U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

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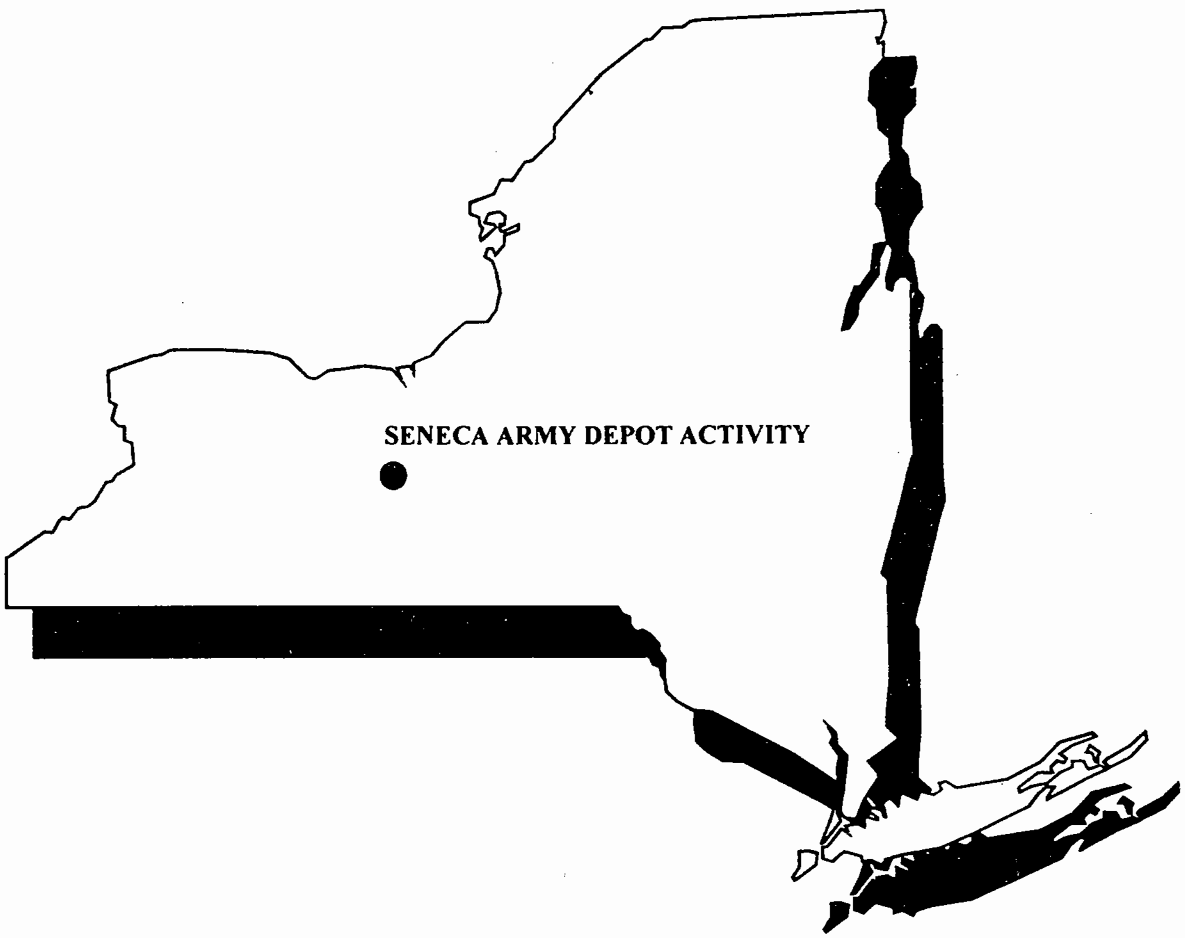

FINAL

DECISION DOCUMENT - MINI RISK ASSESSMENT

SEAD 9, 27, 28, 32, 33, 34, 43, 44A, 44B, 52, 56, 58, 62, 64A, 64B, 64C, 64D, 66, 68, 69, 70, and 120B

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FINAL

DECISION DOCUMENT
For
VARIOUS "NO ACTION" SITES
MINI RISK ASSESSMENTS

Prepared For:

Seneca Army Depot Activity
Romulus, New York

and

US Army Corps of Engineers
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Prepared By:

Parsons Engineering Science, Inc.
30 Dan Road
Canton, Massachusetts 02021-2809

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Appendix K	SEAD-58: Debris Area near Booster Station 2131
Appendix L	SEAD-62: Nicotine Sulfate Disposal Area near Buildings 606 and 612
Appendix M	SEAD-64A: Garbage Disposal Area
Appendix N	SEAD-64B: Garbage Disposal Area
Appendix O	SEAD-64C: Garbage Disposal Area
Appendix P:	SEAD-64D: Garbage Disposal Area
Appendix Q:	SEAD-66: Pesticide Storage near Buildings 5 and 6
Appendix R:	SEAD-68: Building S-335 - Old Pest Control Shop
Appendix S:	SEAD-70: Fill Area Adjacent to Building T-2110
Appendix T:	SEAD-120B: Ovid Road Small Arms Range
Appendix U	Background Data
Appendix V	Residential Scenario
Appendix W	Response to Comments

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AN	Army-Navy
AOC	Area of Concern
AWQS	Ambient Water Quality Standards
BAF	Bioaccumulation Factor
BAP	Benzo(a)pyrene
BCF	Bioconcentration Factor
BPAH	Benzo-polyaromatic hydrocarbons
BRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CLP	Contract Laboratory Program
COC	Compound of Concern
COPC	Chemicals of Potential Concern
CRAVE	Carcinogen Risk Assessment Verification Endeavor
CSF	Cancer Slope Factors
CSM	Conceptual Site Model
CT	Central Tendency
DoD	Department of Defense
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation/Cost Analysis
EM-31	Electromagnetic-31 geophysical unit
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESI	Expanded Site Inspection
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	Feet
GPR	Ground Penetrating Radar
HEAST	*Health Effects Assessment Summary Tables*
HI	Hazard Index

ACRONYMS AND ABBREVIATIONS
(continued)

Acronym	Definition
HQ	Hazard Quotient
IEUBK	Integrated Exposure Uptake Biokinetic Model
IRFNA	Inhibited Red Fuming Nitric Acid
IRIS	Integrated Risk Information System
IRM	Interim Remedial Measures
LOAEL	Lowest Observed Adverse Effect Level
LOT	Limit of Tolerance
LRA	Local Redevelopment Authority
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MW	Monitoring Well
NFA	No Further Action
NOAEL	No Observed Adverse Effect Level
NPL	National Priorities List
NTU	Nephelometric Turbidity Units
NYSDEC	New York State Department of Environmental Conservation
OB	Open Burning
OSWER	Office of Solid Waste and Emergency Response
OVM	Organic Vapor Meter
PAH	Polyaromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PM	Particulate Matter
QA	Quality Assurance
RAGS	*Risk Assessment Guidance for Superfund*
RBRG	Risk-Based Remediation Goals
RCRA	Resource Conservation Recovery Act
RD/RA	Remedial Design/Remedial Action
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study

ACRONYMS AND ABBREVIATIONS
(continued)

Acronym	Definition
RME	Reasonable Maximum Exposure
ROD	Record of Decision
SB	Soil Boring
SD	Sediment
SEAD	Seneca Army Depot
SEDA	Seneca Army Depot Activity
SFF	Site Foraging Factor
SGC	Standard, Guideline and Criteria
SOW	Statement of Work
SS	Surface Soils
SVO	Semivolatile Organic
SW	Surface Water
SWMUs	Solid Waste Management Units
TAGM	Technical Administrative Guidance Memorandums
TAL	Target Analyte List
TCL	Target Compound List
TEF	Toxicity Equivalency Factors
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
TRV	Toxicity Reference Value
TSP	Total Suspended Particulate Matter
UCL	Upper 95^{th} Confidence Limit
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
URF	Unit Risk Factors
VOC	Volatile Organic Compound
yd	Yards

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EXECUTIVE SUMMARY

Beginning with its inception in 1941 and continuing until its mission was terminated in 1995, the mission of the Seneca Army Depot Activity (SEDA or the Depot) was the management and storage of various military items, including munitions. Management of these items required areas and facilities where storage, quality assurance testing, range testing, munitions washout, deactivation and other support actions such as ordnance detonation could be performed. In addition, administrative and plant operational facilities were also established in support of the Depot's mission. Additionally, the Depot performed maintenance for small arms weapons, industrial plant equipment, cargo trucks, jeeps, tractors, trailers, and weapons carriers. Waste management was integrated with the SEDA management mission.

Management of waste materials produced from these operations has been completed in accordance with the requirements of the Resource Conservation Recovery Act (RCRA). As part of the requirements of RCRA, the Depot identified and listed 72 sites where solid wastes were managed. These 72 sites were designated as Solid Waste Management Units (SWMUs) under RCRA.

In 1990, the Depot was included in the federal section of the National Priorities List (NPL). As a federal NPL facility, provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - 42 USC § 9620e) required that the US Army investigate and conduct remedial actions, as required by the findings of the investigations, at all sites required at the facility. In accordance with this stipulation, the US Army, the US Environmental Protection Agency (EPA), and the New York State Department of Environmental Conservation (NYSDEC) negotiated and finalized a Federal Facility Agreement (FFA) that outlined the administrative process and the procedures that would be followed to comply with CERCLA at the Depot.

As part of its response to provisions of the FFA and CERCLA, the US Army provided the USEPA and NYSDEC with a list of 72 SWMUs at the Depot, and identified them as sites that might require investigation and possible remedial actions. Following this initial identification of sites, the US Army ranked each of the SWMUs based upon that site's projected risk and need for investigation. The goal of the initial categorization of SWMUs was to prioritize the pending investigations and remedial actions. The assigned rankings divided the 72 SWMUs into five groups (i.e., No Further Action, High Priority, Moderate Priority, Moderately Low Priority, and Low Priority SWMUs). Subsequent to the US Army's proposal of the priority rankings, all parties met to review and discuss the available information for the identified SWMUs, and to finalize priority-ranking assignments. As a result of this process, 24 of the 72 listed SWMUs were classified as No Further Action sites, 21 were classified as Low Priority

Areas of Concern (AOCs), 11 were identified as Moderately Low Priority AOCs, 3 were classified as Moderate Priority AOCs, and 13 were classified as High Priority AOCs based upon historical and available information.

Once all of the SWMUs were categorized, the Army implemented site investigations at all SWMUs that were not classified as No Further Action sites. Initially limited Site Inspections (SIs) were conducted, but if warranted based on the findings of the SIs, Expanded Site Inspections (ESIs) and Remedial Investigations (RIs) were implemented.

In 1995, the SEDA was designated for closure under the Department of Defense's Base Realignment and Closure (BRAC) process. With SEDA's inclusion on the BRAC list, the US Army's emphasis expanded from expediting necessary investigations and remedial actions at sites believed to pose potential risk to the environment and human health to include the release and reuse of non-affected portions of the Depot to the surrounding community for non-military (i.e., industrial, municipal and residential) purposes. Thus, BRAC required that the US Army finalize decisions and actions for SWMUs, regardless of ranking, so that these sites may be released for non-military use.

Section 10.3 of the FFA describes the process to be followed for those SWMUs that are No Further Action SWMUs. The FFA states:

> *"No Action SWMUs shall be those SWMUs from which no release of hazardous substances, pollutants, or contaminants has occurred or from which a release of hazardous waste or substances, pollutants, or contaminants has occurred that does not pose a threat to the public health, welfare, or the environment. SWMUs classified as No Action will be identified in the 6 NYCRR Part 373/HSWA permit as No Action SWMUs."*

As a result of the SIs and the ESIs, 22 sites[1] at the Depot initially classified as either Low Priority or Moderately Low Priority sites are now considered to represent sites that warrant No Further Action based on the results of mini human health and ecological risk assessment that have been conducted using data that was developed during the prior investigations. The Depot has withdrawn its RCRA permit, due to the base's closure; therefore, there is no document in which to list SWMUs as No Action SWMUs. As an alternative to the RCRA permit, this Decision Document is intended to serve as a

[1] Twenty-one of the originally classified SWMUs, plus an additional site added as a result of a subsequent environmental baseline survey.

substitute for the RCRA permit and will document the decisions that have been made pertaining to a finding of No Further Action for these 22 SWMUs at the Depot.

This document summarizes available information and data for the 21 Low Priority and Moderately Low Priority SWMUs that are located at the SEDA, and presents a justification and rationale explaining why these sites are not considered to pose a threat to human health and the environment. In addition, information is also provided for one additional SWMU (SEAD-120B) that was initially not identified by the Army on the list of 72 SWMUs. SEAD-120B was added as a SWMU as a result of a subsequent environmental baseline survey that was completed at the Depot. However, based on the results of additional investigations or actions that have been completed, the Army has determined that No Further Action is warranted at SEAD-120B. Information and data presented serve as the basis of the US Army's determination that the 22 SWMUs identified warrant "No Further Action" under CERCLA and therefore, can be eliminated from ongoing and future environmental studies and solid/hazardous waste investigations required at the Depot.

1.0 INTRODUCTION

Since its inception in 1941, the mission of the Seneca Army Depot Activity (SEDA or the Depot) has been the management of various military items, including munitions. Management of these items required areas and facilities for storage, quality assurance testing, range testing, munitions washout, deactivation furnaces and other support areas such as ordnance detonation. In addition, administrative and plant operational facilities were established in support of the depot mission. Waste management was integrated with the SEDA management mission.

Management waste materials produced from these operations has been in accordance with the requirements of the Resource Conservation Recovery Act (RCRA). As part of the requirements of RCRA, the Depot identified 72 Solid Waste Management Units (SWMUs). In 1990, the Depot was included in the federal section of the National Priorities List (NPL). As a federal facility listed on the NPL, provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA – 42 USC § 9620e) required that the US Army investigate the sites known to exist at the Depot and complete all necessary remedial investigations and actions at the facility. In accordance with this stipulation, the US Army (Army), the US Environmental Protection Agency (EPA), and the New York State Department of Environmental Conservation (NYSDEC) negotiated and finalized a Federal Facility Agreement (FFA) that outlines the administrative process and the procedures that will be followed to comply with CERCLA.

The US Army identified all of the SWMUs at the Depot as those sites that would potentially need to be investigated and provided this list to USEPA and NYSDEC. Following the initial identification of sites, the Army ranked each site for investigation based upon that site's projected risk. The goal of the initial categorization of SWMUs was to prioritize the pending investigations and remedial actions so that those sites with the greatest risk would be addressed first. The assigned rankings divided the 72 identified SWMUs into 5 groups (i.e., No Further Action, High Priority, Moderate Priority, Moderately Low Priority, and Low Priority SWMUs). Subsequent to the US Army's proposal of the priority rankings, all parties met to review and discuss the available information for the identified SWMUs, and to finalize priority-ranking assignments. The consensus of all parties was to mount necessary investigations and possible actions at those SWMUs of concern and identify the SWMUs for which no investigations would be required.

In 1995, the SEDA was designated for closure under the Department of Defense's (DoD's) Base Realignment and Closure (BRAC) process. With SEDA's inclusion on the BRAC list, the US Army's emphasis expanded from expediting necessary investigations and remedial actions at the High and Moderately High Priority sites. It was changed to include the release and reuse of non-affected portions of the depot to the surrounding community for non-military (i.e., industrial, municipal and residential) purposes. Thus, BRAC sites may be released for non-military use.

This document focuses on 21 of the SWMUs that were classified as either Low Priority or Moderately Low Priority and one additional site that was identified during subsequent investigations. The 21 SWMUs were initially classified as Low or Moderately Low Priority based on historical and available information. These classifications warranted additional data acquisition in order to support the assigned ranking. The data was obtained through sampling performed in conjunction with the SWMU Classification Report or through an Expanded Site Inspection (ESI). In the case of the 21 SWMUs, the data collected indicates that there is less of a concern at these SWMUs than originally assumed. This document serves to prove that claim through a mini risk assessment and to propose a change in classification of each of these SWMUs to No Further Action.

Additional sites, unknown at the time of the SWMU classification, were identified during an Environmental Baseline Survey (EBS) of the Facility in 1998 and evaluated in accordance with the requirements of BRAC. One of these sites has been added to the list of 21 SWMUs evaluated in this document in order to prove that the site poses no threat and can be considered a No Further Action site.

Section 10.3 of the FFA describes the process to be followed for those SWMUs that are No Further Action SWMUs. The FFA states:

> *"No Action SWMUs shall be those SWMUs from which no release of hazardous substances, pollutants, or contaminants has occurred or from which a release of hazardous waste or substances, pollutants, or contaminants has occurred that does not pose a threat to the public health, welfare, or the environment. SWMUs classified as No Action will be identified in the 6 NYCRR Part 373/HSWA permit as No Action SWMUs."*

The Depot has ceased in its efforts to obtain a RCRA permit, due to its impending closure and continues to operate under interim status. As an alternative to the RCRA permit, this Decision Document is intended to substitute for the RCRA permit and will document the decisions that have been made pertaining to a finding of No Further Action for these SWMUs.

1.1 OBJECTIVE OF THIS DOCUMENT

This document summarizes available information and data for twenty-one (21) SWMUs and one (1) Environmental Baseline Survey (EBS) site that are located at the Seneca Army Depot Activity (SEDA) near Romulus NY, and presents a justification and rationale explaining why these sites are not considered to pose a threat to human health and the environment. Information and data presented serve as the basis of the US Army's determination that the 22 areas identified warrant "No Further Action" and therefore, can be eliminated from ongoing and future environmental studies and solid/hazardous waste investigations required at the depot.

1.2 HISTORIC OVERVIEW

SEDA lies between Cayuga and Seneca Lakes in New York's Finger Lake Region, near the communities of Romulus and Varick, NY. SEDA encompasses approximately 10,600 acres of land and contains more than 900 buildings that provide more than 4.4 million square feet of space, including approximately 1.3 million square feet of storage space. SEDA was originally developed and opened in 1941. SEDA's historic military mission included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives and special weapons. This mission was terminated in September of 1999, and the military installation was closed in September of 2000.

Historic military activities conducted at SEDA used chemical materials, and generated wastes that contained hazardous materials. The generation, storage, treatment, shipment, and disposal of hazardous wastes were regulated under RCRA [42 USC §§ 6901 – 6991, as amended by the Hazardous and Solid Waste Amendments of 1984, Public Law 98-616]. Activities conducted at SEDA were approved for Part A, interim status in 1980. SEDA submitted a federal Part B permit application for activities and operations in 1986, and a NYSDEC Part 373 permit application for hazardous waste management facilities in 1991.

Since 1978, the potential environmental impacts of operations and activities conducted at SEDA have been subject to review by the Army, the NYSDEC, and the EPA. Initially, environmental investigations were conducted under the DoD's Installation Restoration Program (IRP), but subsequently these programs were performed under the Comprehensive Environmental Response, Compensation, and Liability Act – CERCLA [42 U.S.C. §§ 9601 – 9675, as amended by the Superfund Amendments and Reauthorization Act of 1986, Public Law 99 – 499] and RCRA. As a result of these investigations, evidence of hazardous chemical and radioactive constituents and compounds used, stored, and demilitarized at the depot was found in samples of ground water, soil, sediment and surface water collected and characterized.

On July 14, 1989, the EPA proposed SEDA for inclusion on the National Priorities List (NPL) based on a hazard ranking score of 37.3. Supporting its recommendation for listing, the EPA stated:

> " ...the Army identified a number of potentially contaminated areas, including an unlined 13-acre landfill in the west-central portion of the depot, where solid waste and incinerator ash were disposed of intermittently for 30 years during 1941-79; two incinerator pits adjacent to the landfill, where refuse was burned at least once a week during 1941-74; a 90-acre open burning/detonation area in the northwest portion of the depot, where explosives and related wastes have been burned and detonated during the past 30 years; and the APE-1236 Deactivation Furnace in the east-central portion of the depot, where small arms are destroyed."

The EPA's recommendation was approved on August 30, 1990, and SEDA was listed in Group 14 on the Federal Section of the NPL.

