monitoring wells sampled. This suggests that the dissolved concentration of lead is below the GA standard. The non-filtered samples showed elevated levels of various metals, many were above the GA groundwater quality standard. Concerns regarding the validity of filtered samples as representative of "true" groundwater conditions required the development of low-flow sampling techniques.

Low-flow sampling techniques allow for the collection of a groundwater sample, without filtering, that represents 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, lead concentrations exceeded the NYSDEC 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. These wells are MW-19 and MW-14. 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 concentrations of lead in these two wells were found to be 36 ug/L and 86 ug/L. The Army believes that the 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. Low-flow sampling techniques have also been utilized as part of the RCRA groundwater monitoring program. This technique and subsequent improvement have been successful in obtaining consistent samples of low-turbidity without filtering. One of the two wells that exceeded the GA standard from the second 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.

Concentrations less than 1.0 ug/L of the explosives RDX, Trinitrotoluene (TNT), and Dinitrotoluene (DNT) were also detected in 4 of 39 monitoring wells on-site but were all at concentrations below applicable criteria. There are no federal drinking water standards for RDX, TNT and DNT. 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 NYSDEC GA standard for the compound TNT is 5 ug/L. The NYSDEC GA standard for DNT is also 5 ug/L. Since none of these compounds were detected above these criteria in the monitoring well network, a groundwater remedial action is not warranted.

6.3 Impacts to Surface Water

For the analysis of surface water data, the on-site surface water samples were separated from the surface water samples collected from Reeder Creek because the nature of the on-site surface water, essentially small intermittent pools, is unlike the surface water in Reeder Creek, which is a year round flowing stream. The on-site surface water pools have not been classified by NYSDEC as a surface water body and NY Ambient Water Quality Concentrations (AWQC) do not apply to the surface water that accumulates at the OB Grounds. Although the AWQCs were not used for comparison, any remedial action would consider the on-site surface water by implementing proper runoff/runon controls thereby preventing interactions with on-site soils, both during construction activities and as part of a permanent design. Since AWQCs do not apply, the on-site surface water was eliminated as a media of interest. As mentioned previously, the off-site surface water samples collected from Reeder Creek were considered separately from the on-site surface water samples. Since this media is surface water, the NY AWQCs were considered as an appropriate screening criteria. NYSDEC has classified Reeder Creek as a Class C waterbody. No analytes exceed the Class C AWQC for Reeder Creek. Since there are no exceedences of any AWQC, the surface water in Reeder Creek was been eliminated as a media of interest.

6.4 Impacts to Sediment

The NYSDEC Sediment Guidelines were used to screen sediment data collected from Reeder Creek.. The metals copper and lead exceeded these criteria. The maximum concentration of lead was 332 mg/Kg, the NYSDEC Sediment Guideline is 31 mg/Kg. The maximum concentration of copper was found to be 2,380 mg/Kg, the NYSDEC Sediment Guideline is 16 mg/Kg. Since there are exceedences for the NYSDEC Sediment Guidelines, this media has also been retained as a media of interest.

7.0 SUMMARY OF SITE RISKS

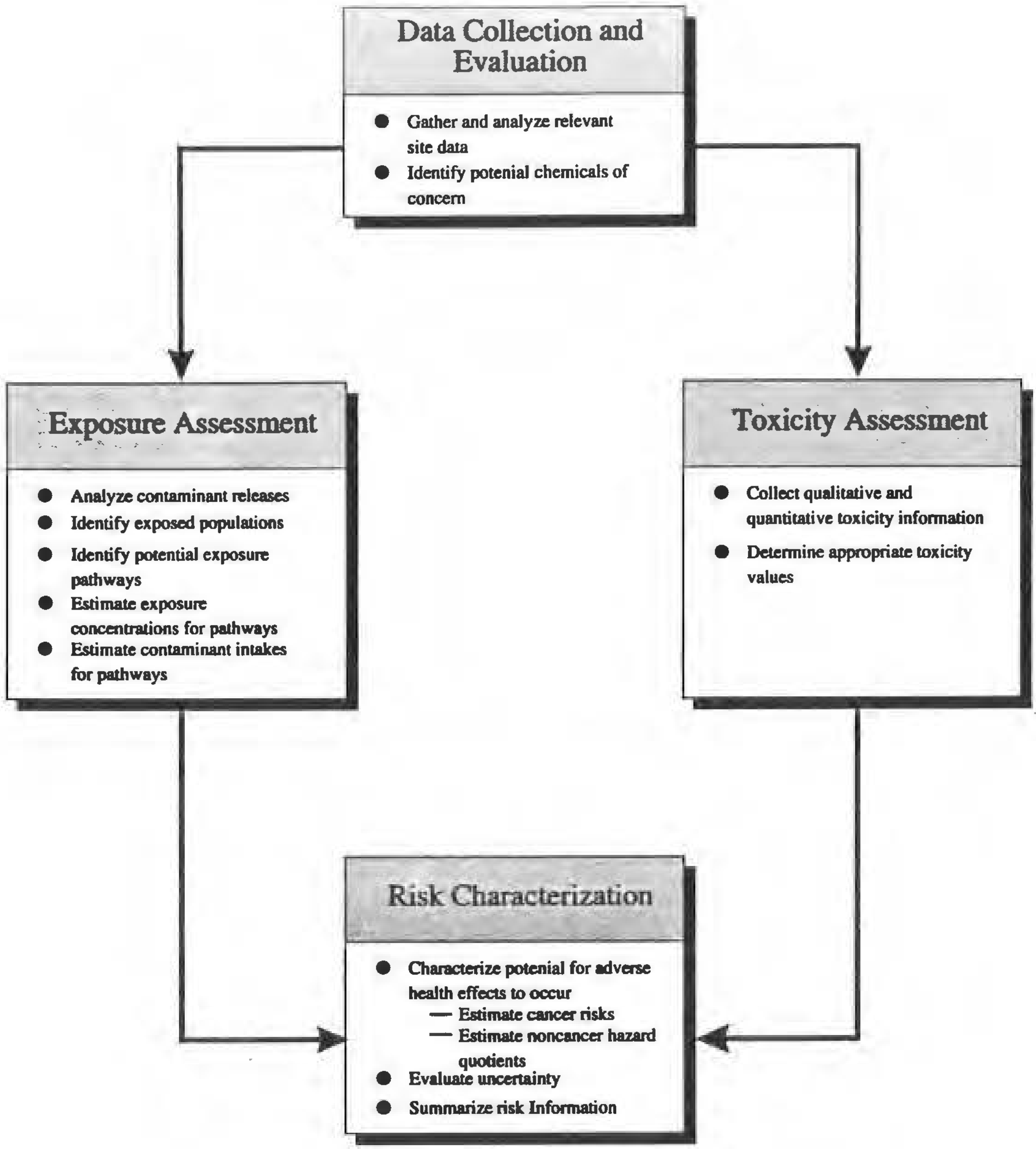
A baseline risk assessment, for both human health and ecological receptors, estimated the risks associated with current and future site conditions.

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 6-1**.

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.



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

R:\GRAPHICS\SENECA\ASHBRAP.CDR

Table 6-1 lists the exposure point concentrations for the baseline risk assessment which are based on analytical data and modeling results. 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 :

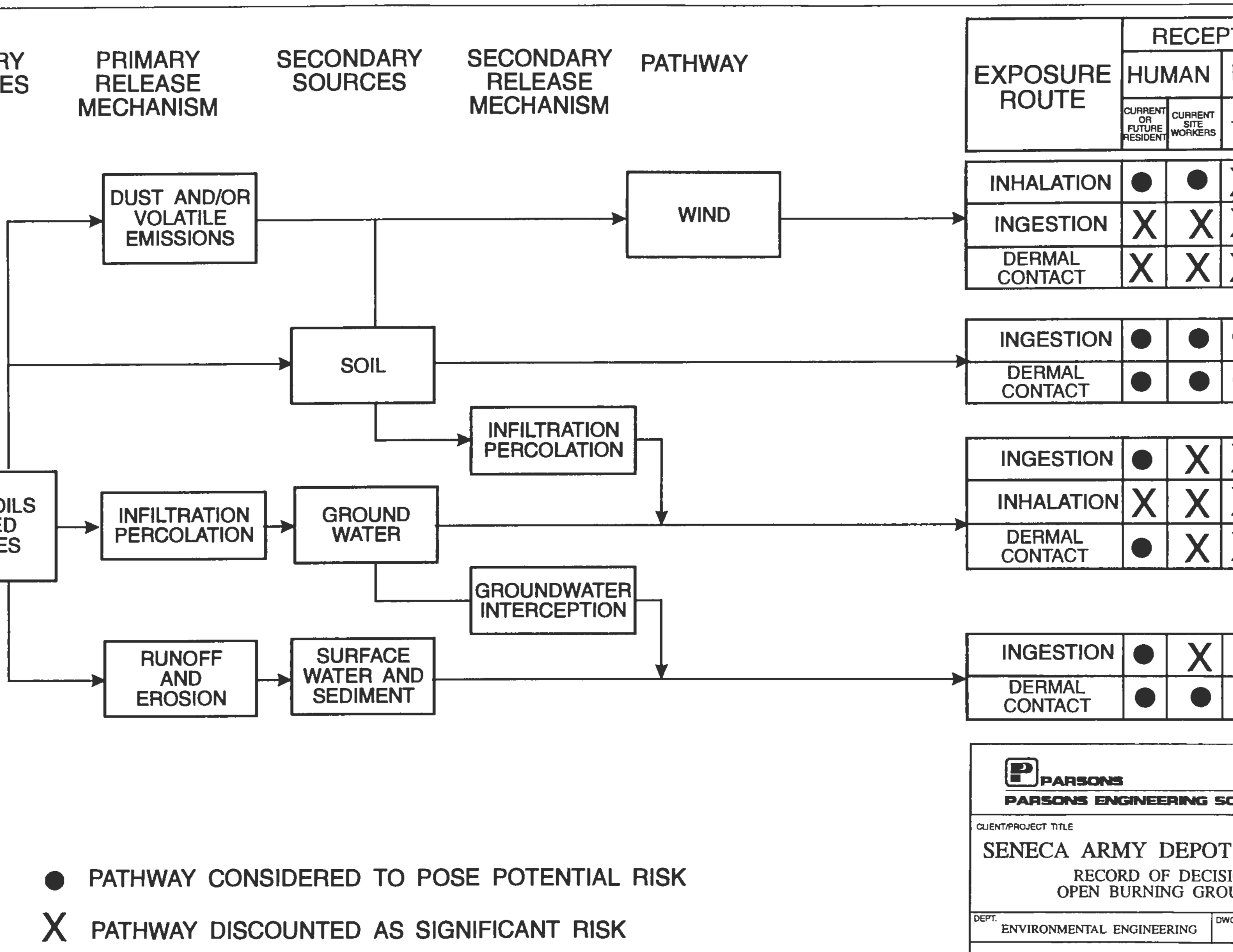
1. Incidental ingestion and dermal contact to on-site soils (Current and Future Land Use Scenarios)
2. Inhalation of fugitive dust (Current and Future Land Use Scenarios)
3. Dermal contact to surface water and sediment while wading in on-site wetlands (Current and Future Land Use Scenarios).
4. Ingestion 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) approach, 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 HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for non-carcinogenic health effects to occur as a result of site-related exposures. The HI 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



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DEPT. ENVIRONMENTAL ENGINEERING | DWG

FIGURE 7-2
EXPOSURE PATHWAY

SCALE NA | DATE FE

CA\OBRIEXP.CDR

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, an lead risk evaluation was conducted to relate soil concentrations to impacts to receptors. This approach involved the use of the EPA Biokinetic Uptake (BKU) model (Version 0.9). The BKU model estimates the concentration of lead in a child receptor as a function of environmental exposure to soil or groundwater concentrations. The results of this analysis is detailed in Section 6.5.5 of the RI report and suggests that a blood level greater than the EPA target level of 10 ug/dL in children between the ages of 1 and 4 is possible.

Table 7-1 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 the site is not remediated. The maximum HI was estimated to be 0.33. 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 HI is 0.23 and is therefore below the EPA maximum value of 1.0.

TABLE 7-1

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

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.

Since published risk factors are not available for lead, an alternative lead risk evaluation was used. This involved the use of the EPA Biokinetic Uptake model (Version 0.9) which considers children's blood lead level as a function of environmental concentrations, such as soil or groundwater concentrations. The results of this analysis suggests that blood level greater than the EPA target level of 10 ug/dL for a child receptor between the ages of 1 to 4 are possible. However, this would require that residential exposure.

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, 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.

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 is 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 classified by the State of New York as a Class C steam.

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. For the protection of aquatic life in contact with contaminated sediments, the 95th UCL for both copper and lead exceed both the NYSDEC sediment guidelines and the Limits of Tolerance (LOT) criteria for the protection of benthic macroinvertebrates. The NYSDEC sediment guideline to protect wildlife that consumes aquatic life that is in contact with sediments containing copper is 19 mg/kg. The 95th UCL for copper in sediments is 401 mg/kg. For lead, the NYSDEC sediment guideline is 27 mg/kg; the 95th UCL is 652 mg/kg. Soil concentrations considered to be phytotoxic to terrestrial vegetation were obtained from the scientific literature. Copper and lead at the 95th UCL 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.

In summary, soils and sediment, in particular on-site soils and sediment in the on-site low lying wet areas, suggest the 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.