1.3 FEDERAL FACILITY AGREEMENT

Subsequent to SEDA's placement on the NPL, representatives of the Army, EPA, and the NYSDEC negotiated a FFA (Docket Number: II-CERCLA-FFA-00202) to govern and coordinate necessary remedial investigations/feasibility studies (RI/FS) and necessary corrective actions. The general purposes of the FFA are to:

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

With specific reference to the procedural framework, terms of the FFA stated that all of the signatory parties intended "to integrate the Army's CERCLA response obligations and RCRA corrective action obligations which relate to the release(s) of hazardous substances, hazardous wastes, pollutants, or contaminants covered by" the Agreement. Therefore, requirements of RCRA were deemed to be an applicable or relevant and appropriate requirement (ARAR) under CERCLA, and actions selected, implemented and completed must be protective of human health and the environment such that remediation of releases shall obviate the need for further corrective action under RCRA. The FFA was finalized in January of 1993.

The FFA also describes a sequential process for the identification, investigation, evaluation, remediation and closure of all sites where hazardous waste are known, or suspected, to have been released. A schematic diagram of the defined process is shown in **Figure 1-1**.

The decision process involves implementing a series of baseline actions. Decisions are integrated into the baseline action process to justify the actions that are taken. Supplemental actions, such as collecting additional data, are conducted, where necessary, to provide support for the baseline actions. The final action for each SWMU or AOC involves preparation of a decision document, a record of decision (ROD) or a closeout report. These reports provide documentation that site conditions have met the requirements of the decision process. A key aspect of the overall process is that any identified site or unit may exit the process, requiring no further action, after one of six key steps, if site conditions are shown to meet specified decision criteria. The process is divided into six (6) distinct phases. These include:

1. The Site Classification Phase;
2. The Site Investigation Phase;
3. The Interim Remedial Measures (IRM) Phase;
4. The Remedial Investigation Phase (RI) Phase;
5. The Feasibility Study (FS) Phase; and
6. The Remedial Design/Remedial Action (RD/RA) Phase.

Each phase is further subdivided into a series of actions that result from the decisions. As depicted in **Figure 1-1**, each decision is identified with a letter, whereas each action is identified with a number so that the status of each site can be identified. This provides an easy mechanism to understand what decisions have been made and what decisions need to be made. Each of the six phases of the process allows the site or unit to exit the process. The effort involved in exiting the process is dependent upon the phase involved and the information required documenting that conditions are within the required limits. In one case, this may involve a comparison of available data to an appropriate State and Federal Standard, Guideline and Criteria (SGC), while in another, this may involve completion of a remedial action or an Interim Remedial Measure (IRM).

The first phase of the overall process is the site classification phase. Site classification begins with an initial identification of a site and ends with a determination of whether the site has impacted the environment or not. The key decision point in the site classification phase involves determining whether or not site conditions have impacted the environment. In many instances, this decision may be based on historical records or an understanding of the processes involved, without collecting additional field data. In other instances, this decision requires some limited sampling and analysis. If no impact is shown, no further action is required and unrestricted use of the site or unit is allowed.

The second phase is the Site Investigation Phase. This phase involves collection of data as part of an ESI, as shown in Action 6 of **Figure 1-1**. The resulting ESI data are then evaluated to determine whether a threat exists at the site or unit. This determination is based upon direct comparisons of the site data to background or an appropriate SGC. Exceedences of an appropriate standard, guideline, or criteria are used to indicate that a threat exists. A quantitative risk analysis is not performed to quantify the threat. Professional judgments are also used to evaluate the significance of the exceedences and are incorporated into the recommendations for either no further action or additional evaluations, as shown in Decision No. E.

Each medium has unique SGCs that are used for comparison. For example, soil data are typically compared to background concentrations or the NYSDEC Technical Administrative Guidance Memorandum's (TAGM's) cleanup objective value. If none of the resulting data exceeds the SGC value, then the recommendation for the site is No Further Action (NFA). However, if exceedances of TAGMs or other media specific SGC are noted then further evaluation of the data is required.

When exceedances of a SCG are noted, then a "mini" risk assessment may be performed to assess whether a contaminant actually poses a risk. Performance of the mini-risk assessment provides a mechanism to quantitatively determine a risk value that can be used to support recommendations for future action. One such future action alternative may be "no further action," while the other is more steps are needed.

The mini-risk assessment uses procedures that are generally identical to those that would be used for a Baseline Risk Assessment (BRA), but substitutes the maximum detected concentration for each chemical as the Exposure Point Concentration (EPC) instead of the Upper 95th Confidence Limit of the mean value. This replacement is made due to the uncertainties associated with evaluating a site with the smaller ESI database. If the results of the mini-risk assessment indicate an acceptable risk, i.e., carcinogenic risks are less than 1E-04 or the Hazard Index (HI) is less than 1, then the site conditions meet the requirements for no further action. When appropriate, the basis of the no further action decision is documented in a Decision Document. Otherwise, the site conditions are not acceptable and the site enters the Interim Remedial Measure (IRM) phase, Decision No. E in **Figure 1-1.**

The IRM phase involves evaluating whether the site can attain a no further action designation via implementation of an IRM. An IRM is most likely to be a non-time critical removal action and is generally considered appropriate if:

- The problems can be attributed to discrete soil or sediment "hot spots";
- The extent of soil or sediment to be excavated is less than 1000 cubic yards (yd^3);
- The technologies are limited to "low tech" technologies such as off-site disposal or capping;
- The pollutants involved are amenable to technologies such as off-site disposal or capping; and
- Groundwater or surface water conditions are acceptable.

If deemed appropriate, an IRM can be used to eliminate a site from further consideration by preparing an Engineering Evaluation/Cost Analysis (EE/CA). The EE/CA is the decision document that presents the goals and rationale for implementing the IRM and discusses the evaluations conducted in support of the IRM. After the removal action is performed, confirmatory sampling is required to document the effectiveness of the IRM in attaining the IRM goals. This information is then documented in the project completion report and the ROD.

If the conditions of the site are such that the problems are not readily solvable via an IRM then the site moves into the RI phase. This phase is identical to the process described by CERCLA and involves a multi-media sampling effort and BRA. The results of the BRA may support a no further action if the risk conditions are below the EPA target limits for risk. Otherwise, the site enters the FS stage.

The FS phase involves an initial evaluation of presumptive remedies. Presumptive remedies include a variety of technologies for both groundwater and soil such as bioventing, off-site disposal, capping or deed restriction for soils and alternative water supply, air sparging, zero-valence iron treatment or natural attenuation with monitoring for groundwater. If presumptive remedies are not appropriate, then an FS is prepared.

The final phase is the preparation of a remedial design and implementation of the remedial action. Both the FS and the RD/RA will follow guidance provided by both the EPA and the NYSDEC.

A Decision Document is similar to a ROD. Each are required to document the decisions made to support final site closure. RODs are required following completion of an RI/FS. Decision Documents are prepared, prior to an RI/FS, when the site conditions are determined not to pose a continual threat to human health and the environment due to either a removal action or following an initial site investigation.

1.4 BASE REALIGNMENT AND CLOSURE (BRAC)

The major portion of SEDA was approved for the 1995 BRAC list in October of 1995. The mission closure date for the facility was September 30, 1999, with an installation closure date of September 30, 2000. A small enclave at SEDA remains open today, and is used to store hazardous materials and ores.

Woodward-Clyde Federal Services was retained to prepare an Environmental Baseline Survey for SEDA. Under this process, Woodward-Clyde was charged with the initial classification of discrete areas of the Depot into one of seven standard environmental conditions of property area types consistent with the Community Environmental Response Facilitation Act (CERFA – Public Law 102-426), which amends Section 120 of CERCLA. The results of Woodward-Clyde's effort were documented in the U.S. Army Base Realignment and Closure 95 Program Report that was issued on October 30, 1996. This report served as part of the basis for subsequent decisions made regarding land use.

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 to plan and oversee 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, areas within the Depot were classified according to their most likely future use. These areas currently include:

- housing;
- institutional;
- industrial;
- warehousing;
- conservation/recreational land;
- an area designated for a future prison;
- an area for an airfield, special events, institutional, and training; and
- an area to be transferred from one federal entity to another (i.e., an area for the existing navigational LORAN transmitter).

A map summarizing the currently recommended future land use for areas at SEDA is presented as **Figure 1-2**.

1.5 ENVIRONMENTAL SETTING

1.5.1 Geology

SEDA is located within one distinct unit of glacial till that covers the entire area between the western shore of Lake Cayuga and the eastern shore of Lake Seneca. The till is consistent across the entire depot although it ranges in thickness from less than 2 feet to as much as 15 feet with the average being only a few feet thick. This till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably rip-up clasts removed by the active glacier during the late Pleistocene era. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). Grain size analyses performed by Metcalf & Eddy (M&E, 1989) on glacial till samples collected during the installation of monitoring wells at SEDA show a wide distribution of grain sizes. The glacial tills in this area have a high percentage of silt and clay with trace amounts of fine gravel. A zone of gray weathered shale of variable thickness is present below the till in almost all locations at SEDA. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

This underlying bedrock below weathered shale is a member of the Ludlowville Formation of the Devonian age Hamilton Group. The Hamilton Group, 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales, mudstones and thin limestones with numerous zones of abundant invertebrate fossils. The Ludlowville Formation is known to contain brachiopods, bivalves, trilobites, corals and bryozoans (Gray, 1991). In contrast, the lower two formations (Skaneateles and Marcellus) consist largely of black and dark gray sparsely fossiliferous shales (Brett et al., 1991). Locally, the shale is soft, gray, and fissile. **Figure 1-3** displays the stratigraphic section of Paleozoic rocks of Central New York. Three known predominant joint directions, N60°E, N30°W, and N20°E are present within this unit (Mozola, 1951).

1.5.2 Hydrogeology

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

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

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

Data from site quarterly groundwater monitoring program indicate that the saturated thickness of the till/weathered shale overburden aquifer is variable, ranging between 1 and 8.5 feet. However, the aquifer's thickness appears to be influenced by the hydrologic cycle and some monitoring wells dry up completely during portions of the year. Based upon a review of two years of data, the variations of the water table elevations are likely a seasonal phenomenon. The overburden aquifer is thickest during the spring recharge months and thinnest during the summer and early fall. During late fall and early winter, the saturated thickness increases. Although rainfall is fairly consistent at SEDA, averaging approximately 3 inches per month, evapotranspiration is a likely reason for the large fluctuations observed in the saturated thickness of the over-burden aquifer.

Regional precipitation is derived principally from cyclonic storms that pass from the interior of the country through the St. Lawrence Valley. With local influence derived from lakes Seneca, Cayuga, and Ontario providing some lake effect snows, leading to a significant amount of the winter precipitation and a moderate the local climate. Wind velocities are moderate, but during the winter months, there are numerous days with sufficient winds to cause blowing and drifting snow. The most frequently occurring wind directions are westerly and west southwesterly (**Figure 1-4**).

1.6 SOLID WASTE MANAGEMENT UNIT CLASSIFICATION

As mandated by the EPA Region II and by NYSDEC, the U.S. Army Corps of Engineers commissioned the "Solid Waste Management Unit Classification Report" at SEDA (ERCE 1991). This report was finalized by Parsons on June 10, 1994. The goals of this work were to evaluate the effects of past solid waste management practices at identified SWMUs and to classify each SWMU as an area where "No Action is Required" or as an "Area of Concern" where additional investigations and studies were required. Areas of Concern include both (a) SWMUs where releases of hazardous substances may have occurred and (b) locations where there has been a threat of a release into the environment of a hazardous substance or constituent (including radionuclides).

AOCs included former spill areas, landfills, surface impoundments, waste piles, land treatment units, transfer stations, wastewater treatment units, incinerators, container storage areas, scrap yards, cesspools and tanks with associated piping that are known to have caused a release into the environment or whose integrity has not been verified.

A total of 69 SWMUs and AOCs were originally identified in the ERCE SWMU Classification Report. Following the completion of the ERCE report, three additional SWMUs were added by the Army, bringing the total number of SWMUs listed at SEDA to 72.

A recommended classification for all SWMUs was presented in the final SWMU Classification Report (Parsons, 1994). At this time, the Army identified 24 of the original SWMUs as sites that required "no further action" based on existing information. Furthermore, 13 other SWMUs were designated as High Priority sites; 3 were designated as Moderate Priority sites; 11 were designated as Moderately Low Priority sites; and 21 were designated as Low Priority sites.

The Army identified additional sites, unknown at the time of the SWMU Classification Report, as part of the Environmental Baseline Survey conducted in 1998. These sites have not received a SWMU classification. In response to the BRAC closure process, the Army has refocused its efforts and is investigating and evaluating sites that are located within parcels that have the greatest reuse potential under the BRAC future land use designation. This effort encourages the reuse of the facility through land transfer or lease prior to the end of the military mission at the Depot. The Army will still continue to close sites after the military mission is complete.

The goal of this document with respect to 21 of these SWMUs and one EBS site is to:

1. Assemble and summarize all of the currently known information about the SWMU/EBS site;
2. Compare the available data and information with applicable guidance levels and standards and conduct a mini risk assessment in order to determine if there is an indication of potential threats to human health and the environment at the site;
3. Provide a recommendation, and a justification and rationale to substantiate the proposed classification of the SWMU/EBS site to the "No Action" status.

The list of the affected SWMUs and the EBS site is provided in **Table 1-1**. If the Army's designation of "No Further Action" is accepted, these sites may be released for future land-use.

Additional information clarifying and substantiating recommendations pertinent to individual SWMUs/EBS site is provided in the following sections of this Report.

TABLE 1-1
MINI RISK ASSESSMENT SITES

Decision Document – Mini Risk Assessment – Other Sites
Seneca Army Depot Activity

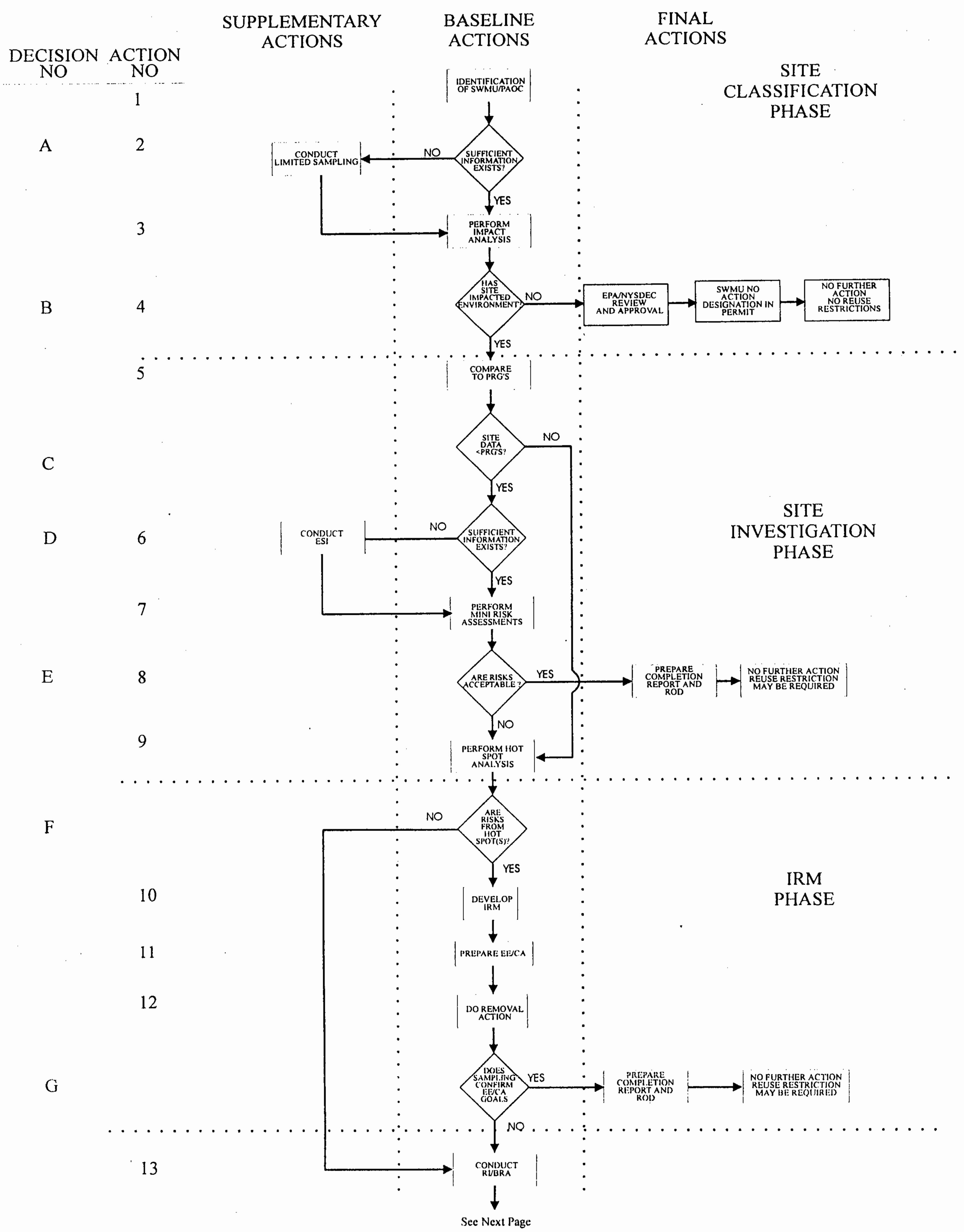
SWMU NUMBER	1994 PRIORITY RANKING	PROPOSED CLASSIFICATION	SWMU DESCRIPTION
SEAD-9	Moderately Low	No Action	Old Scrap Wood Site
SEAD-27	Low	Land Use Control	Building 360 – Steam Cleaning Waste Tank
SEAD-28	Low	No Action	Building 360 – Underground Waste Oil Tanks (2 units)
SEAD-32	Low	No Action	Building 718 – Underground Waste Oil Tanks (2 units)
SEAD-33	Low	No Action	Building 121 - Underground Waste Oil Tank
SEAD-34	Low	No Action	Building 319 – Underground Waste Oil Tanks (2 units)
SEAD-43,56,69	Moderately Low	No Action	Building 606 – Old Missile Propellant Test Laboratory, Herbicide and Pesticide Storage, Disposal Area
SEAD-44A	Moderately Low	No Action	Quality Assurance Test Laboratory – Site A
SEAD-44B	Moderately Low	No Action	Quality Assurance Test Laboratory – Site B
SEAD-52	Low	No Action	Ammunition Breakdown Area
SEAD-58	Moderately Low	No Action	Debris Area near Booster Station 2131
SEAD-62	Low	No Action	Nicotine Sulfate Disposal Area near Buildings 606 and 612

TABLE 1-1
MINI RISK ASSESSMENT SITES

Decision Document – Mini Risk Assessment – Other Sites
Seneca Army Depot Activity

SWMU NUMBER	1994 PRIORITY RANKING	PROPOSED CLASSIFICATION	SWMU DESCRIPTION
SEAD-64A	Low	No Action	Garbage Disposal Area
SEAD-64B	Low	No Action	Garbage Disposal Area
SEAD-64C	Low	No Action	Garbage Disposal Area
SEAD-64D	Low	Land Use Control	Garbage Disposal Area
SEAD-66	Low	No Action	Pesticide Storage Near Buildings 5 and 6
SEAD-68	Low	No Action	Building S-335 – Old Pest Control Shop
SEAD-70	Low	No Action	Fill Area Adjacent to Building T-2110
SEAD-120B	NA	No Action	Ovid Road Small Arms Range

SENECA ARMY DEPOT ACTIVITY
Decision Criteria Flowchart



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESSMENT

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO.