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 underestimation of risk. In general, risk assessments strive to provide a reasonable, yet conservative, estimate of risk. To minimize the underestimate 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. However, this process was performed infrequently and only a small number of compounds, the were non-detected, 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, suggest 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 number of times the compound has been detected 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. Not comparing anthropogenic organic compounds to background would increase the estimation of risk, 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. The assumption use in assessing risk at this site is that each component of contributes to the total site risk is independent of another component that may be in a mixture, such as soil or groundwater. 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 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 and the environment. 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 compromise 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 protection 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 a negotiated value that 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

ronmental Media	Remedial Action Objectives	Clean-up Goals	Basis
il & 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/recreatior
	3) Prevent soil loading to Reeder Creek,		Protect ecological receptors ir
	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 a
eek Sediment	6) Prevent bioaccumulation of copper and lead	16 mg/kg for copper and 31 mg/kg for lead	Protect ecological receptors ir

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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 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.
- 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 2 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. 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 exceedences 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 discussion presents the nine criteria and brief narrative 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, HI, for this scenario was determined to be 0.33, which is below the EPA target

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	Alternati Excavation/Soi
PROTECTIVENESS OF EALTH AND THE MENT				
an Health Protection get range is 1 x 10E-4 to 5 for carcinogenic risk and 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 residential ex 9 x 10E HI = 0.1
thway - Direct Contact and f Soils with concentrations 00 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 hur Soils with lea >500 mg/kg r
n 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 ecologica Sediments > NYSI removed from Re
IANCE WITH ARARs	Complies with all ARARs *	Complies with all ARARs *	Complies with all ARARs *	Complies all ARAR
RM EFFECTIVENESS D PERMANENCE				
tude 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 coarse fraction will but will be tested t no unacceptable levels
tude 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 considered per

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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	Alternati Excavation/Soil
TION OF TOXICITY, LITY, OR VOLUME UGH TREATMENT				
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 volume, toxicity, a Solidification redu and mobility. Soi reduces the v
ERM EFFECTIVENESS				
nmunity 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 pr as some transportat materials off-site Hazardous materials (transported on-site f
orker 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 pr Excavation and off-sit of waste materials inc for worker exposu Use of hazardous mat increase potential for w
ironmental Impacts	Not applicable.	Excavation will increase potential for runoff to Reeder Creek.	Excavation will increase potential for runoff to Reeder Creek.	Least protective due potential for spills du
ntil 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: Soil Washing: 1 t Backfilling & Dem Moderate time require due to soil washing

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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	Alternati Excavation/Soi
LEMENTABILITY				
chnical 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 feas feasible of the three re this technology is con innovative and least pr conditio
ng 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 i some equipment slab may interfere with f
o Obtain Approvals and tes 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 this alternative wil construction of a w facility
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 t available from smal group of soil washin
COST				
Capital Cost	$0	$3.6 to $5.2 Million	$5.2 Million	$10.6 Mil
nnual O&M Cost	$0	$45,300	$49,100	$45,30
r Present Worth Cost	$0	$4.1 to $5.7 Million	$5.7 Million	$11.1 Mi

ine Risk Assessement did not exceed EPA's Target Range for risk, therefore, groundwater remediation is not warrented and GA Groundwater Standards are not ARAF
DEC 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, perforn
groundwater moitoirng program did not confirm the exceedence. The Army believes that that exceedances are due to turbidity of the groundwater samples.

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 remain in-place. Since the SEDA security measures prevent public access to the site, there is currently little or no risk to the public because there is no exposure. 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.

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 HI 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 exceded 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 exceedences are most likely attributed to residual turbidity of the groundwater samples. The Army also believes that because the Federal Action Level for 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". 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, 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 are limited.

Cost - The last criterion to compare is the present worth costs of the alternatives. The present worth costs for each alternative was 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.

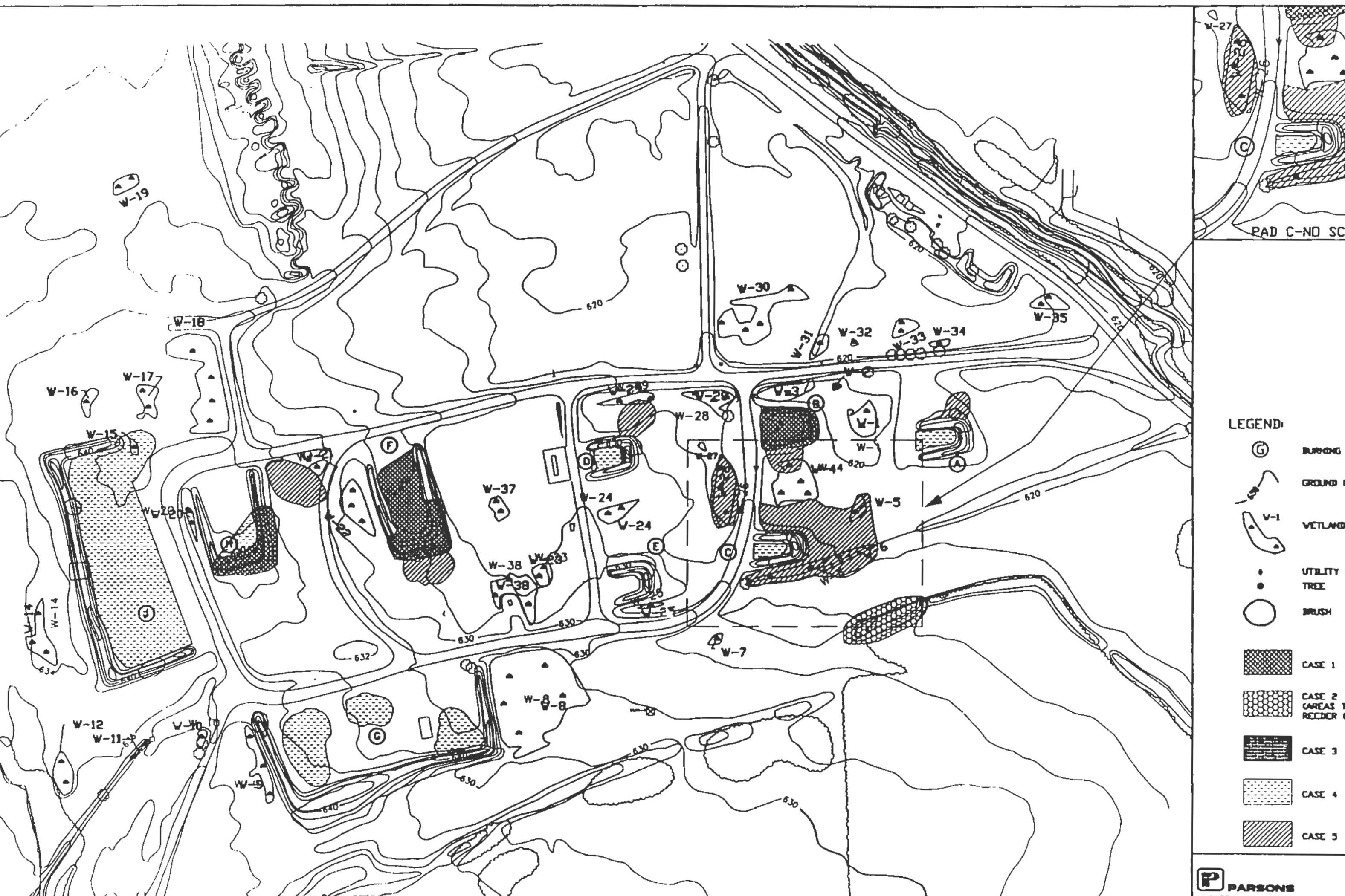
11.0 THE SELECTED REMEDY

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**. The remedy includes the following:

- Clearance of UXOs for use as a conservation 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.
- Processing soils that exceed 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 Requirements (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 off-site is 17,900 CY, including the 3,800 CY of solidified soil.
- Conducting site groundwater and sediment in Reeder Creek monitoring program. This program will monitor metals. For groundwater the level of detection will be to below 15 ug/L, the federal action level for groundwater. For sediment the detection limit will be to 10 mg/kg.
- 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 cap will be vegetated to prevent erosion and to prevent direct contact and incidental soil ingestion by terrestrial wildlife.
- Construction of slope stabilization near Reeder Creek as necessary to prevent surface water runoff from migrating to the creek.

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 groundwater samples from the site. To ensure that there will be no further impacts, groundwater



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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 (HI) 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 exceedences 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

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 United States Environmental Protection Agency's (EPA's) and the New York State Department of Environmental Conservation's (NYSDEC's) responses to those comments and concerns. All comments summarized in this document have been considered in 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, FS report, and the Proposed Plan for the site were released to the public for comment on (***date***). These documents were made available to the public in the administrative record file at the EPA Docket Room, Region II, New York and the information repositories at (other repository locations). The notice of availability for the above-referenced documents was published in the ***(local news paper)*** on ***(date of publication***). The public comment period on these documents was held from (***start date***) to ***(finish date***).

On (***date***), EPA and NYSDEC conducted a public meeting at (***meeting place***) 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 following correspondence was received during the public comment period (C.2, Letters Submitted During the Public Comment Period):

- (***summarize each letter under bullet***)
-
-
-
-

A summary of the comments contained in the above letters and the comments provided by the public at the (***date***) public meeting, as well as EPA's and NYSDEC's responses to those comments, follows.

APPENDIX C.2

LETTERS SUBMITTED DURING THE PUBLIC COMMENT PERIOD

APPENDIX D

SUMMARY OF ARARS FOR SELECTED REMEDY

SOURCE CONTROL ARARS

Summary of ARARs for Alternative 4, Off-Site Disposal
Seneca Army Depot Activity - OB Grounds

ARARs	Alternative 4
CHEMICAL-SPECIFIC ARARS	
Air Quality	
40 CFR Part 50.6: Ambient Air Quality Standard for PM-10.	Will Comply
Water Quality	
40 CFR Part 131: Water Quality Standards	Not Applicable
40 CFR Part 131.12: Antidegradation Policy.	Will Comply
40 CFR Part 141: National Primary Drinking Water Standard	Not Applicable
40 CFR Part 141.11: Maximum Inorganic Chemical Contaminant Levels.	Not Applicable
40 CFR Part 264 Subpart F: Releases from Solid Waste Management Units.	Will Comply
40 CFR Part 403: Pretreatment Standards	Not Applicable
6 NYCRR Chapter X: SPDES	Not Applicable
6 NYCRR subparts 701 and 702: Water quality standards	Will Comply
6 NYCRR subpart 703: Groundwater standards	Will Comply
6 NYCRR subpart 375: Inactive hazardous waste disposal sites.	Will Comply
6 NYCRR subpart 373-2.6 and 373-2.11: Groundwater monitoring for releases from SWMUs	Will Comply
6 NYCRR subpart 373-2: Postclosure care and groundwater monitoring	Not Applicable
10 NYCRR Part 5: Drinking water supplies.	Not Applicable
NYSDEC TOGS 1.1.1: Water quality standards and guidance	Will Comply

Soil Quality	
40 CFR Parts 264.552 and 264.533: Corrective Action	Not Applicable
40 CFR Part 264, Subpart X: Misc. Units	Will Comply
6 NYCRR subpart 375: Inactive hazardous waste disposal sites.	Will Comply
LOCATION-SPECIFIC ARARS	
40 CFR Part 257.3-2: Endangered species	Will Comply
40 CFR Part 264.18: Location Standards for Hazardous Waste Facilities.	Not Applicable
40 CFR Part 241.202: Site selection	Not Applicable
16 USC Part 469a-1: The Archaeological and Historic Preservation Act	Will Comply
36 CFR Part 800: Historic properties	Will Comply
ACTION-SPECIFIC ARARS	
Solid Waste Management	
40 part CFR 241.100: Land Disposal of Solid Wastes.	Will Comply
40 CFR Part 241.204: Water Quality.	Not Applicable
40 CFR Part 241.205: Air quality	Will Comply
40 CFR Part 243.202: Transport	Will Comply
6 NYCRR Part 360: Subtitle D solid waste landfills	Will Comply
Hazardous Waste Management	
40 CFR 260:	Will Comply
40 CFR 262.11: Generators	Will Comply
40 CFR 261: Identification of Hazardous Waste	Will Comply
40 CFR 262 Subparts B, C, D: Offsite Disposal of Hazardous Wastes	Will Comply
40 CFR Part 263.30 and 263.31: Release during transport.	Will Comply
40 CFR Part 264: Hazardous waste management facility standards	Will Comply

40 CFR Part 268: Land Disposal Restrictions	Will Comply
40 CFR Part 270 subpart C: Permit conditions	Not Applicable
40 CFR Part 270 subpart B: Permit applications	Not Applicable
Occupational Health and Safety Administration	
29 CFR Part 1910.50: Occupational Noise	Will Comply
29 CFR Part 1910.1000: Occupational Air Contaminants	Will Comply
29 CFR 1910.1025: Occupational Exposure to Lead	Will Comply
29 CFR Part 1910.1200: Hazard communication	Will Comply
29 CFR Part 120: Employee training and medical monitoring.	Will Comply
40 CFR part 1926.62 Constructoin Work Where Exposure to Lead	Will Comply
Transportation of Hazardous Waste	
49 CFR Part 171: Transport of hazardous material.	Will Comply
40 CFR Part 172: Hazardous materials table, special provisions, Hazardous Materials Communications, Emergency Response Information, and Training requirements.	Will Comply
40 CFR 173: General DOT Requirements for Shipment & Packaging	Will Comply
49 CFR Part 177: Carriage by Public Highway.	Will Comply
6 NYCRR Chapter 364: New York Waste Transport Permit Regulation.	Will Comply
EPA/DOT Guidance Manual on hazardous waste transportation	Will Comply

RESPONSE TO ARMY COMMENTS ON THE PRE-DRAFT ROD

RESPONSE TO COMMENTS
BY
U.S. ARMY - SENECA ARMY DEPOT ACTIVITY
FOR
PRE-DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
May 1, 1997

Comment by S. Absolom

Comment #1 **Page 5-1**
No sedimentation pond is to be constructed as a result of the earth cover being provided.