FIGURE 1-1
DECISION CRITERIA
REMEDIATION FLOWCHART

Page 1 of 2

SCALE N/A | DATE APRIL 2002

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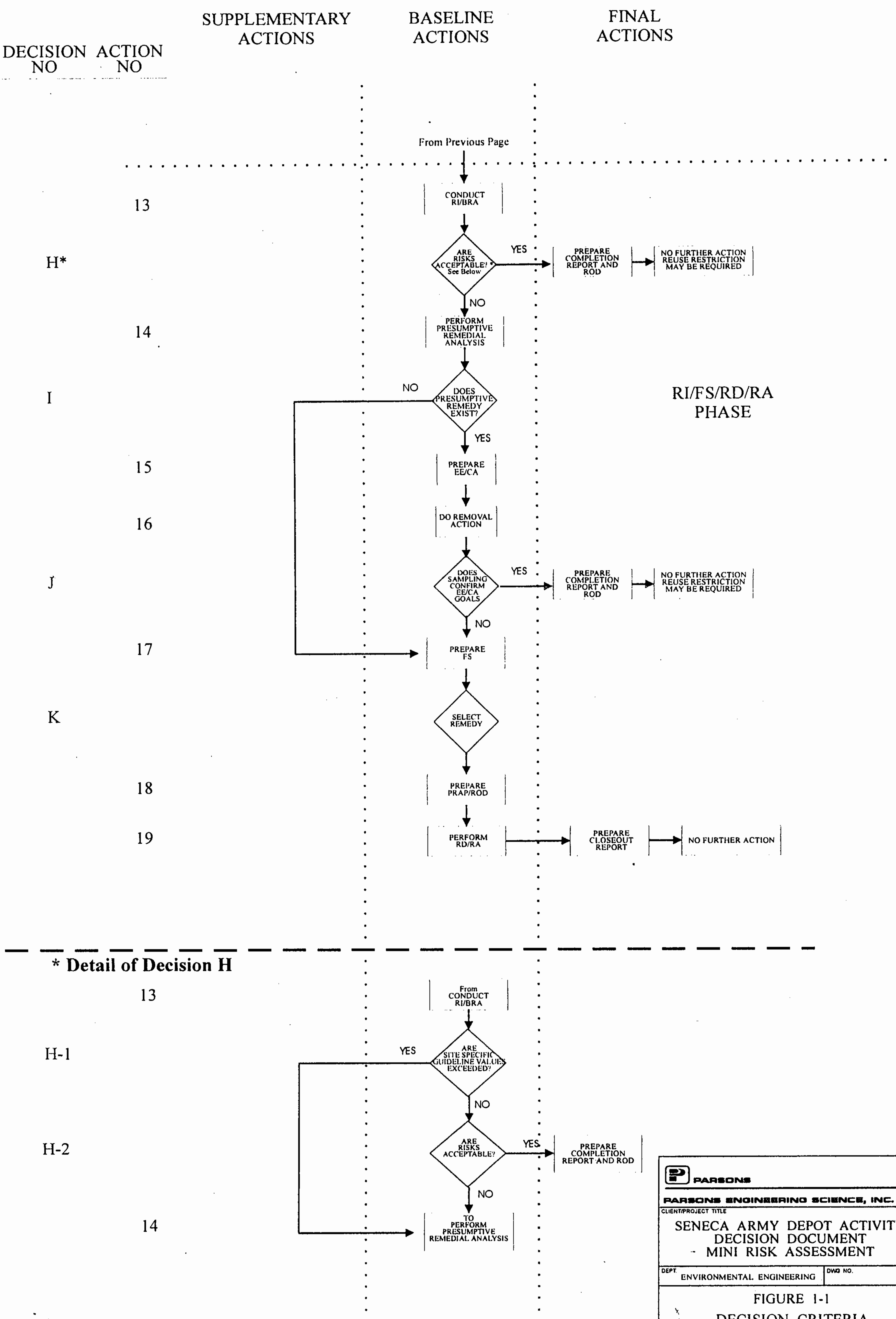
SENECA ARMY DEPOT ACTIVITY
Decision Criteria Flowchart



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
- MINI RISK ASSESSMENT

DEPT ENVIRONMENTAL ENGINEERING | DWG NO.

FIGURE 1-1

DECISION CRITERIA REMEDIATION FLOWCHART

Page 2 of 2

SCALE N/A | DATE APRIL 2002

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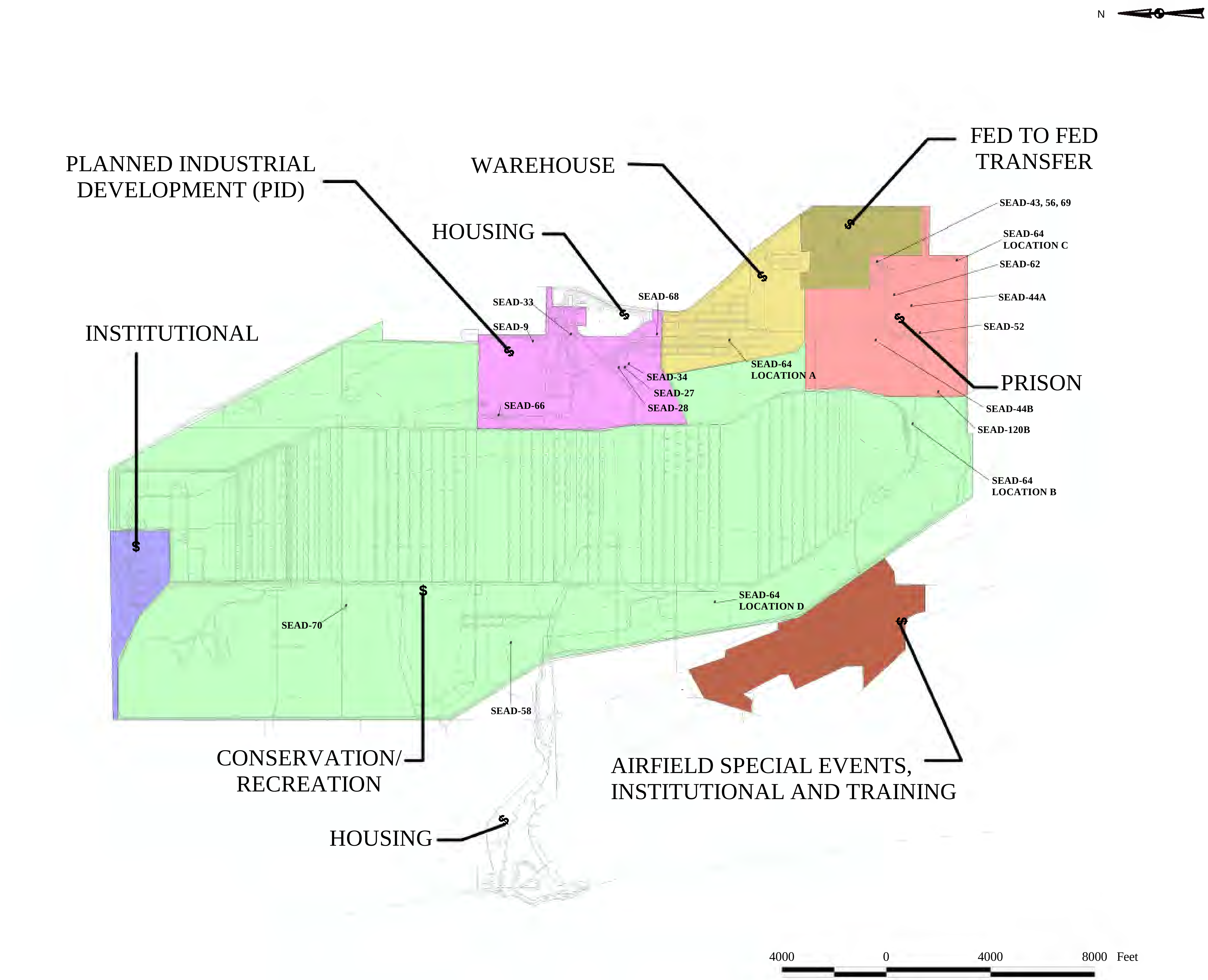
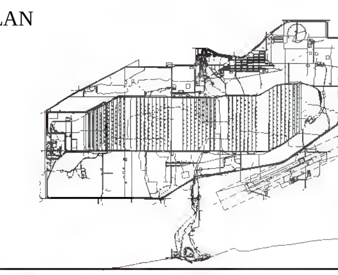


LEGEND

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

KEY PLAN



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINIRISK ASSESSMENT

FIGURE 1-2
LAND USE PLAN

JOB NUMBER: 736026-01000 | DATE: JANUARY 2001

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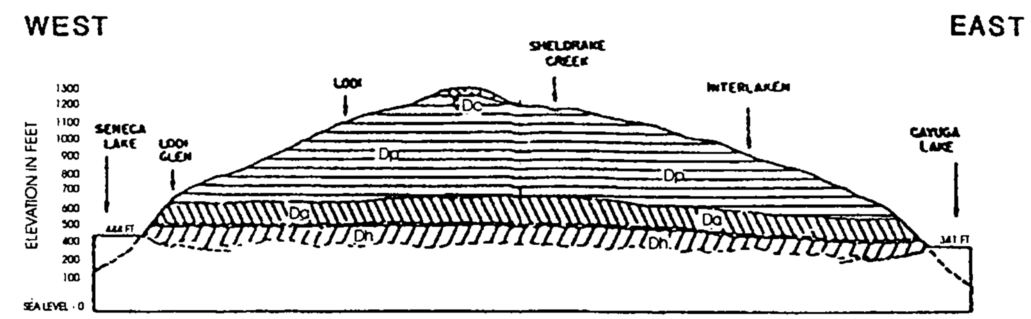
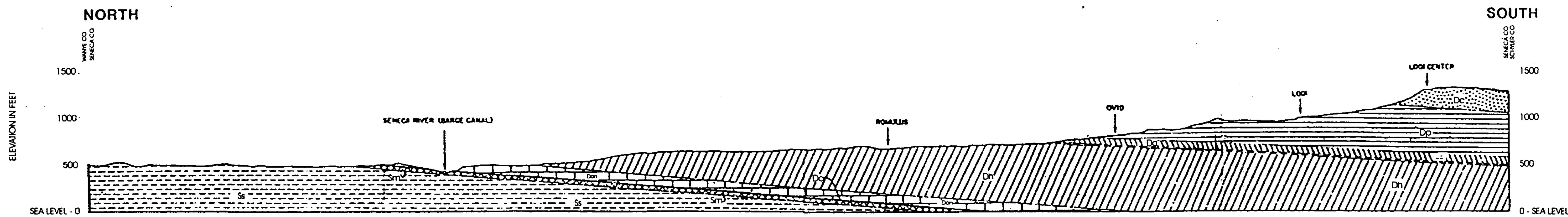


EAST-WEST SECTION ALONG A- A'



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

LEGEND

DEVONIAN

UPPER DEVONIAN
- Dc — WISCOY SHALE, NUNDA SANDSTONE, WEST HILL FORMATION, GRIMES SANDSTONE
- Dp — HATCH SHALE, CASHAQUA SHALE
- Da — GENESEE GROUP: WEST RIVER SHALE, GENESEO SHALE

MIDDLE DEVONIAN
- TULLY LIMESTONE
- Dh — HAMILTON GROUP: MOSCOW SHALE, LUDLOWVILLE SHALE, SKANEATELES SHALE, MARCELLUS SHALE

MIDDLE OR LOWER DEVONIAN
- Don — ONONDAGA LIMESTONE

LOWER DEVONIAN
- Do — ORISKANY SANDSTONE

SILURIAN

SILURIAN (UPPER)
- Sm — MANLIUS AND RONDOUT LIMESTONES AND COBLESKILL DOLOMITE
- Ss — SALINA FORMATION INCLUDING BERTIE LIMESTONE MEMBER AND CAMILLUSSHALE MEMBER

SCALE
1 0 1 2 3 MILES

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

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

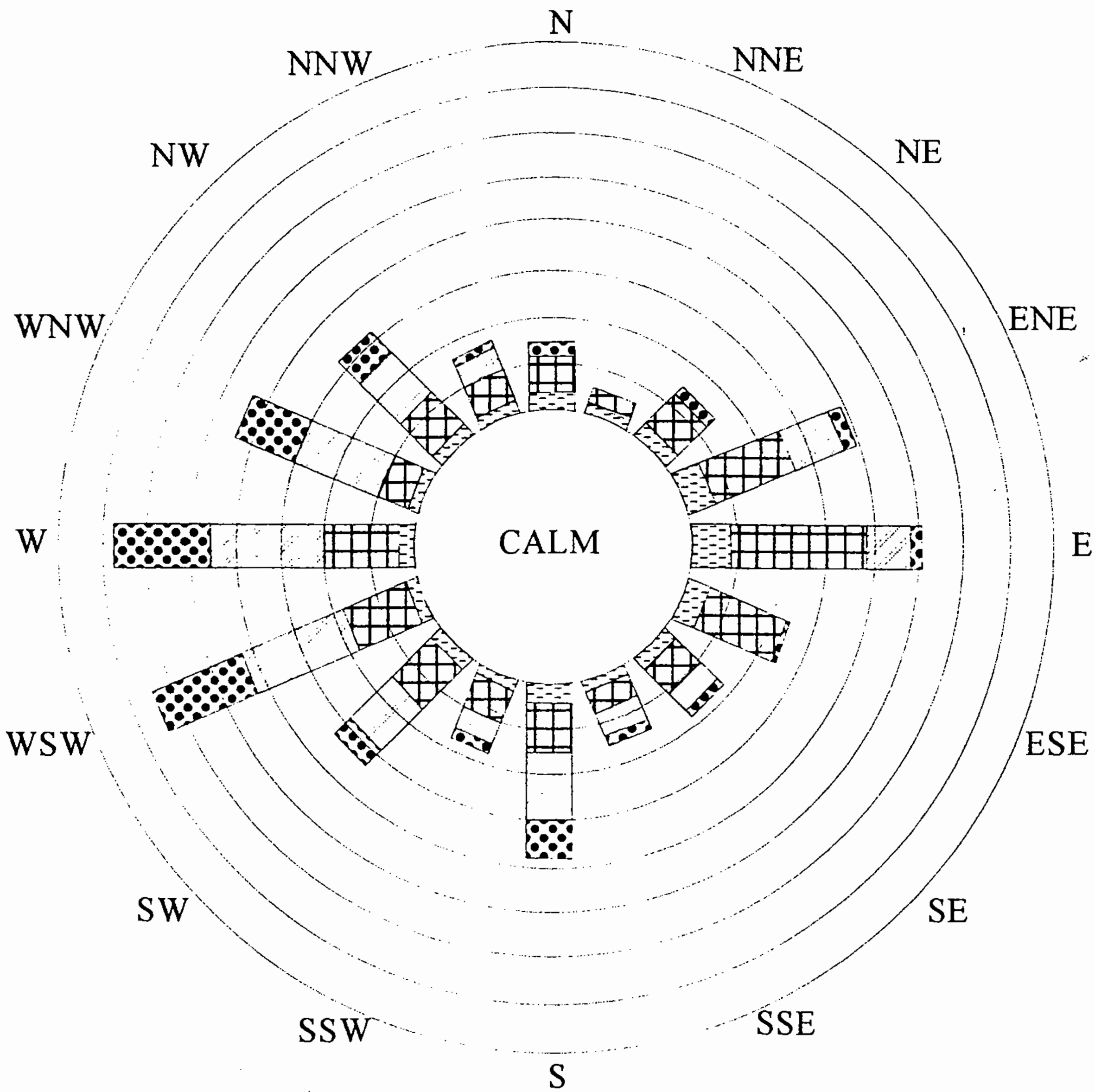
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESSMENT

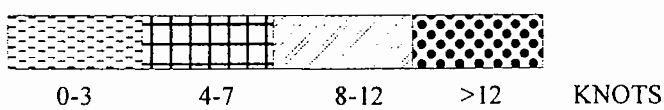
DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 736026-01002

FIGURE 1-3

REGIONAL GEOLOGIC CROSS SECTIONS

SCALE AS NOTED | DATE APRIL 2002





NOTE: EACH DIVISION IS 2% OF TOTAL TIME

INSTALLATION: SENECA ARMY DEPOT
LOCATION OF DATA: SYRACUSE, NEW YORK
SOURCE: MODIFIED FROM:
US ARMY ENVIRONMENTAL
HYGIENE AGENCY

PARSONS
PARSONS ENGINEERING-SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESSMENT

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 736026-01002

FIGURE 1-4

WIND ROSE,
SYRACUSE, NEW YORK

SCALE NA | DATE APRIL 2002

R:\PROJECT_GRAPHICS\SENECA\WINDROSE.CDR(CVM)

2.0 PREVIOUS INVESTIGATIONS AT MINI-RISK ASSESSMENT SITES

2.1 INTRODUCTION

The following sections contain a brief overview of the history of each site included in this Decision Document and the previous field investigations that have occurred there. Information for each area was acquired through the implementation of the field investigations associated with an ESI, an EBS, or the SWMU Classification process. These reports are listed below. The reports describing these investigations outline the following procedures:

1. Geophysical Investigations,
2. Surface and Subsurface Soil Sampling,
3. Monitoring Well Installation, Development and Sampling, and
4. Surface Water and Sediment Sampling.

Also included in the following sections are summaries of the analytical results from each site. Data from each media (soil, groundwater, surface water, and sediment) were compared to available New York State and Federal standards, guidelines, and criteria.

The criteria for soils were obtained from the NYSDEC TAGM #4046 titled "Determination of Soil Cleanup Objectives and Cleanup Levels" (HWR-92-4046) issued in November 1992 and revised in January 1994. This document provides criteria for soil clean-up levels. Although these criteria have not been promulgated, these criteria are useful guidelines for comparing on-site soil concentrations to determine if site conditions warrant further actions.

For the metals in soil, the TAGM criteria are the larger of either the state's average concentration for the metal in background soil or a SEDA-specific background concentration. The SEDA-specific background values for metals in soil are equivalent to the 95th percentile of a background dataset that has been compiled from approximately 55 soil samples collected over several years of investigation. The TAGM guidelines were used for the following metals: arsenic, barium, beryllium, cadmium, cobalt, copper, lead, mercury, selenium, and vanadium. The SEDA background soil concentrations were used for the following metals: aluminum, antimony, calcium, chromium, iron, magnesium, manganese, nickel, potassium, silver, sodium, thallium, and zinc.

TAGM criteria are also available for groups of compounds that do not have a specific guideline:

Maximum Concentration

Total Volatile Organic Compounds (VOCs)	10 ppm
Total Semivolatile Organic Compounds (SVOCs)	500 ppm
Individual SVOCs	50 ppm
Total Pesticides	10 ppm

The lowest (i.e., most stringent) of three separate groundwater criteria [i.e., federal Maximum Contaminant Levels (MCLs), federal Secondary Drinking Water Regulations (SEC), and State of New York GA Groundwater Standards (GA)] were applied as the basis of comparison to data in this Completion Report.

The surface water criteria, which were applied to this Completion Report, were the NYSDEC Ambient Water Quality Class C Standards and Guidelines.

Some NYSDEC criteria are based on the hardness of the surface water. The average water hardness for the SEDA site (217 mg/L) was calculated using data from two upstream surface water samples: 232 mg/L at SW-801 from the Ash Landfill remedial investigation and 201 mg/L at SW-196 from the OB Grounds remedial investigation. Hardness was used to calculate NYSDEC criteria for the following metals: cadmium, chromium, copper, lead, nickel, silver, and zinc.

Sediment criteria were guidance values from the NYSDEC Bureau of Environmental Protection, Division of Fish and Wildlife. The most stringent of the sediment criteria for wildlife, human health, or for aquatic life were used as the criteria. For metals, the criteria were the more stringent of the criteria for aquatic life or the Limit of Tolerance (LOT) values (listed in the same document as the criteria).

The data tables included in the appendices list only those constituents that were detected in the samples from that site. The complete data tables, which include all constituents that were analyzed can be found in the following documents: SWMU Classification Report (September, 1994); Draft Final ESI Report - Eight Moderately Low Priority Areas of Concern, (December, 1995); Draft ESI Report - Seven Low Priority Areas of Concern (April, 1995); Draft Project Scoping Plan for Performing a CERCLA RI/FS at SEADs-52 and-60 (January 1996); and the Draft Investigation of Environmental Baseline Survey of Non-Evaluated Sites (May, 1998).

2.2 SEAD-9 – OLD SCRAP WOOD SITE

2.2.1 Site Description

The Old Scrap Wood Site (SEAD-9) is located in the eastern-central portion of the Depot about 400 feet north of the intersection of East Kendaia Road and East Patrol Road (**Figure 2-1**). The dirt road leads to a cul-de-sac at the end of which debris is present. This debris consists of numerous piles of scrap wood and other miscellaneous items that exist in and around the cul-de-sac. There are no buildings or existing structures near this site.

Topographically, the area is basically flat and takes on a semi circular shape towards the western boundary where it drops off about 10 or 15 feet to a lower region. This steep slope does not appear to be native and is possibly indicative of a fill boundary.

2.2.2 Summary of Historic Operations

Construction debris was deposited at this site from 1977 to 1984, and scrap wood from 1984 to 1986. Periodically between 1985 and 1992 the fire department used this area for training when they burned scrap wood that could not be sold. The nature of this fire training is uncertain. No historical data exists on the procedures used or materials burned.