Response #1 Agreed. All reference to construction of a sedimentation pond has been removed. Control of surface water runoff will be attained via proper site grading. This will be detailed in the final design documents.

Comment #2 **Page 8-4**
Delete reference to sedimentation basin for runoff control.

Response #2 Agreed. The sedimentation basin has been removed.

Comment #3 **Page 11-1**
See Page 8-4 comments.

Response #3 Agreed. The sedimentation basin has been removed.

Comment #4 **Page 1-5**
Change Title to: Raymond Fatz

Response #4 Agreed. The title has been changed from Lewis D. Walker to Raymond Fatz.

RESPONSE TO COMMENTS
BY
U.S. ARMY FOR
PRE-DRAFT RECORD OF DECISION (ROD)
OPEN BURNING GROUNDS
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NY
April 1, 1997

Comment by Frye

Comment #1 **Section 1, Page 1-2**

In the Remedy Description section, the ROD states that the remedy for soils lowers the already acceptable risk levels. This sounds as though the remedial action is being taken for no real reason. Also, the statement is not really correct. While carcinogenic risks do not exceed the 10-4 to 10-6 range, risk from lead exposures is not included in the quantitative risk numbers. The risk assessment summary in section 7.1 (page 7-7) states the EPA Biokinetic Uptake model showed contaminant levels could cause exceedences of the 10 ug/dL blood lead level target. Section 7.2 states that contaminant levels in sediments may pose ecological risk.

Please reword the sentence accordingly...perhaps by stating that the remedy will lower risks posed to human health and the environment (and deleting the wording, "already acceptable risk levels").

Response #1 Agreed. The wording has been revised in Section 1 (Page 1-2) and Section 7 (Page 7-6) as suggested in the comment. The phrase "already acceptable levels" has been replaced with "lowers the risks posed to human health and the environment". The last sentence of the third paragraph on Page 7-6 has been changed to read "The BKU model estimates the concentration of lead in a child receptor as a function of environmental exposure to soil or groundwater concentrations. The results of this analysis is detailed in Section 6.5.5 of the RI report and suggests that a blood level greater than the EPA target level of 10 ug/dL in children between the ages of 1 and 4 is possible."

Comment by Forget

Comment #1 **General**

Clarify/justify the assumption of future residential use to determine lead cleanup levels when the area will not be fully cleared of UXO.

Response #1 Agreed; Clean-up to residential land use was not the basis for clean-up. The statement in Section 8.4, (Page 8-4), that the 500 mg/kg clean-up goal for lead in soil was based on the output of the UBK model has been replaced. Clean-up goals for the OB Ground were to meet industrial land use conditions because the Army planned on continuing to use the OB Ground as a demilitarization area. However, regulators required assurances that the land use would always be industrial and the Army could not guarantee that future land use could never be residential. Residential use was never considered a realistic future use and the Army would not agree to clean-up to residential conditions. Without the assurances that the regulators required, i.e. deed restriction, the regulators were reluctant to agree to a clean-up value much higher than the EPA value of 400 mg/kg. The EPA guidance value of 40 mg/kg for lead in soil was derived using the UBK lead model for protection of residential receptors. The compromise clean-up value was 500 mg/kg. Although 500 mg/kg is only slightly higher than 400 mg/kg it was the best the regulators were willing to accept. Since the Army intended to use the OB Grounds for demilitarization of munitions, UXO clearance was unnecessary as continued operations would have the potential for contributing UXO. Operations had moved to a steel aboveground tray, not directly on the pads, as had been done in the past. UXO clearance would be postponed until the demilitarization operations ceased and the grounds were released for other uses.

Shortly thereafter in 1995, the depot was listed on the final BRAC list, wherein future land use became an issue again. At this point in the BRAC process, final land uses for the entire depot, including the OB Grounds have been developed by the Local Redevelopment Authority (LRA). When the clean-up levels for the OB Ground were being established the future land use was as a demilitarization area, now the future use is as a conservation/recreation area. Since this land use will involve human activities that may involve contact with UXOs, the decision was made to clear the OB Grounds as part of the remedial design. The clean-up level of 500 mg/kg remained. To ensure that future users of the site would not be affected by UXOs. Clearance will involve complete clearance. This will include an initial magnetic sweep, flagging and removal. The soil in the area that will involve excavation and disposal will be scraped, sifted and stockpiled. The sifted material will be hand sorted to remove UXO and other metal debris. The remaining soil will be available for disposal.

Page 8-4, Section 8.4 Site Specific Clean-Up Goals has the following bullet added to the text : "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."

Page 9-2, Section 9.0 has the following text added "Remediation of Ordnance and Explosives (OE) will be required for Alternatives 2 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."

Comments by J. Peterson

Comment #1 **General**

In my discussions with Dorothy Richards, CEHNC on 10 Mar. 97, the contractor is under no contractual obligation to prepare remedial action cost estimates in a Work Breakdown structure format, since the contract was initiated back in FY 92 timeframe. However, as I previously commented on for the Draft Final Work Plan, please insure that the remedial action and/or operation and maintenance cost estimates for the design phase submittals are structured using the HTRW Remedial Action and O&M Work Breakdown structures. ER 1110-3-1301, dated 15 April 94, requires in paragraph 8.b.(I), "Cost estimates for HTRW remedial action shall use the latest HTRW remedial action work breakdown structure (RA-WBS)...". The latest HTRW RA-WBS and O&M WBS was distributed to USACE offices in February 96, and should be used to structure HTRW cost estimates. Structuring cost estimates using these documents helps to insure that remedial action and operation and maintenance cost estimates are standardized, complete, and that cost engineering offices are involved in either the preparation or review of the cost estimates.

Response #1 Disagree. The current cost estimates are based upon estimates prepared for the feasibility study. The original estimates were not in the format of ER 1110-3-1301, as they were prepared in March, 1994. We did not receive Army comments on the Pre-draft and draft versions of this document that indicated that a change in format was a requirement at that time. The current version of ER 1110-3-1301 that we have is dated April, 1994, after the preparation of this feasibility study had already been sent to the regulators for review. Since the feasibility study is now final, any changes would require a change in both the feasibility study and the Project Remedial Action Plan (PRAP). In the future, Parsons ES will comply with the requirements of ER 1110-3-1301 for remedial action and/or operation and maintenance cost estimates for the design phase will be based on the HTRW Remedial Action and O&M Work Breakdown structures. The use of these WBS for the future feasibility studies will follow this format. The cost estimates that were prepared for this effort did rely on vendor quotes for site-specific work . While the estimates are not in the format of ER 1110-3-1301 the costs that are presented in the reports are considered to represent reasonable estimates of the various alternatives. Changing final documents at this time appears unwarranted.

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Comment #2 **General**

Remedial Action cost estimates should reflect all the necessary project costs including direct construction costs, contractor indirect costs (overheads), necessary contingencies (both design and construction), prime and sub-contractor markups, cost growth to the mid-point of construction, construction management, E&D during construction, and Government quality assurance costs. The HTRW CX has prepared an example HTRW cost estimate in the RA WBS format, including all the above mentioned costs. Even though all project costs may be difficult to identify or develop at early project stages, they should be accounted for, so that cost estimates are as complete as possible, particularly since they will likely be used for budgeting/programming purposes. For more information, please contact Jim Peterson in the HTRW CX at (402) 697-2612.

Response #2 Disagree. Cost estimates for the feasibility study were performed in 1994 without the HTRW CX format but were based on vendor quotes, that included their overhead costs and other markups. This estimate was supplemented from data from Means. We would request that since the cost estimates have already been developed for the feasibility study, which is now considered to be final document, the effort involved in revising these costs and the delays associated with this effort be weighted into the need decision to redo the entire cost estimation. We do not believe that such an effort is justified at this point. However, as mentioned in the previous comment, in the future when the remedial alternatives are developed the cost estimates will be in the prescribed format.

Comments by K. Healy

Comment #1 **Section 5.0, Fifth Bullet, Page 5-1**
The area to be covered with fill is stated as 43.8 acres, which is suggested to be most of the area of the OB Grounds. However, historically, we have used 30 acres as the size of the site. Please clarify.

Response #1 The boundaries of the OB Ground and therefore the actual size of the OB Grounds has never been officially determined. However, for this effort we have calculated the area to be covered with the 9-inch soil cover as approximately 27.5 acres which is all of the area of the OB Grounds that will be excavated and portions of the site adjacent to the excavated area. This area extends from the road near the burn pads on the north, to the high point of the hill to the west, to the low-lying hill in the south, to Reeder Creek in the east. There is one additional area, near Reeder Creek that is included in the 27.5 acres estimate that extends from the northern side of the road near the burn pads to an area north along Reeder Creek. This area was included as it encompasses drainage areas from the pad area.. The text has been revised to state this. The following statement has been added to the end of the last bullet on Page 5-1: "The area to be covered is approximately 27.5 acres. This area includes area of all the pads and an area near Reeder Creek."

Comment #2 **Section 5.0, Last Paragraph of Page 5-1**
Exceedences of the NYSDEC groundwater standard are discussed. However, it has been the Army's contention that the excessive turbidities (even using low flow sampling methods) are more responsible for the numbers than any actual contamination. Although the subject is discussed later on in the ROD, recommend that a detailed discussion (turbid vs. Non-turbid and filtering vs. Unfiltered samples, etc.) of the problem be given here in order to lend perspective to the use of the word "exceedence". The subsequent discussion could then simply reference this initial detailed discussion. I don't believe we should be acknowledging the existence of a problem when we ourselves are not sure that the numbers reflect true contamination.

Response #2 Agreed. There is little evidence to support that groundwater is a problem at the site. However, groundwater exceedences of the NYSDEC GA standard for lead were noted for two wells during the second round of groundwater sampling at the OB Grounds. The first round collected in January of 1992, involved collection of both filtered and non-filtered samples. Filtered samples had been previously collected by other groups at the OB Grounds for RCRA permitting purposes. These data were collected to evaluate dissolved versus suspended. The concentrations of metal, most notably lead, were all non-detect in the filtered data, but several samples were above the GA groundwater standard for the non-filtered samples. The agencies determined that filtered samples were not representative of the true concentrations in the wells and they would not accept the filtered data for determining if groundwater is an issue. Therefore, site specific, low flow sampling techniques were subsequently developed that now provide low NTU samples without filtering. The second round of sampling, performed in March 1993, involved low-flow sampling to achieve lowered turbidity samples. Two wells of the 36 sampled exceeded the 25 ug/L GA standard. These techniques were further refined after the second round of sampling at the OB Grounds. The quarterly RCRA groundwater sampling effort involved sampling one of these two wells using the most developed, low flow, sampling techniques. This data has always produced samples that are non-detect for lead in the one well that was originally one of the wells that was above the GA value. The other wells was not part of the RCRA monitoring program and has never been sampled since the second round of the RI. This information, and other pertinent data, has all been discussed with the EPA, who still is not convinced that the exceedences are turbidity related.

Since receipt of this comment the Army and EPA and Parsons ES have discussed the groundwater concerns at the OB Grounds in relation to ARAR compliance issues and it appears that the EPA is willing to accept that groundwater remediation is not a requirement, provided adequate monitoring is performed. We believe that further discussion of this point in this document would be unnecessary as the EPA has accepted the notion of not remediating groundwater. Therefore, we have modified the last paragraph on Page 5-1 to drop the reference related to exceedences of the GA standard as per our latest discussion with EPA, exceedences of the GA standard are not a driver for implementing a remedial action. Since the risk assessment did not involve exposure to groundwater the issue of an exceedence is not significant. We also provide discussion of groundwater exceedences in Section 6.2 Impacts to Groundwater.

The last paragraph has been modified as follows : "The groundwater conditions at the site does not require a remedial action. The future use of the OB Grounds, as a conservation area, does not involve exposure to groundwater, therefore groundwater remediation was not warranted. To ensure the future quality of groundwater, the remedial plan will include a continuation of the existing groundwater monitoring program. The preferred alternative will ensure that groundwater concentrations remain at or below the current levels."

Comment #3 **Section 6.2, Page 6-8.**
A discussion of lead exceedences is presented in the first few lines of this page. Recommend referencing a detailed discussion of the turbidity issue as proposed in Comment 2, above.

Response #3 Agreed, An expanded discussion of lead exceedences in groundwater and the relationship to turbidity has been added. The following is the revised section that pertains to lead exceedences: Groundwater was found to be minimally affected by metals. However, issues related to how to best obtain a representative groundwater sample have been on-going. These issues are not unique to this site but are of particular concern due to the high content of clay in the soils at the OB Grounds. Soils with high clay content typically yield groundwater samples with higher turbidity levels. Filtering can remove these particles but may yield a sample that is not representative of the true conditions in the saturated soil. Turbidity is caused by the suspension of solids, usually clay sized particles, from the soil matrix surrounding the well and has a tremendous effect on the concentration of metals. Samples that are collected in a manner that suspends clay materials yields samples that are artificially high in metals. This effect is important as the groundwater standards that are being used for comparison are in the low part-per-billion range. The first round of groundwater sampling, performed in January, 1992, involved both non-filtered and filtered samples. The concentration of metals, most notably lead, in the filtered samples were all below detectable limits. However, the concentration of lead was above the GA standard in 15 of the 28 monitoring wells sampled. This suggests that the dissolved concentration of lead is below the GA standard. The non-filtered samples showed elevated levels of various metals, many were above the GA groundwater quality standard. Concerns regarding the validity of filtered samples as representative of "true" groundwater conditions required the development of low-flow sampling techniques.