2.2.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-9 beginning in February 1994 as part of the Expanded Site Inspection for Eight Moderately Low Priority AOCs. Sample locations are shown in **Figure 2-2**.

Geophysics

Four 115-foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of the site. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the site. Electromagnetic (EM) and ground penetrating radar (GPR) surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was laid out and surveyed across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources.

An interpretation of the seismic survey indicated that the bedrock surface sloped to the west, following the slope of the surface topography. Groundwater flow was also expected to be directed to the west, following the slope of the bedrock surface.

The apparent ground conductivity measured by the EM-31 survey conducted at SEAD-9 well defined the extent of the debris pile. The western and northwestern perimeter of this area of EM anomalies coincided with the physical boundary of the debris pile that was characterized by a 10 to 15 foot step in the surface topography. With the exception of the two predominantly low apparent ground conductivity anomalies in the northeastern portion of the EM grid, the full extent of the debris pile, as detected by the EM-31 survey, would appear to be roughly crescent shaped with an average width of 150 feet. One area of elevated ground conductivity was noted in the southwestern portion of the grid and was correlated to a small marsh area. The north-south and east-west trending lineaments observed throughout the EM grid were correlated to barbed wire fences and underground utilities.

The extent of the in-phase anomalies associated with the debris pile was smaller in size than the extent of the apparent conductivity anomalies observed. The results of the in-phase response survey indicated that, with the exception of the two anomalies located in the northeastern portion of the grid, the majority of buried metallic objects were situated within 75 feet of the western boundary of the debris pile.

The GPR survey conducted at SEAD-9 revealed two debris pits in the northeastern portion of the EM grid. One debris pit was associated with each of the two EM anomalies detected in the northeastern portion of the EM grid. Several localized anomalies were detected throughout SEAD-9, and most were located within the presumed disposal area. All of these localized anomalies exhibited characteristic reflections of small, irregular shaped, metallic objects.

Soils

A total of three soil borings were performed at SEAD-9. The three soil borings were drilled over detected geophysical anomalies to determine the thickness of fill and to provide subsurface samples for chemical analysis. Three samples from each soil boring were submitted for chemical analysis. The borings found fill, till, weathered dark gray shale and competent gray-black shale to be the four major geologic units at SEAD-9.

Three test pits were excavated at distinct geophysical anomalies detected during the EM-31 and GPR surveys. The purpose of these test pits was to visually identify the contents of the old scrap woodpile area, and therefore no soil samples were collected. Test pits at TP9-1 and TP9-2 found fill material that appeared to have been exposed to intense heat (pieces of burnt wood and glass were fused into a black, light weight, rock matrix) and large portions of which covered with an iron oxide. This fill material extended to a depth of 3 feet. The fill material excavated at TP9-3 consisted primarily of wooden construction debris and metal fence posts with cement bases. The base of fill at this test pit location was 5.5 feet below grade. The excavated material was continuously screened for organic vapors and radioactivity with an organic vapor meter (OVM-580B) and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro-Rems per hour of radiation) were observed during the excavation.

Groundwater

Three groundwater monitoring wells were installed at SEAD-9. One monitoring well (MW9-1) was installed upgradient of SEAD-9 to obtain background water quality data, while the remaining two monitoring wells were installed adjacent to and downgradient from SEAD-9 to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. Groundwater flow was predicted to be to the west-northwest based on groundwater elevations and the results of the seismic survey.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from the two downgradient wells and submitted for chemical analysis. The upgradient well was dry.

2.2.4 Summary of Analytical Results

Nine soil samples and two groundwater samples were collected from SEAD-9 for chemical analysis. All of the samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Scope of Work (SOW), and total petroleum hydrocarbons by EPA Method 418.1. The results of these analyses can be found in **Appendix A, Tables A-1** and **A-2** for soil and groundwater, respectively.

Soil

Of the nine soil samples collected at SEAD-9, only one sample exceeded the TAGM for one compound. SB9-3-03, collected from a depth of 4-6 ft, contained beryllium at a level of 0.78 mg/Kg that exceeds the TAGM by 0.05 mg/Kg.

Groundwater

Samples collected from both groundwater wells in SEAD-9 contained concentrations of iron and sodium that exceeded NYSDEC's Class GA groundwater standards and concentrations of aluminum and manganese that exceeded the federal Secondary Drinking water levels. The aluminum and iron concentrations measured in both samples, and the sodium concentration measured in MW-2 were all significantly over comparative criteria levels used (at least 10 times).

2.3 SEAD-27 – BUILDING 360 – STEAM CLEANING WASTE TANK

2.3.1 Site Description

SEAD-27 is located in the eastern-central portion of the Depot (**Figure 2-1**). The steam cleaning waste tank (also known as the Steam Jenny Accumulation Pit) at Building 360 is an open top indoor concrete tank with a grate over the top. The dimensions are 35 feet long by 12 feet wide, and the deepest part is 4 feet. The capacity is 4,500 gallons when filled to near the top or 1,100 gallons to the 2-foot freeboard mark. This tank is no longer in use.

2.3.2 Summary of Historic Operations

Building 360 is a building where old equipment was refurbished and reconstructed. Lathes, presses, metal-working machines were degreased with steam, high-pressure water and detergents in the cleaning area. After steam cleaning the equipment was moved to other portions of Building 360 for rehabilitation.

The cleaning area was a 20'-6" wide by 38'-6" long portion of Building 360 separated from the rest of Building 360 by a high bay cinder block wall. Track mounted carts carrying the equipment to be refurbished were rolled into the cleaning area, through a roll-up-door, on a permanently installed rail system. Metal grating was placed adjacent to and in the middle of the rail system. The floor slopes to the metal grating.

Under the metal grating is a trench system which slopes from a depth of 2'-0" on the west end to a depth of 2'-10" toward the east end. Water and grease flowed through the trench system to an accumulation pit at the east end. The accumulation pit is constructed with openings through both rail foundation walls. The pit depth is 3'-4" under the metal grating. The width of the pit is 10'-6". The pit length is 3'-0". The accumulation pit was emptied into approved waste removal vehicles and disposed of as hazardous waste at an approved storage facility.

Use of the pit began in 1976. Since cleaning operations ceased on January 2, 1990, SEDA has periodically monitored the depth of water in the accumulation pit to determine if water levels in the pit are affected by varying groundwater levels. SEDA has also periodically rinsed the pit and disposed of the rinseate as hazardous waste but has never had the pit tested after rinsing for contamination. An analysis of sludge from the bottom of the pit and water in the pit was completed in 1987. A closure investigation was performed in July of 1995 and the determination was made that the accumulation pit in Building 360 satisfied the requirements for clean closure.

2.3.3 Summary of Field Investigations

Field activities were performed at SEAD-27 as part of the July 1995 Building 360 Closure Investigation. They are as follows:

- Accumulation pit liquid waste characterization
- Concrete coring and removal
- Closure sampling (concrete and soil)
- Drilling and surveying
- Groundwater monitoring and well installation
- Closure sampling (monitoring wells and T-sump)
- Pressure washing of metal grating and interior building surfaces
- Ongoing periodic post-closure groundwater sampling (monitoring wells and T-sump)

More details of these activities can be found in International Technology Corporation's *Final Report – Volume I, Building 360 Closure, Seneca Army Depot, Romulus, New York.*

Concrete Sampling

Samples of the concrete floor of Building 360 were taken at three locations (C-1, C-2, and C-3) and at three depth intervals. Soil samples were taken from beneath the concrete core at each location using an auger and thin wall tube sampler. These samples were submitted for laboratory analysis.

Following the soil sampling, the auger was advanced in each boring in order to collect a groundwater sample. The groundwater was manually bailed and allowed to settle for 24 hours prior to sampling. These groundwater samples were submitted for laboratory analysis.

Well Installations

Two monitoring wells were installed in the vicinity of Building 360 in order to assess the potential impact of the accumulation pit. MW-1 was placed at a location upgradient of Building 360 and MW-2 was placed downgradient. Soil sampling was performed continuously using a hollow stem auger equipped with a split spoon sampler. Soil samples from these borings were screened for VOCs using a photoionization detector (PID).

A previously existing sump pump, known as "trichlor sump" (T-sump) due to its location beneath a storage tank used to store 1,1,1-trichloroethane, was also used as a groundwater monitoring location. This location is approximately 25 ft south of the accumulation pit.

Well Development

Each monitoring well was developed by bailing until a minimum of three well volumes of water was removed. The pH, temperature, turbidity, and specific conductivity of the well water was measured and recorded after development to evaluate the initial performance of the well. Water levels were measured both before and after development.

Groundwater Sampling

The two monitoring wells were sampled once each month from February 1995 through May 1995 and submitted for laboratory analysis. Prior to sampling, each well was purged using a Teflon bailer until pH, specific conductivity, and temperature stabilized to within 10% between any two well volumes and until a minimum of three times the initial volume of water was evacuated.

T-sump samples were taken by lowering a clean disposable Teflon bailer into the sump so as not to agitate the liquid and suspend the sediments in the sump. The contents of the bailer were poured into sample jars. The T-sump was also sampled once each month from February 1995 through May 1995.

2.3.4 Summary of Analytical Results

The results of the chemical analyses can be found in **Appendix B, Tables B-1** and **B-2** for soil and groundwater, respectively. Although samples of liquid were collected from the T-sump during the period of February to May 1995, results obtained from the analysis of these samples are not presented in this report. The T-sump is a secondary containment device that was located under the historic cleaning operation. Available information indicates that it does not leak, and it is therefore isolated from the surrounding environment.

Soil

The four soil samples collected from SEAD-27 were analyzed for VOCs, PCBs, cadmium, chromium, and lead. Of these compounds, only chromium and lead were detected. None of these detections exceeded TAGMs.

Groundwater

The groundwater samples collected from SEAD-27 were analyzed for VOCs, SVOCs, PCBs, cadmium, chromium, and lead. There were three exceedances of NYSDEC's GA groundwater criteria for 1,1-dichloroethane, and one exceedance each for 1,1,2,2-tetrachloroethane and total xylene. All of the observed exceedances occurred in the final round of samples collected (May 1995). 1,1-Dichloroethane was detected in MW-2, the downgradient well, at approximately 7 times the GA standard level, and in the two other wells at levels roughly equivalent to, though higher than, the standard (i.e., 5 ug/L). The concentration of 1,1,2,2-tetrachloroethane measured was slightly greater than NYSDEC's GA standard concentration, while the concentration of total xylene detected was twice NYSDEC's GA criteria level. The sample collected from the upgradient well contained the noted exceedances for total xylene and 1,1,2,2-tetrachloroethane.

The T-sump groundwater samples were not considered to be representative of conditions resulting from the accumulation pit and were therefore, excluded from this analysis.

2.4 SEAD-28 – BUILDING 360 – UNDERGROUND WASTE OIL TANKS (2)

2.4.1 Site Description

SEAD-28 is located in the eastern-central portion of the Depot (**Figure 2-1**). Two underground waste oil storage tanks (Tank IDs: NYS 205 Building 355E and NYS 206 Building 355W) were located here. The fiberglass tanks had a capacity of 2,005 gallons each. The depth to the top of each tank was 4 ft with overburden conditions being crushed rock. Both tanks have been removed.

2.4.2 Summary of Historic Operations

The two underground waste oil storage tanks, both since removed, stored waste oil for later use as a fuel supplement in the boiler located at Building 718. Previously, it was also used as a fuel supplement in the boilers located in Buildings 319 and 121. The tanks, installed in August 1981, were tested in July 1988, using the "Tegrity Tester." The results of these tests indicated that one tank gained 0.029 gallons of volume during the 61 minute test, whereas the second gained a volume of 0.01 gallons during a 63 minute test. Both of these results are lower than the standard leakage rate criteria value of 0.05 gallons per hour, indicating that both tanks are "tight."

During the 1990 site inspection it was noticed that waste oil had been spilled around the tank, however there was no evidence that these areas constituted more than surficial contamination. Since the visual site inspection, SEDA personnel have reported that the surficial soils have been removed and disposed of appropriately.

In July of 1993 it was determined that used oil tank 355W and associated pump-out-pipe contained water. A decision was made to remove the tank. Upon removal, no oil contamination was found in the excavation that had filled with groundwater. A small crack did exist on the top of the tank but this may have been caused during excavation. It was concluded that the water inside the tank had been poured into it with the used oil and that the water inside the pump-out-pipe was trapped there by a thick oil sludge that was in the bottom of the pipe. As the mission of the depot has changed, it was decided to not replace this tank.

The remaining 2,005-gallon, used oil tank, identified as 355E, was in service until its removal in December of 1994. The tank was not leaking and no oil was found in the excavation.

2.4.3 Summary of Field Investigations

Following the removal of tank 355E in 1994, a confirmatory sample was taken from the excavation. The sample was a composite soil sample of the bottom, north, south, east, and west sides of the excavation. The sample was submitted to the laboratory for an EPA Method 8270 analysis. This composite sample detected no contamination, eliminating the need for groundwater sampling.

2.4.4 Summary of Analytical Results

The results of the chemical analyses performed for soil can be found in **Appendix C, Table C-1**.

Soil

No compounds were detected in the SEAD-28 soil sample.

2.5 SEAD-32 – BUILDING 718 – UNDERGROUND WASTE OIL TANKS (2)

2.5.1 Site Description

SEAD-32 is located in the northern portion of the Depot (**Figure 2-1**) and consists of the two underground waste oil storage tanks at Building 718. Tank A has a maximum storage capacity of 40,000 gallons. Tank B has a maximum storage capacity of 20,000 gallons. Both tanks are of steel construction.

2.5.2 Summary of Historic Operations

From 1956 to present, the primary use of Tanks A and B has been for the storage of fuel (primarily No. 6 fuel). Prior to 1981, SEDA disposed of waste oil through various practices (such as burning in open fires during fire training practices). With RCRA, this practice changed and SEDA tried, whenever possible, to reclaim waste oil for its energy value as a fuel supplement. In 1981, SEDA started to introduce small quantities of the waste oil (200 to 400 gallon batches) into the fuel tanks when a bulk (7,000 gallon) delivery of No. 6 virgin fuel was scheduled. The fuel was pumped off after the waste oil was put in the fuel tank to achieve mixing. In 1989, this practice was discontinued when a new 10,000-gallon, dual-walled fiberglass waste oil tank with an interstitial space monitoring system was constructed at Boiler Building 718 (SEAD-61). The waste oil from the new Building 718 tank can now be burned directly by a single boiler in Building 718 that was previously modified for that purpose.

2.5.3 Summary of Field Investigations

A limited sampling program was performed in 1994 to obtain evidence of a release. The program consisted of a GPR survey, the installation of two monitoring wells, and the collection of soil and groundwater samples from those two locations (**Figure 2-3**).

In order to avoid puncturing any existing tanks or lines, GPR was performed to determine the boundaries of the underground storage tanks. One boring was advanced at the estimated downgradient location midway between the two tanks and one boring was advanced at the estimated upgradient location midway between the two tanks. The downgradient location was determined in the field, based upon site topography. All borings were advanced to auger refusal. The borings were continuously sampled using hollow stem augers and split spoon soil samplers. Each split spoon sample was screened in the field with an OVM, equipped with a PID. Every split spoon sample was evaluated for the presence of Volatile Organic Compounds, oil and the depth to water. A soil sample from the split spoon sample at the same boring location that produced the highest OVM field screening result was retained for analysis. An additional soil sample from another split-spoon that contained the most visually stained soil was also retained for chemical analysis. If no elevated OVM or oil was present in any of the collected split spoon samples, the sample collected at the water table, was submitted for chemical analysis. If both the highest OVM reading and the most visually, oil stained sample was identified in different split spoon samples, the sample with the highest OVM reading was submitted for VOCs and the most visually stained soil was submitted for Total Recoverable Petroleum Hydrocarbon (TRPH) analysis. In this instance, it may be possible that no soil sample was collected from the split spoon at the water table. Each boring was completed as a monitoring well. Following well development, one groundwater sample was obtained from each well and submitted for chemical analysis. Both soil and water samples were analyzed for VOCs and TRPH (Method 418.1).

2.5.4 Summary of Analytical Results

The results of the chemical analyses can be found in **Appendix D, Tables D-1** and **D-2** for soil and groundwater, respectively.

Soil

Methylene chloride and low levels of TRPH (up to 90 mg/Kg) were detected in the two SEAD-32 soil samples. Neither compound was detected at levels exceeding TAGMs.

Groundwater

TPH was detected at low levels (up to 0.69 mg/L) in two of the three SEAD-32 groundwater samples. There is no groundwater criterion for TPH.

2.6 SEAD-33 – BUILDING 121 – UNDERGROUND WASTE OIL TANK

2.6.1 Site Description

SEAD-33 is located in the eastern central portion of the Depot (**Figure 2-1**). It is comprised of the 30,000-gallon, steel underground waste oil tank at Building 121.

2.6.2 Summary of Historic Operations

From 1943 to present, the primary use of the tank has been for the storage of fuel (primarily No. 6 fuel). Prior to 1981, Seneca disposed of waste oil through various practices (such as burning in open fires at fire training practices). With RCRA, this practice changed and Seneca tried, whenever possible, to reclaim waste oil for its energy value as a fuel supplement. In 1982, Seneca started to introduce small quantities of the waste oil (200 to 400 gallon batches) into the fuel tanks when a bulk (7,000 gallon) delivery of No. 6 virgin fuel was scheduled. The fuel was pumped into the tank after the waste oil was put in the fuel tank to achieve mixing. In 1989, this practice was discontinued when a new purpose built waste oil tank was constructed at Boiler Building 718. The waste oil from the Building 718 tank can now be burned directly by a single boiler in Boiler Plant 718 that was previously modified for that purpose. Thus, waste oil is no longer stored in this tank.

2.6.3 Summary of Field Investigations

A limited sampling program was performed in 1994 to obtain evidence of a release. The procedures to evaluate this SWMU were identical to those as described previously for SEAD-32. GPR was performed to determine the boundaries of the underground storage tank. One boring was advanced downgradient of the tank location and one was advanced at the upgradient location. The borings were continuously sampled and screened in the field with an OVM. One soil sample from each boring, the one with the highest field screening result, the most visually stained sample, or, if no oil or OVM readings are observed, the sample at the water table, was submitted for chemical analysis.

A monitoring well was installed in each boring (**Figure 2-4**). At the time of this sampling, no groundwater was present in the wells and thus no samples were obtained from the wells.

2.6.4 Summary of Analytical Results

Soil samples were analyzed for TCL VOCs and TPH (Method 418.1). The results of the chemical analyses performed for soil can be found in **Appendix E, Table E-1**.

Soil

Analytical results from two soil borings found only TPH that was detected at 470 mg/Kg in one of the borings at a depth of 4 to 6 feet below grade and 78 mg/Kg in the other boring at a depth of 2-4 ft below grade. There is no TAGM for TPH.

2.7 SEAD-34 – BUILDING 319 – UNDERGROUND WASTE OIL TANKS (2)

2.7.1 Site Description

SEAD-34 is located in the eastern central portion of the Depot (**Figure 2-1**). It is comprised of the two underground waste oil tanks at Building 319. Tank A has a maximum storage capacity of 30,000 gallons. Tank B has a maximum storage capacity of 20,000 gallons. Both tanks are constructed of steel.

2.7.2 Summary of Historic Operations

Tanks A and B have been in use from 1951 to present. Since 1956, the primary use of the tanks has been for the storage of fuel (primarily No. 6 fuel). Prior to 1981, Seneca disposed of waste oil through various practices (such as burning in open fires at fire training practices). With RCRA, this practice changed and Seneca tried, whenever possible, to reclaim waste oil for its energy value as a fuel supplement. In 1982, Seneca started to introduce small quantities of the waste oil (200 to 400 gallon batches) into the fuel tank when a bulk (7,000 gallon) delivery of No. 6 virgin fuel was scheduled. The fuel was pumped off after the waste oil was put in the fuel tank to achieve mixing. In 1989, this practice was discontinued when a new purpose built waste oil tank was constructed at Boiler Building 718 (SEAD-61). The waste oil from the Building 718 tank can be burned directly by a single boiler in Boiler Plant 718 that was previously modified for that purpose. Thus, waste oil is no longer stored in this tank.