Low-flow sampling techniques allow for the collection of a groundwater sample, without filtering, that represents 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, lead concentrations exceeded the NYSDEC 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. These wells are MW-19 and MW-14. 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 concentrations of lead in these two wells were found to be 36 ug/L and 86 ug/L. The Army believes that the 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. Low-flow sampling techniques have also been utilized as part of the RCRA groundwater monitoring program. This technique and subsequent improvement have been successful in obtaining consistent samples of low-turbidity without filtering. One of the two wells that exceeded the GA standard from the second 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

Comment #4 **Section 7.1, Page 7-1.**
We discuss how two PAH compounds are known carcinogens in the second paragraph of this section. However, we make no effort to qualify this statement with a discussion on how these two "bad actors" are artificially figured in to all risk calculations and how a risk assessment can be skewed by these two compounds regardless of whether they are actually prevalent at the site. Again, I don't believe we should be acknowledging the existence of a problem when we ourselves are not sure that the numbers reflect true contamination or , in this case, risk. Please clarify and expand.

Response #4 Agreed. This statement has been deleted.

Comment #5 **Section 7.1, Page 7-7.**
At the end of the last paragraph of this section, we discuss the results of an analysis which suggest a blood level greater than 10 ug/dL. However, I believe that we should finish this thought by drawing a conclusion from the statement. Something seems to be missing.

Response #5 Agreed. This small paragraph has been moved after the human health risks are presented. The sentence has been completed as "The results of this analysis is detailed in Section 6.5.5 of the RI report and suggests that a blood level greater than the EPA target level of 10 ug/dL in children between the ages of 1 and 4 is possible."

Comment #6 **First full paragraph, Page 7-9.**
Correct "medial" to "medium". Also, please define a "TIC". I don't believe we've done so for the general public to this point in the document.

Response #6 Agreed. The spelling has been corrected. The discussion on TICs has been modified as follows:

"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."

Comment #7 **Section 8.2, Page 8-2.**
In the last sentence of the second paragraph, I believe some additional explanation is required. Lead levels will be above the allowable cutoff if what (?) is not done...cleanup to 500 mg/kg? Please clarify.

Response #7 Agreed. The second paragraph has been modified as follows:
"As a result, consideration was given to reducing lead concentrations to a predetermined level that would be considered to be protective of human health and the environment. 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 compromise 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."

Comment #8 **Section 8.4, Page 8-4.**
The discussion of UXO cleanup presented in the fifth bullet is from a prior presentation when it was thought that the HTRW remediation would precede the OE remediation and that OE avoidance during HTRW remediation would be required. This is no longer the case, since it appears that funds will be available for both and that OE remediation will occur first. Please use the rewritten presentation that was submitted for inclusion in the draft PRAP.

Response #8 Agreed. The bulleted item has been moved as the first bulleted item as this will be the first task that will be performed. The bullet has also been rewritten to indicate that the Army will conduct clearance and removal operation over the areas of the site that will be excavated and disposed of and the remaining areas.

Comment #9 **Page 9-4.**
In the discussion of the Common Components, please verify the 43.8 acres in bullet 2 as per my Comment 1, above.

Response #9 Agreed. The area to be covered has been estimated to be approximately 27.5 acres. This bullet has been changed to reflect this.

Comment #10 **Page 9-5.**
Please correct the discussion (this page and the next) on UXO remediation as per my Comment #8, above.

Response #10 Agreed. This section has been revised with the write-up that was included in the PRAP. This revised section is now found on Page 9-2.

Comment #11 **Section 11.0, Page 11-1.**
In bullet 6, please verify the 43.8 acres as per Comment 1, above. In bullet 8, recommend deleting "in the areas of remediation".

Response #11 Agreed. The calculated area that will require a vegetative cover has been estimated to be approximately 27.5 acres. The referenced bullet has been modified to reflect this.

Comment #12 **Appendix D**
Correct the spelling of "Summary".

Response #12 Agreed. The spelling has been corrected.

Comments by S. Bradley

Comment #1 **Section 3.1, page 3-2.**
While it does make for entertaining reading on bureaucratic wheel spinning, the discussion of the history of the Subpart X permit is not needed in a ROD.

Response #1 Agreed. The discussion of the history of the Subpart X permit has been removed.

Comment #2 **Section 3.1, page 3-3.**
Discussion of BRAC and the LRA should be shortened to a succinct statement that future land use for the site has been designated as Conservation and Recreation.

Response #2 Agreed. The referenced paragraph has been revised.

Comment #3 **Section 4.0, page 4-1.**
Words on BRAC and LRA from previous section are repeated here. Summarize impact of LRA and RAB to community relations, which is the title of this section.

Response #3 Agreed. The section has been summarized.

Comment #4 **Section 5.0, page 5-1.**
At fourth bullet, state what COC will be monitored. Correct statement that selected remedies are discussed in Section 9.0, since that section discusses all remedies. Add a sentence that the selected remedy is discussed in Section 11.0.

Response #4 Agreed. It is anticipated that only the monitoring of metals in groundwater and sediments will be conducted. This has been added to the bulleted item. The referenced section has been changed to Section 11.

Comment #5 **Section 11.0, page 11-1.**
State what COC monitoring is for, and required detection limit for monitoring program.

Response #5 Agreed. The chemicals of concern which will be monitored in the groundwater are metals. The required detection limits for each media has been added to the bulleted item on page 11-1.

Comments by C. Weese and J. Ferguson

Comment #1 **Table 6-1, Page 1 of 6, Weese**
COCs and EPCs, Groundwater
Comment: Explosives are listed as COCs, although there are no NY DWQS for these compounds. The EPCs correlate with a risk from oral ingestion of drinking water of less than 1 E-06. Thus, for the direct exposure route from ingestion, these do not appear to be COCs in groundwater. They are not further discussed as impacting soil, nor directly addressed with respect to remedial actions. It is thus assumed that they did not pose a risk through soil pathways. Why are they listed as COCs?

Recommendation: Please clarify.

Response #1 Comparison to a water quality standard is not the only criteria for classifying a compound as a Chemical Of Concern (COC). The risk assessment does not make a distinction between Potential Chemicals of Concern (PCOC) and COCs. Therefore, once a chemical passes the intitial screening portion of the risk assessment it is considered a COC. Explosive compounds are listed as COCs and included in the baseline risk assessment because of the number of times detected and the concentration levels that they were detected. Background screening is also performed but only applies to metal compounds, not organics. After the screening is complete, the list of compounds are narrowed to a smaller list and Exposure Point Concentrations (EPC) are estimated. Explosives have been carried through the baseline risk assessment for each exposure scenario and contribute to the risk for each receptor. For groundwater ingestion three (3) explosives, RDX, 2,4,6-TNT and 2,6-DNT contribute to the HI and the first two contribute to the carcinogenic risk. While the NYSDEC has not promulgated Groundwater (GA) standards specifically for these compounds there are requirement for non-specific compounds, such as explosives. The NYSDEC considers these to be Principal Organic Contaminant (POC) and has established an overall groundwater protection level for such a compound as 5 ug/L. Fortunately, none of the explosive compounds were detected in any well above this criteria.