A visual site inspection has shown that waste oil had been spilled around the tanks' fill pipes. However, there was no visual evidence that these areas constituted more than surficial contamination. Since the visual site inspection, SEAD personnel have reported that the surficial soils have been removed and disposed of appropriately.

2.7.3 Summary of Field Investigations

A limited sampling program was performed in 1994 to obtain evidence of a release. As described for both SEAD-32 and SEAD-33, GPR was performed to determine the boundaries of the underground storage tanks. One boring was advanced downgradient of each of the two tank locations and a second was advanced upgradient of the tank locations. The borings were continuously sampled and screened in the field with an OVM. One soil sample from each boring, the one with the highest field screening result, the most visually stained sample or, if no oil or OVM readings were observed, the sample from the water table, was submitted for chemical analysis. A monitoring well was installed in each boring (**Figure** 2-5). One groundwater sample was obtained from each well and submitted for chemical analysis.

2.7.4 Summary of Analytical Results

Both soil and water samples were analyzed for TCL VOCs and TRPH (Method 418.1). Results of the chemical analyses can be found in **Appendix F, Tables F-1** and **F-2** for soil and groundwater, respectively.

Soil

Analytical results from the two SEAD-34 soil borings found only low levels of TPH (up to 93 mg/Kg). There is no TAGM for TPH.

Groundwater

No compounds were detected in either of the two SEAD-34 groundwater samples.

2.8 SEAD 43 – OLD MISSILE PROPELLANT TEST LAB, SEAD 56 – HERBICIDE/PESTICIDE STORAGE, SEAD 69 – BUILDING 606 DISPOSAL AREA

2.8.1 Site Description

SEADs-43, 56 and 69 are located in the southeast corner of the depot (**Figure 2-1**). These areas will be discussed together due to their association with Building 606. Building 606, was once used as a missile propellant test laboratory (SEAD-43). More recently, Building 606 was used as a pesticide and herbicide storage and mixing facility. An old building foundation, west of Building 606, was used for herbicide and pesticide storage (SEAD-56). A disposal area associated with these operations is also located nearby (SEAD-69). The entire area encompassing the three SWMUs is roughly 900 feet long (east-west) and 600 feet wide (north-south). Southwest of Building 606 is a septic system. The system includes two (2) above-ground concrete vaults that are located at either end of a 25 foot long mound. Atop the mound are several black vent pipes. Two working sump pumps are located at the most eastern end of the mound. There are two drainage swales located in the area: one to the west of the rinseate facility and another on the eastern side of Building 606. Approximately 300 feet southeast of Building 606, a road leads east to the open field that was used as a disposal area for Building 606.

The waste disposal area (SEAD-69) contains various construction debris including bricks and concrete blocks that are visible on the surface. The AOC measures approximately 100 feet by 100 feet. The area of SEAD-69 beyond the access roadway is relatively flat and covered by vegetation (grass). An elevation difference of roughly 3 feet exists between the surface of the road (higher elevation) and the grass cover land. There are no signs of stained soil or stressed vegetation present in the grass area.

2.8.2 Summary of Historic Operations

Building 606 was reportedly used as a missile propellant test laboratory in the 1960s. The Old Missile Test Facility conducted QA surveillance testing. This commonly involved operational or functional testing of explosive devices. The SWMU Classification Report indicates that liquid Inhibited Red Fuming Nitric Acid (IRFNA) that was disposed of at the IRFNA disposal site (SEAD-13) was stored in the Building 606 area. During this time IRFNA and/or liquid propellants may have been released in this area. Since 1976, Building 606 has been used for herbicide/pesticide storage. The building was renovated in 1979 to include the following health and safety features: ventilation fan with lowering door vents, local exhaust for the mixing area, shower, emergency spill kits, a fire protection system connected directly with the on-post fire department, and adequate shop signs and disposal procedures.

The building's drains and concrete floors have been sealed.

Northwest of Building 606 is a concrete foundation that was associated with the old missile test facility. This was an acid storage building. The actual corrugated metal building has been moved to the Administrative area, and is now Building 132. This concrete pad has been used in the past, and currently, to aerate spill residues.

A concrete underground tank was used for intermittent storage of wastewater from the rinsing of the portable truck mounted tank used for mobile spraying operations. The mobile tank requires rinsing between dissimilar pesticide and herbicide applications. Rinseate is always used as the diluent in the next batch of the pesticide or herbicide. In 1989, the tank was removed and was replaced with a new tank located within a vault to comply with underground tank regulation. East of Building 606 a pesticide rinseate building has been constructed. The rinseate from this process is now discharged into the new tank.

In June of 1992, Depot employees repaired the Building 606 water faucet. During the repair excavation, a floating product and a diesel fuel odor was observed. Seneca environmental personnel interviewed a Depot employee, and this interview yielded information pertaining to a fuel line break in a small tractor that was stored at this site several years ago, and which may have resulted in the release of virgin diesel fuel.

2.8.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEADs-43, 56, and 69 beginning in February 1994 as part of the ESI for Eight Moderately Low Priority AOCs. Sample locations are shown in **Figure 2-6**.

Geophysics

Four 115-foot long seismic refraction profiles were surveyed on 4 lines positioned along the outside boundary of SEAD-43, 56 and 69. Data from the survey were used to determine the direction of groundwater flow and to adjust monitoring well locations to assure that one monitoring well was installed upgradient and three monitoring wells were installed downgradient of the SEADs. Additionally, data was used to delineate disposal pit extents (SEAD-69) and identify metallic objects.

EM-31 and GPR surveys were also performed to delineate the limits of the suspected disposal pits

(SEAD-69) and to identify metallic anomalies of metallic origin at both SEAD-43 and 69. The electromagnetic data was collected from a grid laid out across SEADs 43 and 69. The profiles were spaced at 20-foot intervals and EM-31 measurements were taken at 10-foot intervals along each profile. GPR data was collected along profiles spaced at 50-foot intervals. Supplemental GPR data were also collected over distinct EM-31 anomalies to provide a more defined characterization of the suspected metallic sources.

The EM-31 survey found that an area of elevated apparent ground conductivity is clearly evident in the southeastern portion of the EM grid. This area is situated immediately south and west of the mound presumably associated with the septic system being investigated as SEAD-43. A second area of elevated ground conductivity was detected in the area of the drainage swale surrounding the pesticide/herbicide rinse pad. These areas of elevated apparent ground conductivity may be due to an increase in the clay content of the soils or to and increase in the content of dissolved solids in the groundwater or soil moisture. Since the most conductive soils coincided with drainage swales along the access roads around SEAD 43, road salt should be considered a possible explanation for these increases in apparent ground conductivity.

The apparent ground conductivity measured in the remaining areas of SEADs 43 and 69 showed a relatively featureless response with only four localized anomalies being detected. The eastern most of these anomalies (situated in the west-central portion of SEAD-69) was associated with metallic construction debris on the ground surface. This area was later identified by SEDA personnel as being the location of a small waste disposal trench that had been excavated and filled during the 1970s. The three remaining localized anomalies, as well as several low intensity anomalies detected in the southeastern corner of SEAD 69, were related to cultural effects.

The results of the in-phase response survey showed a generally featureless response. Several isolated anomalies were detected in the southern one half of the EM grid and were correlated to the cultural effects also observed in the apparent ground conductivity results.

The GPR survey found no evidence of disturbed soil at either SEAD-43 or SEAD-69. With the exception of the GPR data acquired over the disposal trench discussed above, no anomalies showing discontinuities in subsurface layers or characteristic reflections from buried wastes or objects were detected.

Soils

A total of 10 soil borings were performed at SEADs-43, 56, and 69; three borings at SEAD-56 and 69, and 4 borings at SEAD-43. A total of 30 samples from the ten soil borings were submitted for chemical analyses. The soil borings identified fill, till, weathered dark gray shale, and competent gray-black shale as the four major geologic units at the site.

Three test pits were excavated at SEAD-69 over distinct geophysical anomalies and over areas with debris on the ground surface. The purpose of the test pits, specific to SEAD-69, was to visually identify the contents of the disposal area for Building 606, and therefore, no samples were taken.

The test pits revealed buried cement blocks, chain link fence, construction debris, and piping. The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Four groundwater monitoring wells were installed at SEAD-43, 56, and 69, inclusively. One monitoring well (MW43-1) was installed upgradient, along the eastern boundary of SEAD-43, 56, and 69, to obtain background water quality data. The remaining three monitoring wells were installed downgradient of the individual SEADs, in a linear fashion along the southwestern side of each potentially contaminated area, to determine if hazardous constituents have migrated from the respective areas and to further determine the direction of groundwater flow. The presumed direction of groundwater flow at SEAD-43, 56 and 69 was to the west-southwest based upon the seismic survey interpretation.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analyses.

Sediment/Surface Water

Five surface water and sediment samples were collected from SEAD-43, 56 and 69. The five samples were collected along the various drainage swales running amongst SEAD-43, 56 and 69. Of these samples, one was collected from the drainage swale located upgradient of the site, two were taken downgradient of SEADs-43 and 56 following both possible drainage directions (northwest and southwest). The final sample was collected downgradient of the suspected disposal area for Building 606 (SEAD-69). All surface water and sediment samples were submitted for chemical analyses.

2.8.4 Summary of Analytical Results

A total of 30 soil samples, three groundwater samples, and five surface water and sediment samples were collected from SEAD-43, 56, and 69 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOCs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, explosives by Method 8330, herbicides by Method 8150, and nitrates by Method 353.2. Results of the chemical analyses can be found in **Appendix G, Tables G-1** through **G-4** for soil, groundwater, surface water, and sediment, respectively.

Soil

A total of 21 semivolatile organic compounds were found at varying concentrations in the 30 soil samples collected at SEAD-43, 56 and 69. Only 6 polyaromatic hydrocarbon (PAH) compounds, benzo(a)anthracene, chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene were found at concentrations that exceed their respective TAGM values. All of the TAGM exceedances for these compounds were in soil samples SB43-3-00, SB43-4.01 and SB43-4.02. The highest concentrations of the PAHs found above TAGM values, as well as the highest concentrations for 12 of the 15 remaining SVOCs detected at SEADs 43, 56, and 69, were found in soil sample SB43-4.02.

Twenty-two metals were found at varying concentrations in the 30 soil samples collected at SEADs 43, 56 and 69. Eleven of the 22 metals detected were found in one or more samples at concentrations that exceeded their respective TAGM values. The occurrences of TAGM exceedances were distributed throughout the 30 soil samples analyzed from SEADs 43, 56 and 69. Aluminum, chromium, iron, magnesium, potassium and zinc were the most frequently detected metals, and each had reported concentrations above their associated TAGM values. Zinc was found at concentrations that exceeded the TAGM value of 115 mg/Kg in 10 of the 30 soil samples. A trace amount of cyanide (1.7 mg/Kg) was found in soil sample SB56-3-04. This was the only detected concentration of cyanide in the 30 samples collected.

Groundwater

The analysis for herbicides by Method 8150 revealed 2,4,5-TP (silvex) at a concentration of 0.44 ug/L in the groundwater sample from monitoring well MW43-3. This concentration was slightly above the New York Class GA groundwater standard of 0.26 ug/L.

A total of 20 inorganic elements were detected in the groundwater at SEADs-43, 56 and 69. The reported concentrations of aluminum, iron, and manganese found in all 4 of the groundwater samples exceeded their respective comparative criteria (aluminum and manganese – Secondary Drinking Water Regulations, and iron – NYSDEC's GA standard). Additionally, the thallium concentration measured in well MW43-1 exceeded its federal MCL.

Surface Water

Two semivolatile organic compounds were found in the surface water collected at SEADs-43, 56 and 69. Surface water sample SW43-2 had 1 ug/L of 4-Methylphenol and surface water sample SW43-1 had 150 ug/L of bis(2-ethylhexyl)phthalate. The concentration of 4-Methylphenol detected in surface water sample SW43-1 exceeded the New York Class C criteria for bis(2-ethylhexyl)phthalate (0.6 ug/L). Currently, no criteria exist for detected concentrations of 4-Methyphenol in New York Class C surface water.

A total of 17 metals were found in the surface water samples collected at SEADs-43, 56 and 69 concentrations. Aluminum, iron, potassium, and zinc were elevated in one or more of the five surface water samples collected. The highest concentrations of aluminum (1,190 ug/L) and iron (1,750 ug/L) were detected in sample SW43-1. The highest concentrations of potassium (277 ug/L) and zinc (1,040 ug/L) were found in surface water sample SW43-4. All other detected metals were below criteria values.

Sediment

A total of 22 metals were detected in the sediment samples collected as part of the SEAD-43, 56, and 69 investigations. Arsenic, cadmium, chromium, copper, iron, manganese, nickel, and zinc were found at concentrations that exceeded their respective criteria values. Except for zinc, the highest concentrations for the eight metals found above criteria values occurred in sample SD43-1. The highest reported concentration of zinc (178 mg/Kg) was in sediment sample SD43-5.

2.9 SEAD-44A – QUALITY ASSURANCE TEST LABORATORY

2.9.1 Site Description

SEAD-44A is located in the southeastern portion of the Depot approximately 1,000 feet East of Brady Road and 1,500 feet North of South Patrol Road (**Figure 2-1**). The site is on an unnamed dirt road that runs parallel to South Patrol Road. Along both sides of the dirt road at SEAD-44A there are berms. These bermed areas potentially contain unexploded ordnance since they were used for QA testing. There were no visible signs of any building foundations. Along the north side of the dirt road there were three metal poles that may have been used for holding screens in place while detonating munitions. There was also a small ditch on the north side of the dirt road. There were no apparent wetlands or stressed vegetation in the area. At the end of the dirt road, on the south side, is an empty drum labeled "steam waste".

2.9.2 Summary of Historic Operations

The quality assurance test lab (SEAD-44A) was used for the testing of various pyrotechnics, firing devices, and specifically, CS grenades. The detonation of land mines occurred in aboveground bermed areas. Building 416 (no longer standing) was situated in the eastern portion of SEAD-44A.

2.9.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-44A beginning in February 1994 as part of the Expanded Site Inspection for Eight Moderately Low Priority AOCs. Sample locations are shown on **Figure 2-7**.

Soils

Nine berm excavations were performed at three berms; three samples were taken from each berm. The soil samples were collected using a backhoe from a mid-depth locality within each of the three berms investigated.

Two surface soil samples were collected at various points around each of the three berms from a depth of 0-2 inches. All surface soil samples were submitted for the chemical analyses.

Groundwater

Three groundwater monitoring wells were installed at SEAD-44A. One monitoring well (MW44A-1) was installed upgradient of the site to obtain background water quality data, while the remaining two monitoring wells were installed downgradient of specific berms to determine if hazardous constituents have migrated from a specific berm and to determine the direction of groundwater flow. The presumed direction of groundwater flow was to the southwest.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analysis.

Surface Water and Sediment

Four surface water and sediment samples were collected from SEAD-44A. The primary area sampled was a drainage ditch that drains east to west along the southern boundary of SEAD-44A. This drainage ditch is south of the bermed areas and is in line with the direction of groundwater flow. Three surface water and sediment samples were collected along this drainage ditch. The final sample was taken from a small ditch containing some pooled water on the north side of the dirt access road to SEAD-44A. All surface water and sediment samples were submitted for chemical analyses.

2.9.4 Summary of Analytical Results

Fifteen soil samples, three groundwater samples, and four surface water and sediment samples were collected from SEAD-44A for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW; explosives were analyzed by Method 8330; and nitrates were analyzed by Method 353.2. Results of the chemical analyses can be found in **Appendix H, Tables H-1** through **H-4** for soil, groundwater, surface water, and sediment, respectively.

Soil

Twenty-three semivolatile organic compounds were found at varying concentrations in the soil samples collected at SEAD-44A. Twelve were detected in the six surface soil samples collected, but none were found at levels exceeding TAGM levels. All measured SVOC concentrations were reported as estimated values (i.e., "J" qualifier). Subsurface berm excavations revealed TAGM exceedances for benzo(a)anthracene, chrysene, benzo(a)pyrene , and dibenz(a,h)anthracene. Berm excavation sample TP44A-7 had a benzo(a)pyrene concentration of 1,100 ug/Kg that was roughly 18 times the TAGM value of 61 ug/Kg. Benzo(a)pyrene was found to be present in all 9 berm excavations performed at SEAD-44A. Benzo(a)anthracene, chrysene, and dibenz(a,h) anthracene were found at concentrations that were 2 to 11 times greater than their associated TAGM values.

Nine pesticide compounds were detected in the soil samples collected at SEAD-44A. The frequency of detection of the pesticides ranged from 6% for heptachlor epoxide, endrin, and endrin ketone to 41% for dieldrin. All of the pesticides detected, except dieldrin, endrin ketone and endrin aldehyde, were found at concentration which were at least an order of magnitude below their respective TAGM value. Two samples with maximum concentrations of 59 and 70 ug/Kg exceeded the TAGM for dieldrin (44 ug/Kg). Endrin ketone and endrin aldehyde were found at maximum concentrations of 5.2 and 4.5 ug/Kg, respectively. No TAGM values exist for these two compounds.

Twenty-one metals were detected in the soil samples collected at SEAD-44A. Of the 21 metals reported, four were found in one or more of the samples at concentrations that were above TAGM limits. The reported concentrations of those metals that were found above TAGM limits were typically less than two times their associated TAGM values. The only exception was magnesium that was detected at a maximum concentration of approximately twice the associated TAGM value.

2,4,6-Trinitrotoluene was detected in only one sample, SS44A-5, at a concentration of 110 ug/Kg. There is no TAGM value for 2,4,6-TNT.

Groundwater

Aluminum exceeded its Secondary Drinking Water Regulation level (50 ug/L) in all three of the groundwater samples collected in SEAD-44A. Iron (NYSDEC's GA standard) and manganese (Secondary Drinking Water Regulation) each exceeded their respective groundwater comparative criteria in wells MW44A-2 and MW44A. The highest concentrations of each of these metals, and many of the others, were found in the sample collected from monitoring well MW44A-2, where an elevated level of turbidity was also noted during sampling. It is likely that many of the elevated metals result due to the high turbidity (693 NTUs) measured in sample MW44A-2.

Surface Water

Seventeen metals were detected in the surface water samples collected at SEAD-44A. Of the 17 metals detected, aluminum, iron, nickel and zinc were found at concentrations that exceeded New York Class C surface water guidelines. Iron concentrations exceeded the NYSDEC guideline of 300 ug/L in all four samples. The highest concentration was 632 ug/L in sample SW44A-1. The zinc concentration in sample SW44A-1 also exceeded the guideline of 159.6 ug/L, where it was found at a concentration of 1,050 ug/L. The concentrations of zinc in the three remaining surface water samples were below the guideline value.

Sediment

Two SVOCs were identified in two of the four sediment samples collected at SEAD-44A. The SVOCs detected were both phthalates and were found at low concentrations. The maximum concentration detected was 72 ug/Kg of di-n-butylphthalate that was found in sediment sample SD44A-1. Phthalates are common laboratory contaminants.

A number of metals were detected in the sediment at SEAD-44A. Of these, antimony, calcium, magnesium, potassium, and sodium were detected at concentrations that exceeded the NYSDEC Sediment Criteria. The highest concentration of antimony was 0.4 J mg/Kg that was found in the sample SD44A-1. This value was only slightly above the sediment criteria of 0.37 mg/Kg. The calcium criterion of 68,900 mg/Kg was exceeded in sample SD44A-2 that had a calcium concentration of 79,400 mg/Kg. The maximum concentration of magnesium was detected in sample SD44A-2 (12,900 mg/Kg) that was slightly greater than the sediment criteria value of 10,500 mg/Kg. The potassium criterion of 2,440 mg/Kg was exceeded in samples SD44A-2 (concentration of 2,760 mg/Kg), while the sodium criteria of 50 mg/Kg was exceeded in two samples, SD44A-2 (69.7 J mg/Kg) and SD44A-4 (52.7 J mg/Kg).

2.10 SEAD-44B – QUALITY ASSURANCE TEST LABORATORY

2.10.1 Site Description

SEAD-44B, located in the southeastern portion of the Depot (**Figure 2-1**), runs along the east side of Brady Road and occupies an area that is approximately 350 feet by 200 feet. Contained within these boundaries are two structural remains of buildings and an abandoned concrete foundation that measures approximately 20 feet by 50 feet. Directly behind this foundation, slightly to the east, is a metal pole believed to have been used to display a red flag that was used to signal when testing was being performed. There is also a dilapidated corrugated metal shack behind the concrete foundation.

Topographically, there is a drainage ditch on the eastern border of the SEAD boundary that runs parallel to Brady Road. The vegetation around SEAD-44B is abundant with no apparent stressed vegetation. The terrain of SEAD-44B is variable with flat areas and some 1 to 2 feet high mounds of dirt which appear to have no significance.

2.10.2 Summary of Historic Operations

The Quality Assurance Testing Lab (SEAD-44B), like SEAD-44A, was used to test pyrotechnics, CS grenades, and other fire devices and to store the QA testing materials and devices. Additionally, the QA laboratory at this locale tested timed fuses but it has not been determined if the fuses were actually detonated at the site.

2.10.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-44B beginning in February 1994 as part of the Expanded Site Inspection for Eight Moderately Low Priority AOCs. Sample locations are shown in **Figure 2-8.**

Geophysics

Four 115-foot long seismic refraction profiles were surveyed on 4 lines positioned along each boundary of SEAD-44B. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-44B.

The survey suggested that the bedrock surface sloped to the west, following the surface topography. Groundwater flow was also expected to be to the west, following the slope of the bedrock.

Soils

Three surface soil samples were collected from a depth of 0-2". One sample was collected to the west (downgradient) of the concrete pad and flagpole. A second sample was collected in the southwestern portion of SEAD-44B, immediately downgradient of several small piles observed on the ground surface. The last sample was collected to the west (downgradient) of the dilapidated metal shed.

The samples identified till, weathered dark gray shale, and competent gray-black shale as the major geologic units at SEAD-44B.

Groundwater

Three groundwater monitoring wells were installed at SEAD-44B. One monitoring well (MW44B-1) was installed upgradient of SEAD-44B, east of Brady Road, to obtain background water quality data. The two remaining monitoring wells were installed downgradient of the concrete slab and the dilapidated metal shed along the western boundary of SEAD-44B to determine if hazardous constituents have migrated from SEAD-44B and to determine the direction of groundwater flow.

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analyses.

Surface Water and Sediment

Two surface water and sediment samples were collected from SEAD-44B. Each of the two samples was located within a drainage ditch that runs parallel to Brady Road along the eastern boundary of SEAD-44B.

2.10.4 Summary of Analytical Program

Three soil samples, three groundwater samples, and two surface water and sediment samples were collected from SEAD-44B for chemical analysis. All of the samples were analyzed for TCL, VOCs, SVOCs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW, explosives by Method 8330, and nitrates by Method 353.2. Results of the chemical analyses can be found in **Appendix I, Tables I-1** through **I-4** for soil, groundwater, surface water, and sediment, respectively.

Soil

Thirteen semivolatile organic compounds were found at varying concentrations in two of the three surface soil samples collected at SEAD-44B. In general, the concentrations of SVOCs were low, with only two compounds exceeding their respective TAGM values in surface soil sample SS44B-3. Benzo(a)pyrene and dibenz(a,h)anthracene were detected at concentrations of 98 ug/Kg and 28 ug/Kg, respectively. The TAGM value for benzo(a)pyrene is 61 ug/Kg while the TAGM value for dibenz(a,h)anthracene is 14 ug/Kg.

Five pesticides were found in two of the three surface soil samples collected at SEAD-44B. The compound dieldrin was detected at a concentration of 57 ug/Kg that was slightly above the TAGM value of 44 ug/Kg. No PCB compounds were detected in the soil samples collected at SEAD-44B.

Twenty metals were detected in the surface soils collected at SEAD-44B. Of the 20 metals detected, three were found at concentrations that were above their associated TAGM values. Arsenic was detected in soil sample SS44B-3 at 13.1 mg/Kg which was above the TAGM value of 8.9 mg/Kg. Lead was detected in a single sample (SS44B-1) at a concentration of 39.5 mg/Kg, again only slightly above the TAGM value of 24.4 mg/Kg. Finally, zinc was detected in sample SS44B-1 at a concentration of 145 mg/Kg, compared to the TAGM value of 115 mg/Kg.

Groundwater

Sixteen metals were detected in the groundwater samples collected at SEAD-44B. Aluminum was detected in all three samples collected at concentrations exceeding its Secondary Drinking Water Regulation level (50 ug/L). Manganese was found in two of the wells at concentrations exceeding its Secondary Drinking Water criteria level. Iron was found at concentrations above the NY AWQS Class GA criteria value of 300 ug/L in two of the samples collected. Thallium was found at a level of 4.7 ug/L in the sample collected from well MW44B-3, which is roughly twice its MCL criteria.

Surface Water

Thirteen metals were found in the surface water samples analyzed at SEAD-44B. All reported concentrations of aluminum, arsenic, copper, iron, mercury, nickel, and zinc were below NY Class C guideline values. No criteria exist for the remaining 6 metals detected in the surface water at SEAD-44B.

Sediment

Twenty metals were detected in the sediment samples collected at SEAD-44B. Arsenic, copper, iron, manganese, and nickel were detected at concentrations that exceeded NYSDEC sediment criteria. The highest concentration of arsenic was 58.3 mg/Kg in sample SD44B-1. This value was over 11 times the sediment criteria value of 6 mg/Kg. The remaining metals, copper, iron, manganese, and nickel, were detected in excess of the NYSDEC Sediment Criteria for aquatic life. The concentrations detected for these other metals were only slightly above their associated sediment criteria.

2.11 SEAD-52 – AMMUNITION BREAKDOWN AREA

2.11.1 Site Description

SEAD-52 is located in the southeastern portion of SEDA (**Figure 2-1**). The site is characterized by developed and undeveloped land. East and west of the site are grassy fields with some sparse brush. Brady Road bisects the site running from north to south. The developed areas consist of Building 612, which is immediately west of Brady Road, and Buildings 608, 610 and 611, which are located east of Brady Road. Building 609, which is not part of SEAD-52, is located approximately 200 feet north of Building 612 on Brady Road and is a boiler house for Building 612. SEDA railroad tracks enter the site from the northwest and divide into two spurs that provide access to the northern side of Building 612 and the western side of Building 609. There are paved access routes on all sides of Building 612 and paved access routes to Buildings 608, 610, and 611.

Building 612 is a concrete block structure which is approximately 60 feet wide, 300 feet long, and 15 feet high. Covered platforms are located on the north and south ends of the building. Building 608 is also a concrete block structure that is approximately 20 feet wide by 20 feet long and 12 feet high. A concrete ramp extends from the front of the building to north of the building. The buildings are cast-in-place concrete. Building 611 has dimensions of 20 feet wide by 20 feet long by 10 feet high and Building 610 is 38 feet wide by 14 feet long by 12 feet high.

The topography of SEAD-52 is relatively flat with the area to the west of Brady Road sloping gently to the west from a topographic high at Building 612. Several drainage ditches are located to the west, north, and south of Building 612. Approximately four ditches are located west of the building. One ditch flows north intersecting an east-west trending drainage ditch. One ditch flows southwest and two ditches flow west. Another ditch is located south of Building 612 and flows south paralleling Brady Road. The area to the east of Brady Road also slopes gently to the west. A north-south trending drainage ditch is located east of Buildings 608, 610, and 611. Another drainage ditch parallels the east side of Brady Road and flows south.

2.11.2 Summary of Historic Operations

The Ammunition Breakdown Area (SEAD-52) was an active site from the mid 1950s to the late 1990s. The site consists of four buildings, Buildings 608, 610, 611 and Building 612. Building 612 was used for the breakdown and maintenance of ammunitions; Building 608 was used for the storage of ammunition magazines although no ammunition magazines are currently stored in the building; Building 610 was used for ammunition powder collection; and Building 611 was used for storage of equipment, paints, and solvents.

2.11.3 Summary of Field Investigations

A Limited Sampling Program was performed at SEAD-52 in December 1993. Eighteen (18) surface soil samples were collected from a depth of 0 to 2" below ground surface and chemically analyzed for explosives by EPA Method 8330. One sample was collected from each corner of Buildings 608, 611 and 612 and additional samples were taken from each side of Building 612. Sample locations are shown in **Figure 2-9**.

2.11.4 Summary of Analytical Results

Results of the chemical analyses for soil can be found in **Appendix J, Table J-1**.

Soil

The results of the limited sampling indicate that the three explosive compounds, tetryl, 2,4,6-trinitrotoluene, and 2,4-dinitrotoluene, were detected in up to 10 surface soil samples. Surface soil samples SS52-1 through SS52-8, which were collected from the buildings on the east side of Brady Road, were generally free of explosive compounds, with the exception of SS52-1 and SS52-6, which contained 110 and 280 ug/Kg, respectively, of the compound 2,4-dinitrotoluene.

All of the surface soil samples, except two samples, that were collected around Building 612 contained explosive compounds. 2,4-dinitrotoluene was the most frequently detected compound (found in 10 of the 18 samples) and ranged in concentration from 91 to 2,100 ug/Kg. The compound 2,4,6-trinitrotoluene was detected in only two samples and tetryl in only one sample. SS52-15 and SS52-16, the two samples in which explosive compounds were not detected, were located on the southwest side of Building 612. No NYSDEC TAGM criteria are available for the explosive compounds detected.

2.12 SEAD-58 – DEBRIS AREA NEAR BOOSTER STATION 2131

2.12.1 Site Description

The debris area (SEAD-58) is located in the western-central portion of the Depot about 335 feet northeast of Booster Station 2131 (**Figure 2-1**). The site has two distinct areas separated by a drainage swale that runs east-west. The larger area, located about 50 feet north of the drainage swale, is circular and 300 feet in diameter. The smaller area encompasses an area approximately 125 feet by 175 feet and is just south of the drainage swale.

Topography in the area is very flat with evidence of stressed vegetation and many exposed root systems with underlying growth. The drainage swale makes vehicular access to the south area difficult. There is a rock wall lining the south side of the swale rising about 2 feet. A small stream runs east-west, south of the smaller area.

2.12.2 Summary of Historic Operations

The booster station, Building 2131, is a pump house used to pump drinking water from the lake to the on-site reservoir. Interviews with SEDA personnel have indicated that debris had been dumped in this area. It is not known what types of waste were disposed of in this area. It is rumored that DDT, a contact insecticide, may have been disposed of at SEAD-58. However, there are no DDT usage records available for SEAD-58.

2.12.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-58 beginning in February 1994 as part of the Expanded Site Inspection for Eight Moderately Low Priority AOCs. Sample locations are shown in **Figure 2-10**.

Geophysics

Four 115-foot long seismic refraction profiles were surveyed on four lines positioned along each boundary of SEAD-58. Data from the survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of SEAD-58. EM-31 and GPR surveys were also performed to delineate any vertical extent to the surface features observed at SEAD-58. A grid of electromagnetic data was laid out and surveyed across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals. GPR data were acquired along profiles spaced every 40 feet. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources.

A review of the bedrock elevations suggested that the bedrock surface sloped to the west-northwest.

Groundwater flow was also expected to be directed to the west-northwest, following the slope of the bedrock. A slight bedrock depression in the northern portion of SEAD-58 was detected and one monitoring well was located in this bedrock depression in order to detect any potential contaminants in the groundwater that may have been flowing north along this bedrock depression.

The EM-31 survey detected an area of low apparent ground conductivity that roughly coincided with the area of stressed vegetation observed at SEAD-58. This conductivity feature may be attributed to a decrease in the depth to bedrock or to a decrease in the clay content of the soil. Other detected anomalies were associated with the suspected buried utility and the surface debris in the southern portion of the EM grid.

The GPR survey conducted at SEAD 58 revealed homogeneous layered soils to depths of 4 to 5 feet below grade. Several irregular hyperbolic reflections were observed within the soil layer indicating the presence of large boulders. No anomalies were detected which could be associated with buried metallic objects. An area of attenuated reflections was detected in the central portion of the survey grid. The extent of this area of attenuated reflections was identical to that of the area of low apparent ground conductivity identified by the EM-31 survey.

Soils

Three soil borings were performed in the area of stressed vegetation at SEAD-58. A total of nine soil samples from the three soil borings were submitted for chemical analysis. The borings revealed till, weathered dark gray shale, and competent shale as the three major geologic units at SEAD-58. The depths of the borings at SEAD-58 were up to 11.0 feet below grade.

Six test pits were excavated at SEAD-58. All six test pits were centered over distinct geophysical anomalies detected during the EM-31 and GPR surveys. One soil sample was collected from each test pit and submitted for chemical analysis. No evidence of previous excavations or disposal activities was found in any of the test pit excavations. The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavations.

Three surface soil samples were collected from a depth of 0-2 inches in the area of stressed vegetation. These samples provided a more accurate determination of surficial contaminant locations, if any, present within the stressed area. All surface soil samples were submitted for chemical analysis.

Groundwater

Four groundwater monitoring wells were installed at SEAD-58. One monitoring well (MW58-1) was installed upgradient of SEAD-58, near the center of the eastern boundary of SEAD-58, to obtain background water quality data. The remaining three monitoring wells were installed adjacent to and downgradient of SEAD-58, along the western and northern boundaries, to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analysis.

Surface Water and Sediment

Six surface water and sediment samples were collected at SEAD-58. Three surface water and sediment samples were collected from the drainage swale located within SEAD-58. Two surface water and sediment samples were collected from an unnamed creek, flowing east to west, along the southern boundary of SEAD-58. One surface water and sediment sample was collected from Kendaia Creek at a location immediately downstream of where the unnamed creek feeds into Kendaia Creek. This sampling procedure was aimed at targeting the specific area where surficial contamination, if any, had taken place. All surface water and sediment samples were submitted for chemical analysis.

2.12.4 Summary of Analytical Results

Eighteen soil samples, four groundwater samples, and six surface water and sediment samples were collected from SEAD-58 for chemical analysis. All of the samples were analyzed for TCL VOCs, SVOCs, Pesticides/PCBs, TAL metals, and cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix K, Tables K-1** through **K-4** for soil, groundwater, surface water, and sediment, respectively.

Soil

Eighteen soil samples were analyzed from SEAD-58. There was one exceedance of arsenic, copper, magnesium, sodium, and zinc and three exceedances of potassium. The arsenic, copper, sodium, and zinc levels were only slightly greater than the respective TAGMs. One of the three potassium detections exceeded the TAGM by only a small amount and the other two detections exceeded by approximately 0.25 times. Magnesium was detected in sample TP58-1-1 at a depth of 2.5 ft and at a level that was 0.5 times the TAGM.

Groundwater

Concentrations measured for aluminum, iron, and manganese exceeded their respective comparative criteria in all four of the groundwater samples collected from SEAD-58. The concentration measured for each of these metals, and many of the others detected as well, was highest in the sample collected from location MW58-3, which is the centrally located downgradient well.

Surface Water

Of the six surface water samples collected from SEAD-58, aluminum, iron, and thallium were detected at concentrations that exceeded the surface water criteria. The aluminum criterion was exceeded in 5 of the 6 samples though the only exceedance of significance was in sample SW58-4-1. This same sample had the one iron exceedance and one of the two thallium exceedances. The second thallium exceedance was detected in sample SW58-3-1.

Sediment

Of the six sediment samples collected from SEAD-58, cadmium, chromium, copper, iron, manganese, nickel, and zinc were detected at concentrations that exceeded the sediment criteria. Cadmium, chromium, and zinc were detected in one sample each at levels only slightly greater than the criteria. The manganese criterion was exceeded in three of the six samples by less than twice the criteria in each case. All six samples had copper and nickel exceedances, though the greatest exceedance for each was only slightly more than twice the criterion. All six samples also had iron exceedances, though the greatest exceedance was slightly less than 1.5 times the criteria.

2.13 SEAD-62 – NICOTINE SULFATE DISPOSAL AREA

2.13.1 Site Description

The nicotine sulfate disposal area (SEAD-62) is located in the southeastern portion of SEDA (**Figure 2-1**). It measures approximately one-half mile by one-quarter mile and is characterized by mostly undeveloped land with the exception of bunkers and buildings along the western perimeter. The undeveloped areas are predominantly low grassland in the western portion and they become more vegetated with low brush and sparse trees in the eastern portion. The developed area in the western perimeter of the site includes Buildings 609 and 612 and two grass covered bunkers with paved access. Brady Road separates the buildings and bunkers. The site is bound on all sides by mostly undeveloped land. An unnamed paved road that runs between Brady Road and Building 606 near the eastern boundary of the site defines the northern boundary of the site. The fence separating the ammunition storage area from the unrestricted portion of the site generally forms the eastern boundary of the site. The ammunition storage area fence restricts access to most of the site.

The regional topography slopes gently to the west toward Brady Road. A ditch drains several wet areas in the central and south-central portions of the site; the ditch drains west through a culvert under Brady Road.

2.13.2 Summary of Historic Operations

SEDA personnel reported finding a signed work-order for the disposal of two drums containing nicotine sulfate. The work-order was found during a transfer of office supplies from Building 606 about 10 to 20 years ago. No indication of the size of the drums or the means of disposal was reported on the work-order. Based upon historical disposal practices used at SEDA, base personnel believed these drums could have been disposed in the areas between or surrounding Buildings 606 and 612. Building 606 is currently used as the pesticide/herbicide storage facility. Building 612 is a munitions disassembly facility. Both buildings have been used for these operations for many years.

2.13.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-62 beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-11**.

Geophysics

Four 115-foot long seismic refraction profiles were surveyed along four lines positioned throughout the site. Data from the surveys were used in conjunction with those from the combined SEADs-43, 56, and 69 seismic refraction profiles to allow for a more comprehensive interpretation of groundwater flow direction for this area.

An EM-31 survey was performed to determine the exact location of the suspected nicotine sulfate drums. A grid of electromagnetic data was collected across the site. Survey profiles were spaced at 50-foot intervals and electromagnetic measurements were taken at 10-foot intervals along each profile.

EM-31 was the primary geophysical method of investigation at SEAD-62, however, a GPR survey was also performed to provide additional data in areas of elevated ground conductivity and to characterize the source of several electromagnetic anomalies. The GPR data were collected along the same lines as the EM-31. A total of 73,600 feet of EM-31 data and 34,650 feet of GPR data were collected.

The seismic survey indicated that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be to the west, following the slope of the bedrock.

The EM-31 survey found six localized conductivity anomalies. Three anomalies corresponded to drainage culverts and a concrete slab. The three remaining anomalies could not be associated to any cultural features. Three zones of elevated ground conductivities were also identified from the conductivity data, each coincided with a marshy area. All other conductivity anomalies detected in the EM-31 grid were attributed to cultural features. The in-phase response of the EM survey shows a generally featureless response. Two of the unknown localized anomalies as well as the three culverts mentioned above were apparent in the in-phase response data. No other anomalies were observed which could not be attributed to known cultural features.

The GPR survey, which was conducted in all the zones of the EM grid where EM-31 anomalies of unknown origin were detected, found no evidence of disturbed soils or burial pits.

Soils

Three test pits were excavated at SEAD-62. Two test pits were located over electromagnetic anomalies, each located within an area of elevated ground conductivity. The third excavation was located over an EM-31 anomaly situated along the western boundary of the site. One soil sample was collected from each test pit and submitted for chemical analyses.

TP62-3 was excavated at the EM anomaly along the northwestern boundary of SEAD-62. Metal strapping, 1.5 inches wide, and a 0.5-inch diameter metal rod were found at TP62-3. A large quantity of deteriorated red brick was also unearthed along with several large boulders, typically one to two feet in diameter.

Buried metallic objects were not encountered in either TP62-1 and TP62-2 excavation and there were signs that no previous excavation of the soils had occurred at this location.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Three groundwater monitoring wells were installed at SEAD-62 at locations that were based on the results of the seismic survey. One monitoring well (MW62-1) was installed upgradient of the two areas of high conductivity previously mentioned to obtain background water quality data. The remaining two wells, were installed adjacent to and downgradient of these areas of high conductivity to determine if hazardous constituents were present and to determine the direction of groundwater flow. The presumed direction of groundwater flow at this site was to the southwest, however, the geophysical survey showed the direction to be more to the west. Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analyses.

2.13.4 Summary of Analytical Results

Three soil samples and three groundwater samples were collected from SEAD-62 for chemical analysis. All the samples were analyzed for the following: TCL VOCs, SVOCs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW, and herbicides by Method 8150. Results of the chemical analyses can be found in **Appendix L, Tables L-1** and **L-2** for soil and groundwater, respectively.