Table 6-1 has been updated to reflect the NYSDEC comment that explosive compounds are POCs and have a criteria of 5 ug/L in groundwater.

Comment #2 **Figure 7-2, Weese**
Exposure Pathway Summary
Comment: It is not clear why the current or future resident would not have an inhalation exposure to VOCs while showering.

Recommendation: Please clarify.

Response #2 Agreed. The RI report, which presents the risk assessment for the OB Grounds, states that inhalation exposure was not included as an exposure pathway because only one volatile, acetone, was detected in the groundwater and was not considered a significant contaminant of concern. It was felt that the presence of acetone, i.e. 3%, was not sufficient to justify this exposure route. Acetone, being infinitely soluble in water, also has a Henry's Constant that is not favorable to volatilization. Since the concentrations detected were low, i.e. maximum was 15 ug/L, and the frequency of detection was low, inhalation during showering of acetone was dropped as a realistic pathway. The regulatory agencies have agreed, as the risk assessment is now final. Exposure to acetone was considered as part of the dermal exposure during showering pathway.

No changes to the text have been made as a result of this comment.

Comment #3 **Page 7-7, Section 7.1, Weese**
Human Risk Assessment
Comment: It is stated that the results of the lead analysis suggest a blood lead level greater than the EPA target level of 10 ug/dL. Current guidance indicates that this level should not be exceeded for more than 5% of the population of children. What percentage exceeded this level?

Recommendation: It would be useful to know this, as the major remedial effort is directed towards the removal of lead to mitigate this risk.

Response #3 Agreed. The UBK Model does not provide this information as part of the output. Blood lead levels for children from 0 to 7 years of age were modeled for the future on-site residential land use scenario. The results indicate that the site specific values caused an exceedence of the 10 ug/dL guidance for on-site children for ages 1 to 4. A maximum value of 12 ug/dL was estimated for a child of 2. Although the UBK results suggest that unacceptable lead levels in children are possible, residential exposure would need to be the future land use. Since the future land use of the OB Grounds is not residential, this section has been modified to indicate that on-site residential exposure was not used as the basis for establishing remedial action objectives. This information has been added to the text in Section 8.2, which provides a more detailed discussion of the results of the UBK model and the derivation of the 500 mg/kg clean-up goal for lead in soil.

Comment #4 **Page 8-2, Section 8.2, Weese**
Risk-Based Remedial Action Objectives
Comment: Again it is stated that lead levels would be above the allowable cutoff of 10 ug/dL.

Recommendation: See Comment #5.

Response #4 Agreed. See the response to Comment #3.

Comment #5 **Page 10-6, Section 10.2, Weese**
Comparison of the Alternatives
Comment: The discussion of future land use states that "security measures will eventually be eliminated, and the site could be considered for alternative future land uses." This statement does not present a compelling argument that a residential future land use is likely. Lead risk under recreational exposures is not provided, but the alternatives discussed for the remediation of lead to acceptable residential exposure levels is quite costly, and from the document , not clearly indicated.

Response #5 Agreed. The risk to humans was shown as a possibility through the UBK model, even though the land use would have to be residential. The selection of lead at a concentration level of 500 mg/kg as a clean-up level was not based upon residential exposure. Higher lead values in soil were proposed as alternative clean-up levels to what would be predicted by the UBK model but other factors, such as protection of groundwater, became more important. Leaching modeling suggested that exceedences of the GA value could be possible at lead concentrations at or below 488 mg/kg. The 500 mg/kg value was negotiated after consideration of a variety of factors. These included: protection of groundwater, protection of human health, protection of ecological receptors and compliance with RCRA closure. While it is true that the 500 mg/kg value is near the EPA default value of 400 mg/kg for lead in soil under residential exposure, it is nonetheless higher. Regulatory agencies were reluctant to accept a value much higher due to uncertainties associated with Army assurances that residential exposure would never happen. At the time of the negotiations, the Army believed that the future land use of the OB Grounds was as a military munitions demilarization area. The intended future

land use, without a deed restriction, was established as industrial, which was the basis of the 500 mg/kg value. The finalization of the BRAC land uses occurred approximately 2 years after this clean-up number was agreed to. The outcome of this change in land use was an EPA requirement that all soils greater than 60 mg/kg would have to be covered with a 9 inch vegetative cover to prevent birds from ingesting lead. This was not a previous requirement because EPA felt that an industrial scenario, such as OB operations, would discourage birds from using the grounds. A conservation area would encourage birds to roost, therefore provisions were necessary to protect ecological receptors.
Much of this discussion has been added to Section 8.2. Section 10.2 has not been modified. Removing soils greater than 500 mg/kg will reduce the risk, as shown. Even though this is the risk from residential exposure it is the worst case exposure. Reducing the risk from worst case conditions strengthens the benefits gained by implementing a remedial action, even though this is not considered to be the "driver" of the action.

Comment #6 **Page 10-12, Section 10.2, J. Ferguson**
Availability of Services and Materials
Comment: The sentence which states, "Alternative 6, soil washing, ranked lowest for cost because it is approximately twice as expensive as Alternative 4 and 5", is unclear.

Recommendation: Please clarify.

Response #6 Agreed. The referenced sentence, which is in the cost section, has been revised to state that Alternative 6 ranks lowest for cost because it is approximately twice as expensive as Alternatives 4 and 5, and therefore the most expensive alternative.

Comment #7 **Page 10-12, Section 10.3, Weese**
Summary of the Comparison of Alternatives
Comment: The discussion of Alternative 4 states that it ranks lowest for short-term protectiveness because all of the soils are transported off-site for disposal. The public comment sections are not provided. As this is also a costly alternative, it would be quite useful to have available the community preferences and concerns. It is quite possible that the community would prefer to leave an area which currently provides no health risk alone, rather than be faced with traffic, noise and risk associated with off-site excavation.

Response #7 Agree. It should be noted that Alternative 4 is the least costly remedial alternative that meets the Threshold Criteria and Primary Balancing Criteria. Since remediation is to be implemented, the No-Action Alternative cannot be included in the comparison. Presentations have been made to the local community members, the Restoration Advisory Board (RAB), about the selection process. The members of the RAB agreed with the selection process. They were made aware of the short-term risks associated with increased trucks and dust. Concern was voiced regarding disposing of contaminated soils in an off-site landfill but after discussing the alternative that included a description that the soils above TCLP criteria will solidified there was majority agreement. It was also pointed out that there are also risks associated with the construction and maintenance of an on-site landfill. Finally, although there are risks associated with transport of material off-site, precautions can be taken that will minimize dust, noise, traffic congestion and other risks.

Comment #8 **Appendix C-1, Weese**

Responsiveness Summary

Comment: While it is not unusual for draft documents to lack this section, it is also true that the document is not complete without the provision of this information. Particularly in this instance where no immediate risk to the public is evident, and the future land uses are so ill-defined, it would be quite useful to have this information available.

Response #8 Agreed. Additional information regarding the community involvement has been added.

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