Soil

The soil samples collected at SEAD-62 were found to contain various metals at concentrations that exceed the associated TAGM or site background values. Of the 20 metals detected in SEAD-62 soils, three (mercury, potassium, and zinc) were found in one or more samples at concentrations above their associated TAGM values, however, the exceedances were within the same order of magnitude as the

TAGM value.

Groundwater

Benzene was the only volatile organic compound found in the groundwater samples collected at SEAD-62. This compound was detected in samples obtained from both MW62-2 and MW62-3 at estimated concentrations of 2 J ug/L, which exceed NYSDEC's Class GA standard of 1 ug/L.

Seventeen metals were detected in the groundwater samples collected from SEAD-62. The compounds aluminum, iron, and manganese were detected in each of the three sampled wells at concentrations exceeding their respective groundwater comparative criteria. Thallium was also found in the sample collected from MW62-2 at a concentration exceeding its MCL.

2.14 SEAD 64A – GARBAGE DISPOSAL AREA

2.14.1 Site Description

The disposal area at SEAD-64A is located south of the storage pad at the intersection of 7th Street and Avenue A in the east-central portion of SEDA (**Figure 2-1**). The site is bounded to the north by a square storage pad, to the east by the SEDA railroad tracks beyond which is the elevated fire-training pad (SEAD-26), and to the south and west by undeveloped grassland.

Topography on-site is relatively flat and covered with low grassland vegetation, however, the regional slope of the land surface is to the west. A well-developed drainage ditch is located near the southern boundary of the site. The site is not located within the ammunition storage area and, therefore, access is restricted only by clearance through Post #1, the main gate. The disposal area, which is characterized by undeveloped land, is approximately 350 feet by 200 feet. The area appears to have been disturbed, and some debris was visible on the ground surface during the SWMU classification site visit. A "no dumping" sign is located in the area of the site.

2.14.2 Summary of Historic Operations

SEAD-64A was used during the period from 1974 to 1979 when the on-site solid waste incinerator was not in operation. The types of wastes disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report metal drums and other industrial items were reportedly disposed at this site. SEDA personnel also reported the operation of small burning pits within this area when it was being landfilled. Debris (asphalt, wooden boards, concrete slabs, and corrugated drain pipe) was visible on the surface, though the site is mostly covered with dense vegetation.

2.14.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-64A beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-12**.

Geophysics

Four seismic refraction profiles, each 115-feet long, were surveyed along each boundary of SEAD-64A. Data from the seismic survey were used to determine the direction of groundwater flow and location of the upgradient and downgradient monitoring wells at the site. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was laid out and surveyed across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 20-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. A total of 5,370 feet of EM-31 data and 4,595 feet of GPR data were collected at SEAD-64A.

The EM-31 survey detected a series of conductivity anomalies, forming an arc, approximately 75 feet in width, across the west central and northeastern sections of the survey area. A follow up inspection revealed that the southern boundary of this arc coincided with a 1 to 2 foot step in the ground topography which was interpreted as the southern boundary of the landfill area. In addition, the large and negative anomalies in the western portion of the arc were associated with disposed culverts that were visible on the ground surface. The linear anomaly along the eastern portion of the northern boundary of the grid was caused by six-inch diameter steel piping being stored at this site. Excluding the anomalies detected from this survey, the data over the entire grid, including a large portion of the suspected area of the landfill, displayed a relatively uniform distribution of apparent ground conductivities.

The in-phase response of the EM-31 survey shows the same anomaly features as described above. It should be noted that neither the apparent conductivity measurements nor the in-phase response measurements could delineate the northern and western boundaries of the landfill area.

A GPR survey identified two disposal pits containing metallic debris. One pit was approximately 35 feet long by 15 feet wide and was situated near the center of the suspected landfill area. The second pit, measuring 60 feet by 20 feet, was located near the northeastern boundary of the suspected landfill area, at the same location as one of the more pronounced EM-31 anomalies.

The GPR survey was also able to map a subsurface contact in the suspected landfill area that was associated with the base of fill/native soil contact. Due to the conductive nature of the soils at this site, areas where the fill thickness was less than one foot could not be accurately resolved; therefore, the isopachs of the fill layer have a minimum contour level of 1 foot. The approximate areal extent of the landfill is 250 by 350 feet. The GPR survey was able to accurately locate the southern landfill boundary, but was not able to accurately locate the western, northern, and eastern boundaries.

Soils

Three soil borings were performed at SEAD-64A. The three soils borings were drilled in detected geophysical anomalies, to determine the waste thickness, and provide subsurface samples for chemical analysis. Three soil samples were obtained from each boring. Three soil samples were also collected from the upgradient monitoring well location (MW64A-1) to obtain background soil quality data. All of these soil samples were submitted for chemical analysis. Based on the results of the drilling program, till and calcareous shale were found to be the two major types of geologic materials present on-site.

Three test pits were excavated at distinct geophysical anomalies detected during the EM-31 and GPR surveys. The purpose of these test pits was to visually identify the contents of the disposal area, and therefore no soil samples were collected.

TP64A-1 was excavated in the disposal pit in the northeast section of the landfill. Crushed army-navy (AN) canisters, originally 12 inches in diameter and 14 inches long, as well as rail road ties and construction debris characterized the majority of the fill material from this excavation. Stenciling on the AN canisters indicated that they had, at one time, contained magnesium powder. The base of the fill at this location was measured at three feet three inches below the ground surface. TP64A-2 was excavated in the disposal pit located in the center section of the landfill. Large slabs of reinforced concrete and sections of asphalt were found during the excavation. Lenses of dark gray silt were also noted in the two foot ten inches thick fill layer. TP64A-3 was excavated at the EM anomaly at the southwestern section of the landfill. Buried drainage culverts, Constantine wire, municipal wastes, and construction debris was encountered. The base of fill at this location was measured at two feet eight inches below grade.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Four monitoring wells were installed at SEAD-64A. One monitoring well was installed in an upgradient location (MW64A-1) for background water quality, and two monitoring wells were installed in downgradient locations to determine if hazardous constituents have migrated from this site. The fourth well (MW64A-1A) was intended to be an upgradient well but was erroneously placed on the southern perimeter of the site. The monitoring well was not sampled, but was utilized for groundwater level measurements.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer. Following installation and development (MW64A-1A was not developed), one groundwater sample was collected from each well (except MW64A-1A) and submitted for analysis.

2.14.4 Summary of Analytical Results

Twelve soil samples and three groundwater samples were collected from SEAD-64A for chemical testing. All of these samples were analyzed for TCL VOCs, SVOCs, Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix M, Tables M-1** and **M-2** for soil and groundwater, respectively.

Soil

Twelve soil samples were collected from SEAD-64A. Various PAH and benzo-polyaromatic hydrocarbons (BPAH) were detected at levels that exceeded TAGMs anywhere from 10 to 100 times. The samples containing these detections were in the 0-0.2 ft (SB64A-1-00, SB64A-2-00, SB64A-3-00) and 2-4 ft (SB64A-1-02, SB64A-2-02) depth ranges.

There were also exceedances of aluminum, chromium, copper, lead, potassium, and zinc in 1-2 samples each. The most significant of the metal exceedances was lead in sample SB64A-2-00 (0-0.2 ft).

Groundwater

Three groundwater samples were collected from SEAD-64A. Iron was detected in all three samples at levels that exceeded its GA criteria level. Aluminum was also detected in all three samples at concentrations that surpassed its Secondary Drinking Water criteria level. Manganese and thallium were both detected in the sample collected from MW64A-2 at concentrations exceeding their respective comparative criteria levels. The levels of all the metals detected in groundwater samples from SEAD-64A were highest in the sample collected from MW64A-2.

2.15 SEAD-64B – GARBAGE DISPOSAL AREA

2.15.1 Site Description

The disposal area at SEAD-64B is located immediately north of Ovid Road near Building 2086 in the southern end of SEDA (**Figure 2-1**). The site is characterized by undeveloped land that is bounded by Ovid Road on the south, an unnamed paved road on the west, an intermittent stream and several sets of SEDA railroad tracks to the north, and undeveloped land with dense vegetation and deciduous trees to the east. Additionally, there are two large piles located along the site's northern boundary. Generally, the southern half of the site was more heavily vegetated than the northern half. The site is located within the ammunition storage area and access to it is restricted.

The local topography on-site is somewhat uneven, but generally slopes to the south-southwest. The intermittent stream flows west in response to the west-sloping regional topography.

2.15.2 Summary of Historic Operations

SEAD-64B was used for garbage disposal during the time period from 1974 to 1979 when the solid waste incinerator was not in operation. The types of waste disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report metal drums and other industrial items were reportedly disposed of at the site. Very little surface debris, consisting mainly of household items, was observed in the northwestern portion of the site.

2.15.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-64B beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-13**.

Geophysics

Four seismic refraction profiles, each 115-feet long, were surveyed along each boundary of SEAD-64B. Data from the seismic survey were used to determine the direction of groundwater flow and location of the upgradient and downgradient monitoring wells at the site. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was collected across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition, GPR data were collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. A total of 5,240 feet of EM-31 data and 3,310 feet of GPR data were collected at SEAD-64B.

The results of the seismic investigation suggest that groundwater flow would be to the west or northwest.

The EM-31 survey found a prominent lineament along the western and southern boundaries of the grid that was due to underground utilities and a buried 2-inch metal pipe. A localized anomaly, situated 25 feet east of the western buried utilities/pipe lineament, was characterized by high and low conductivity measurements. The source or sources of the conductivity anomalies situated in the northeastern portion of the grid are unknown. In general, the area of the suspected landfill exhibits slightly elevated ground conductivities (in the range of 15 to 18 millisiemens per meter), however, distinct landfill boundaries were not evident.

The in-phase response of the EM-31 reduced in magnitude the lineament associated with the buried utilities/pipe, allowing a better definition of the localized anomaly previously described. A second localized anomaly, approximately 20 feet south of the western surface pile at this site, consisted of a moderate increase in the measured in-phase percentage and corresponded to the center of an increased ground conductivity zone.

The GPR survey conducted at this site revealed several anomalies at depths of 1 to 3.5 feet. One of these anomalies was associated with the in-phase anomaly located twenty feet south of the western surface pile. A second anomaly was detected in the zone of conductivity anomalies situated in the northeastern portion of the grid. Although these two anomalies did exhibit characteristic radar reflections from metallic objects (a strong ringing of the signal), neither showed characteristic signals associated with cylindrical objects.

Soils

A total of three soil borings were performed at SEAD-64B. The locations of the soil borings were based upon the result of the geophysical surveys. The soil borings were drilled to determine the thickness of waste and to provide subsurface samples for chemical analysis. Three soil samples were obtained from each soil boring. Three soil samples were also collected from the upgradient monitoring well (MW64B-1) to obtain background soil quality data. These soil samples were submitted for chemical analysis. Based on the results of the drilling program, till and calcareous gray to dark gray shale were found to be the two major types of geologic materials present on site.

Three test pits were excavated at SEAD-64B. The test pits were conducted where geophysical anomalies, presumed associated with buried metallic objects, were detected. The purpose of the test pits was to visually identify the contents of the fill within the disposal area. No soil samples were collected from these test pits.

TP64B-2 was excavated at the EM and GPR anomalies located south of the berm located in the northwestern section of the site. The source of the anomalies was a steel cable buried 1 foot below the ground surface. A light brown silt fill layer was observed to a depth of 5 feet under which a 2- foot thick layer of municipal waste was present. The base of this municipal waste layer, at a depth of 7 feet below grade, marked the base of fill at this location. TP64B-1 was excavated at EM anomaly 64B-1, which is located in the western section of the suspected fill area. The source of this anomaly was not determined; however, a metal detector, used to screen the test pit for metallic objects as it was being advanced, indicated the presence of ferrous material in the near surface soils. A visual inspection of these soils could not reveal the source of the magnetic and electromagnetic anomalies. The material excavated from TP64B-3, located at EM anomaly 64B-3, revealed a 5 foot thick fill layer of silt with shale fragments and one eighteen inch long strand of Constantine wire. The wire strand may have contributed to the increased apparent ground conductivity anomaly measured near this test pit location, but it did not cause the entire anomaly. The cause of the anomaly is unknown.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Three monitoring wells were installed at SEAD-64B. One monitoring well (MW64B-1) was installed upgradient of SEAD-64B to obtain background water quality data. Two monitoring wells were installed adjacent to and downgradient of this site to evaluate whether hazardous constituents have migrated from this site and to determine the groundwater flow direction.

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analysis.

Surface Water and Sediment

Three surface water and sediment samples were collected from SEAD-64B. All three samples were collected from the drainage ditch that flows to the west along the northern perimeter of this SEAD. These samples were collected and submitted for chemical analysis to determine if surface water runoff is a transport pathway of contamination at SEAD-64B.

2.15.4 Summary of Analytical Results

Twelve soil samples, three groundwater samples, three surface water samples, and three sediment samples were collected from SEAD-64B for chemical analysis. All the samples were analyzed for TCL VOCs, SVOCs, Pesticides/PCBs, and TAL metals and cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix N, Tables N-1** through **N-4** for soil, groundwater, surface water, and sediment, respectively.

Soil

Of the 12 soil samples taken from SEAD-64B only one sample exceeded TAGMs for one compound. Sample SB64B-2-00 at a depth of 0-0.2 ft slightly exceeded the TAGM for magnesium.

Groundwater

Three groundwater samples were taken from SEAD-64B. Concentrations measured for aluminum and manganese in each of the samples exceeded their respective Secondary Drinking Water Regulation levels. Similarly, the concentrations measured for iron in two of the samples (i.e., MW64B-1 and

MW64B-3) exceeded its NYSDEC GA standard value. The higher concentration measured for each of these metals was found in the sample collected from MW64B-3.

Surface Water

Three surface water samples were taken from SEAD-64B. Sample SW64B-2 exceeded criteria for both aluminum and iron. Neither of the exceedances was extremely significant.

Sediment

Three sediment samples were taken from SEAD-64B. Arsenic, copper, iron, manganese, mercury, and nickel were detected at concentrations exceeding the sediment criteria in one or more of the samples. Arsenic and mercury were detected in only one sample, SD64B-3 at levels that were slightly greater than the respective criteria. Manganese and iron were also exceeded in that sample by approximately 1.5 times the criteria. Copper and nickel were detected in 2 and 3 samples, respectively at levels that were less than twice the sediment criteria.

2.16 SEAD-64C – GARBAGE DISPOSAL AREA

2.16.1 Site Description

The proposed disposal area at SEAD-64C is comprised of undeveloped land and is located near the intersection of East Patrol Road and South Patrol Road in the southeastern corner of SEDA (**Figure 2-1**). The area is vegetated with grass and low brush, which are denser in the southern and western portions of the site.

Two small concrete pads are located in the southeastern portion of the site and can be accessed via a 75-foot long crushed shale road. One pad (25 feet long by 15 feet wide) is slightly elevated above the ground and shows little evidence of deterioration. The second pad (15 feet square), which is slightly covered with gravel and cracked in several places, is located near the southern edge of the first and is oriented approximately 25 degrees counterclockwise to it. A north-south trending chain-link fence divides the site into eastern and western portions. A small west-flowing intermittent stream bounds the site on the north. Paved roadways define the eastern and southern boundaries of the site. Topography on-site is generally flat but slopes gently to the southwest.

2.16.2 Summary of Historic Operations

SEAD-64C is the location of a proposed SEDA landfill. A June 6, 1980 USAEHA report titled "Army Pollution Abatement Program Study No. D-1031-W, Landfill Permit Assistance, Seneca Army Depot Romulus, NY", describes the investigation of a portion of SEAD-64C for the purpose of locating suitable land for a sanitary landfill. The report depicts the proposed site as a rectangular area approximately 950 feet by 450 feet that is oriented with an east-west trending long dimension. The report concluded that the site could be used for a sanitary landfill provided engineering plans and operations utilized an area method to allow for the high water table that was noted during the study. No available information indicates that a formal landfill was established on-site. Information presented in the SWMU Classification Report, however, suggests that limited dumping may have occurred at the site and that transmission power lines may be buried throughout the site.

2.16.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-64C beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-14**.

Geophysics

EM-31 survey was performed over two grids (eastern and western) in the area of SEAD-64C. The survey was performed on a 10 foot by 20-foot grid in on survey area and on a 10-foot by 40-foot grid in a second survey area. The objective of the EM-31 survey was to delineate the limits of the landfill and to identify locations where metallic objects may be buried. Subsequent to the EM-31 survey, a GPR survey was performed. The GPR data were collected along profiles spaced at 50-foot intervals. These data were used to supplement the EM-31 interpretation to define the waste limits, and to provide better characterization of suspected buried metallic sources. A GPR survey was not performed in the western area of SEAD-64C because no EM-31 anomalies of unknown origin were detected in this area. A total of 26.000 feet of EM-31 data and 6,370 feet of GPR data were collected at SEAD-64C.

Two distinct anomalies are visible in both the apparent ground conductivity and in-phase response portions of the EM-31 survey: 1) an oval area, approximately 500 feet long by 200 feet wide, of large positive and negative anomalies, and 2), a small, square, and predominantly negative anomaly, south of the first, which corresponded to the concrete pads located at this site. The EM-31 grid was extended beyond the boundaries of the anomalous zones in order to define background apparent conductivities of the subsurface. The electrical properties of the soils surrounding the anomalous zones are relatively uniform. However, increased conductivities were detected in the area to the south and west of the concrete pads and the areas along South Baseline Road and East Baseline Road. These elevated conductivity values could be attributed to several factors, such as increased clay content in the soil or a higher concentration of dissolved solids in the groundwater or soil moisture. Road salt should be considered a possible explanation for the increased apparent conductivities observed along the baseline roads.

A follow-up inspection of this site revealed several small gauge copper wires and quarter inch steel cables on the ground surface. The area where these wires were found roughly corresponded to the oval area of EM anomalies. These wires were presumably the source of the EM anomalies. Based on the size of the oval area of EM anomalies and the account of an electrical sub-station once being located on one of the concrete pads at SEAD-64C, the wires and cables may have functioned as a grounding grid for the electrical sub-station.

The only anomaly detected in the western grid of SEAD-64C corresponded to a 30-foot by 20-foot burial pit, situated in the southwestern corner of the grid, which was identified by SEDA personnel as being filled with Constantine wire to a depth of 6 to 8 feet. A review of the data over the remainder of the grid show a generally featureless response in the in-phase map and a gradual decrease of the ground conductivities towards the central portion of the grid. This decrease in ground conductivities may be attributed to decreased clay content in the overburden soils or to a decrease in the depth to bedrock.

The GPR survey conducted in the eastern EM-31 grid revealed little information on the source or sources of the EM anomalies. The GPR records acquired in the oval shaped zone of conductivity anomalies showed relatively homogeneous layered soils with no evidence of burial pits, buried metallic objects or areas of abrupt cuts in the soil layering.

It was noted above that the baseline conductivity of the subsurface increased to the south and west of the concrete pads. This change in soil conductivity was also observed in the GPR records. The records acquired in this portion of the grid exhibit weak, near surface reflections. This is attributed to greater attenuation of radar waves traveling through soil that is more conductive.

Soils

Three test pits were performed at SEAD-64C, in areas of distinct geophysical anomalies. Two soil samples were collected from each test pit. Three surface soil samples were collected north of the concrete pad, in areas of distinct geophysical anomalies. All soil samples were submitted for chemical analysis.

The three test pits did not identify the sources of the EM anomalies. Olive gray silt, with zones of shale fragments, fine sands, and large limestone boulders (typically 1 foot in diameter), was found in each test pit excavation. Individual strands of copper wire or steel cable were found in the upper 4 inches of the topsoil layer of test pits TP64C-1 and TP64C-3. Due to the shallow nature of the unconsolidated overburden observed in the test pit excavations, and due to the absence of buried metallic objects in the areas of pronounced EM anomalies, the wires found along the ground surface were believed to be the sole cause of the EM anomalies. A second follow-up inspection of the area, utilizing a metal detector to screen the upper layer of the topsoil, revealed that some of these wires and cables were over 75 feet long. This information further confirmed the supposition that the source of the large area of EM anomalies could be attributed to these wires and cables at or near the ground surface.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Four groundwater monitoring wells existed at SEAD-64C prior to the beginning of this ESI. Groundwater elevations from the four existing monitoring wells at SEAD-64C showed that the groundwater flow direction at SEAD-64C was to the west.

In addition, the geophysical surveys also detected a large anomaly located north of monitoring well MW64C-9. Based on these observations, MW64C-9 is considered an upgradient well. A fifth monitoring well (MW64C-1) was installed at SEAD-64C. MW64C-1 was installed downgradient of the large geophysical anomaly to evaluate whether hazardous constituents have migrated from the site. MW64C-1 was screened over the entire thickness of the aquifer. The drilling at MW64C-1, revealed that till and weathered dark gray shale are the two major types of geologic materials present on-site.

All the monitoring wells at SEAD-64C, the four existing wells and the newly installed well, were developed and one groundwater sample was collected from each well and submitted for chemical analysis.

2.16.4 Summary of Analytical Results

Five groundwater samples, six subsurface soil samples and three surficial soil samples were collected from SEAD-64C for chemical analyses. All of the samples were analyzed for TCL VOCs, SVOCs, Pesticides/PCBs, TAL metals and cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix O, Tables O-1** and **O-2** for soil and groundwater, respectively.

Soil

Ten soil samples were taken from SEAD-64C. Calcium, manganese, and potassium were detected at levels that exceeded TAGMs in one sample each and magnesium was detected at levels exceeding TAGMs in two samples. The magnesium exceedances were in sample TP64C-3-1 at a depth of 2 ft and, to a lesser degree, in TP64C-1-2 at a depth of 4 feet. The manganese TAGM was exceeded by 2 times in TP64C-2-2 at a depth of 2 feet. The level at which calcium and potassium were detected exceeded TAGMs by less significant amounts.

Groundwater

Five groundwater samples were collected from wells in SEAD-64C. Phenol was detected in two wells at a concentration of 2 J ug/L, and this level exceeds its GA standard of 1 ug/L. Iron was detected in four of the samples at concentrations that exceeded its GA standard. Aluminum and manganese were detected in three samples at concentrations that exceeded their respective Secondary Drinking Water Regulation criteria levels. Sodium was detected at a concentration of 30,400 ug/L in one sample (MW64C-8) and exceeded its GA standard. Similarly, thallium was also detected at a concentration of 2.1 J ug/L in this same sample, and this concentrations exceeds its MCL criteria value.

2.17 SEAD-64D – GARBAGE DISPOSAL AREA

2.17.1 Site Description

SEAD-64D covers a large area located between West Patrol Road and the SEDA railroad tracks along North-South Baseline Road in the southwestern portion of SEDA (**Figure 2-1**). The site stretches for approximately 2,700 feet along the straight portion of West Patrol Road and is approximately 1,200 feet wide extending east from West Patrol Road. Firebreaks are cut into the vegetation in the area and trend east-west and north-south.

The site is heavily vegetated with grass, low brush, and small deciduous trees. Areas in the southern portion of the site are heavily vegetated with large deciduous trees. Stressed vegetation was observed adjacent to West Patrol Road.

The topography of this site slopes to the west. The regular west-sloping topography is interrupted in the south-central portion of the site by an eroded steam bed that traverses the south-central portion of the site. The intermittent stream flows west toward low areas east of West Patrol Road. These low areas parallel to West Patrol Road are believed to collect much of the surface water run-off from the site.

Several disposal areas are present on the site and can be identified by the surface expression of metal or debris. Several of these areas are in the southern, south-central and east-central portions of the site. In the southern portion of the site an elongated east-west trending mound (approximately 75 feet long) is reported to contain trash and assorted debris. Immediately to the north and east of this elongated mound are three 25-foot to 30-foot diameter depressions that are 2 to 4 feet deep.

2.17.2 Summary of Historic Operations

Portions of this SEAD-64D were used for garbage disposal from 1974 to 1979 when the SEDA solid waste incinerator was not operational. The types of wastes that were disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report metal drums and other industrial wastes were also disposed at this site.

Grape farming activities are known to have existed in the area prior to the establishment of SEDA and may have produced the small north-south trending furrows beneath the vegetation on most of the site.

2.17.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-64D beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-15**.

Geophysics

Four seismic refraction profiles, each 115-feet long, were performed throughout the area of SEAD-64D. Data from the seismic survey were used to determine the direction of groundwater flow and the locations of the upgradient and downgradient monitoring wells. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was collected across the site. The profiles were spaced at 20 and 40-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 40-foot intervals and included profiles over distinct EM-31 anomalies that provided a better characterization of the suspected buried metallic sources. A total of 115,890 feet of EM-31 data and 57,200 feet of GPR data were collected at SEAD-64D.

The results of the seismic survey suggest that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be to the west, following the slope of the bedrock.

The apparent ground conductivity measured in the grid surveyed at SEAD-64D showed three large areas of anomalous conductivity measurements in the northern half of the grid. These three areas were characterized by groups of smaller anomalies with typically high conductivity values. A follow-up inspection at SEAD-64D suggested that small gauge wires running parallel to the furrows in the ground surface caused these anomalies. These wires were often attached to tubular, 4-foot long, metal posts that were found throughout the northern one half of the grid. The wires and posts were typically covered by one half to two inches of decaying vegetation and/or topsoil. This area may have been used as a vineyard prior to the construction of SEDA.

Three zones of conductivity anomalies, each characterized by predominantly low conductivity values, were detected in the southern one half of the grid. The follow-up inspection at these locations revealed that these anomalies were located where waste material had been disposed on the ground surface.

The background conductivity values show a gradual decrease in the southern and the northeastern portions of the grid. These anomalies may be due to decreased clay content in the overburden soils or due to a decrease in the depth to bedrock.

The in-phase response of the EM-31 survey at SEAD-64D in general showed a featureless response. Anomalies in the in-phase response were observed in the three disposal areas discussed above. However, no anomalies coincided with the areas of high conductivity anomalies observed in the northern one half of the grid.

Several anomalies were detected by the GPR survey, all occurring in the 1 to 3.5-foot depth interval. These anomalies were characterized by hyperbolic reflections (possibly from large boulders or drainage pipes) and reflections from irregular surfaces measuring .5 to 3 feet in length. None of these anomalies exhibited characteristic reflections from buried metallic objects. Several metallic reflections were observed at the ground surface and were associated with the tubular metal posts previously described. All other GPR records acquired from SEAD-64D showed relatively homogeneous layered soils with no evidence of burial pits or areas of abrupt cuts in the soil layering.

Soil Gas Survey

An active soil gas survey was conducted at SEAD-64D to determine if concentrations of gaseous VOCs were present. Soil gas samples were collected from 162 grid locations positioned throughout the disposal area. Collected soil gas samples were analyzed in a calibrated Photovac 1050S gas chromatograph.

The soil gas survey did not detect VOCs at any of the sampling points. Detector responses were used in conjunction with calibration curve data to calculate concentrations expressed as trichloroethene in parts per million by volume (ppmv).

Soils

Ten soil borings were completed at SEAD-64D. The borings were advanced within the suspected disposal areas as located by the geophysical and soil gas results. Three samples from each soil boring were submitted for chemical analysis. The results of the drilling program found till and calcareous gray shale to be the two major types of geologic materials present on-site.

Three test pits were excavated at SEAD-64D. The final test pit locations were based on the results of the geophysical and soil gas surveys. The objective of these test pits was to identify the source of distinct geophysical anomalies and to visually evaluate the waste characteristics within the disposal area. No soil samples were collected from the test pits.

Five surficial soil samples, collected from 0.2 feet below grade, were collected from the stressed vegetation area adjacent to West Patrol Road. These samples were submitted for chemical analysis.

A 2-foot layer of municipal waste inter-mixed with some fill was found in TP64-1 at a depth of 2 and 4 feet below grade. Field measurements indicated that VOC levels in the headspace above the waste were 3 ppm. The lens of municipal waste was overlain by fill material containing some municipal waste and was underlain by silt. Two borings were drilled near this test pit.

Test pit TP64D-2 was excavated to a depth of 4 feet 2 inches. No buried metallic objects were found in this pit. An east-west trending, four inch outside diameter, red clay pipe was intersected at a depth of 2 feet 3 inches. The interior of the pipe was dry and free of deposits.

TP64D-3, advanced to a depth of 4 feet, found no evidence of buried objects or previous excavations.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. Excluding the 3 ppm OVM reading from the 2 to 4 foot interval of TP64D-1, no readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavations.

Groundwater

Five monitoring wells were installed to assess the potential impact of this disposal area on the groundwater quality. One monitoring well (MW64D-1) was installed upgradient of the site to monitor background water quality data. The four remaining monitoring wells were located downgradient of four separate electromagnetic anomalies.

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analysis.

2.17.4 Summary of Analytical Results

Five groundwater samples, 16 surficial (0 to 0.2 feet) and 20 subsurface soil samples were collected from SEAD-64D for chemical analysis. All samples were analyzed for TCL, VOCs, SVOCs, Pesticides/PCBs, TAL metals and cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix P, Tables P-1** and **P-2** for soil and groundwater, respectively.

Soil

Thirty-six soil samples were taken from SEAD-64D. Benzo(a)pyrene, dibenz(a,h)anthracene, phenol, aluminum, calcium, lead, manganese, potassium, and sodium were detected in 1 to 5 samples at levels exceeding TAGMs. Dibenz(a,h)anthracene was detected in samples SB64D-3-00 (0-0.2 ft depth), SB64D-3-20 (0-2 ft), SB64D-4-00 (0-0.2 ft), SB64D-5-00 (0-0.2 ft), SB64D-6-00 (0-0.2 ft) at levels that are 2 to 3 times the TAGM. Lead was detected in samples SB64D-2-00 (0-2 ft depth), SB64D-5-00 (0-0.2 ft), and SB64D-8-00 (0-2 ft) at levels exceeding TAGMs. The lead detected in sample SB64D-2-00 was the only value exceeding the TAGM by more than twice. All other compounds exceeding TAGMs did so at less significant amounts.

Groundwater

Aluminum, iron, lead, manganese, and nickel were detected at concentrations that exceeded their respective comparative groundwater criteria in one or more samples. Aluminum, iron and manganese exceeded their criteria levels in all five of the samples collected, while thallium was detected in three samples at concentrations in excess of its MCL. Lead and nickel were each detected once at concentrations that exceeded their respective GA criteria levels, and both of these concentrations were found in the sample collected from MW64D-5.

2.18 SEAD-66 – PESTICIDE STORAGE AREA NEAR BUILDINGS 5 AND 6

2.18.1 Site Description

The Pesticide Storage Area near Buildings 5 and 6 is located in the east-central portion of SEDA (**Figure 2-1**). Building 5 is located approximately 100 feet north of Building 6. Building 5 is an elongated building, approximately 350 feet long and 45 feet wide. It is located on the Bundle Ammunition Pack Road and has three driveway areas between the road and the loading docks. The metal shed that is suspected to be the former pesticide storage area is adjacent to Building 5 on the south side. Building 6 is much smaller, approximately 50 feet by 50 feet. The concrete pad that is also suspected of being a former pesticide storage area is located adjacent to Building 6 on the south side. Both buildings are located approximately 40 to 50 feet from the road. North-south trending railroad tracks are located approximately 20 feet to the west of the two buildings.

Aside from the paved road and driveways, the ground surrounding the buildings is covered with grass. There is little topographic relief in the area, and no surface water bodies are known to exist at the site.

SEAD-66 is located near the divide between the Reeder Creek watershed and the Kendig Creek watershed. Run-off from the site is directed into the Kendig Creek watershed by roadside drainage ditches. Run-off is directed from SEAD-66 into the feeder creek for the Duck Pond, a large surface water body located approximately 1 mile to the north of SEAD-66.

2.18.2 Summary of Historic Operations

It has been reported that pesticides were stored in a structure located in the vicinity of Buildings 5 and 6. The exact location of the pesticide storage building is unknown.

2.18.3 Summary of Field Investigations

Although no intrusive work has been completed at the site, it is expected that the geologic units would be the same as those that have been discovered at 27 other sites at SEDA. Specifically, till is expected to be the uppermost unit on the site. Below the till black shale is believed to exist, and there is likely to be a thin weathered shale zone at the contact with the basal portion of the till.

Although no aquifer characterization has been performed at SEAD-66, the groundwater flow direction is estimated to be to the north-northwest based on local topography.

A Limited Sampling Program was performed at SEAD-66 in December 1993. Eight (8) surface soil samples (0-2") were collected from locations around the metal shed and concrete pad that are suspected to have been pesticide storage areas. Samples were also collected between Buildings 5 and 6 and in the loading dock area of Building 5. Sample locations are shown in **Figure 2-16**.

2.18.4 Summary of Analytical Results

Surface soil samples collected from SEAD-66 were analyzed for TCL pesticides according to the NYSDEC CLP SOW. Results of the chemical analyses for soil can be found in **Appendix Q, Table Q-1.**

Soil

Of the nine soil samples taken from SEAD-66, two compounds were detected at levels exceeding TAGMs. 4,4'-DDE and 4,4'-DDT were both detected at elevated levels in sample SS66-8 that was taken from a depth of 0-0.2 ft.

2.19 SEAD-68 – BUILDING S-335 OLD PEST CONTROL SHOP

2.19.1 Site Description

SEAD-68 is comprised of a 100-foot by 40-foot single story wooden building, the Old Pesticide Control Shop, which is located on the corner of Avenue C and 3rd Street in the east-central portion of SEDA (**Figure 2-1**). The building is surrounded on the west, north and east sides by narrow grassy areas. There are doors located on these three sides of the building. A large garage (bay) door entrance is on the southern end of the building. Beyond the grassy areas to the north and east is an asphalt and gravel (i.e., crushed shale) area that is used for vehicle parking and staging. A 50-foot concrete driveway extends from the bay door to the intersection of Avenue C and 3rd Street.

2.19.2 Summary of Historic Operations

It has been reported that a pest control shop was once located in Building S-335. The building is presently used for fire fighting training exercises. No documented or visual evidence of a release has been discovered.

2.19.3 Summary of Field Investigations

Surface soil sampling and soil borings were performed at this site. A total of five surface soil samples were collected near doorways on the outside of the building. Three of the samples were collected near three doors on the west, north, and east sides of the building. The other two samples were collected from locations to the northwest and southeast of the large garage door. Two soil borings were performed on either side of the large garage door, beyond the surface soil sample locations mentioned above. The borings were in grassy areas that are likely disposal areas due to the good infiltration of the areas and their location near drainage ditches. Sample locations are shown in **Figure 2-17**.

2.19.4 Summary of Analytical Results

Results of the chemical analyses for soil can be found in **Appendix R, Table R-1**.

Soil

Nine soil samples were taken from SEAD-68. Benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, and arsenic were detected at levels that exceeded TAGMs. All exceedances were from surface soil samples, collected at depth of 0-0.2 ft. The samples with the majority of exceedances are SS68-1, SS68-3, SS68-4, and SS68-5. SS68-2 and SB68-2 had detections of one or two of these compounds, though they only exceeded TAGMs by small amounts.

2.20 SEAD-70 – FILL AREA ADJACENT TO BUILDING T-2110

2.20.1 Site Description

The fill area that comprises SEAD-70 is located on the southern side of East-West Baseline Road approximately 1,000 feet west of the intersection with North-South Patrol Road. It is located in the northwest portion of SEDA (**Figure 2-1**). The site and surrounding area contains developed and undeveloped land. An old dilapidated wooden barn characterizes the developed area (Building T-2110) and the barn contains piles of hay and sawdust, which are visible through its broken walls. The remainder of the site is undeveloped. The most noticeable feature in the undeveloped portion of the site is a kidney-shaped landfill southeast of the barn that forms a low, flat topographic high and appears to originate near the barn. The landfill's scarp is clearly visible on its eastern side. A large mound is located near the southeastern corner of the barn and an elongated vegetated mound is present along the southern perimeter of the landfill. Immediately east of the landfill is a wetland area beyond which is a large stand of deciduous trees.

The topography in the area of the barn and over the extent of the landfill is relatively flat. The local and regional topography surrounding the landfill slopes to the west.

2.20.2 Summary of Historic Operations

The building on-site (Building T-2110) is reported to have been used as a stable for horses by SEDA personnel. The area east of the building was used as a disposal area for construction debris. It is not known if other material was also disposed at the site. Up to two years ago, soldiers at SEDA used this location as a staging area.

2.20.3 Summary of Field Investigations

The field investigations discussed below were conducted at SEAD-70 beginning in February 1994 as part of the Expanded Site Inspection for Seven Low Priority AOCs. Sample locations are shown in **Figure 2-18**.

Geophysics

Four 115-foot long seismic refraction profiles were surveyed along 4 lines positioned perpendicular to and near the center of the boundaries of the site. Data from this survey were used to determine the direction of groundwater flow and to adjust the location of the monitoring wells to assure that one monitoring well was installed upgradient and three monitoring wells were installed downgradient of the site.

An EM-31 survey was performed throughout the site to define the limits of the fill area and to identify locations where metallic objects may have been buried. Electromagnetic data were collected at 10-foot intervals along east-west running lines spaced at 20-foot intervals. A GPR survey was also performed to provide additional data on the subsurface conditions of the site. The GPR data were collected along six north-south running lines spaced over the fill area at 50-foot intervals. A total of 8,220 feet of EM-31 data and 2,395 feet of GPR data were collected.

Results of the seismic survey suggest that bedrock slopes to the west. Groundwater is also expected to flow to the west, following the slope of the bedrock surface.

The EM-31 survey found that a zone of elevated apparent ground conductivity was revealed over the fill area. In general, the southern and eastern boundaries of this elevated conductivity area corresponded with the surface expression of the fill boundaries. However, the northern boundary of the conductivity anomaly extends approximately 50 feet further north than the visible boundary of the fill area. An area of chaotic response in the southern portion of the fill area was caused by spools of Constantine wire, barbed wire and other miscellaneous metallic objects being stored at SEAD 70. Two localized anomalies, each characterized by low conductivity values, were detected beyond the extent of the fill area. The anomaly near the northeastern corner of the fill area was due to steel reinforced concrete debris visible along the fill edge.

The second anomaly, located near the west-central boundary of the fill area, could not be associated to any cultural effects; however, it was situated in or around a 7-foot high pile covered with grass and vegetation.

The in-phase response of the EM-31 survey conducted at SEAD 70 shows a generally featureless response over the entire grid except in the three areas where conductivity anomalies were detected. One anomaly of moderate intensity, located in the northwestern portion of the grid, was associated with cultural effects.

The GPR survey conducted at SEAD-70 revealed a homogeneous layer of fill approximately 2 feet thick throughout the fill area. Several irregular hyperbolic reflections were observed within the fill layer indicating the presence of large boulders. No anomalies were detected which could be associated with buried metallic objects. Data quality was degraded in certain areas due to standing water in the wetlands around the eastern and northern boundaries of the fill area.

Soils

Three soil borings were advanced in the fill area of SEAD-70. The soil borings were drilled at the approximate locations shown in the workplan. The objectives of these soil borings were to determine the depth of the fill and to provide subsurface samples for chemical analysis. Three soil samples were collected from each soil boring and submitted for chemical analysis. Based on the results of the drilling program, till and calcareous shale were found to be the two major types of geologic materials present on-site.

A total of three test pit excavations were performed at this site. All three test pits were located within the fill area and were performed solely to provide a visual identification of fill materials. No soil samples were collected from these test pits.

Each of the test pits revealed a fill layer, comprised of large limestone boulders (typically 1 to 2.5 feet in diameter) and light brown silt. TP70-1 and TP70-2 had been localized over GPR anomalies exhibiting hyperbolic reflections. The source of these anomalies was presumably associated with the large limestone boulders. The base of the fill layer of each test pit was denoted by an interval of dark gray silt, approximately one foot in thickness, which was characterized by decaying vegetation. No metallic objects were found in any of the three test pits excavations.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rems per hour of radiation) were observed during the excavation.

Groundwater

Four groundwater monitoring wells were installed at SEAD-70. One monitoring well (MW70-1) was installed upgradient of the fill area to obtain background water quality data, while the remaining three monitoring wells were installed adjacent to and downgradient of the fill area to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and submitted for chemical analysis.

Surface Water and Sediment

Two surface water and sediment samples were collected from the wetlands area downgradient of the fill area. These samples were collected submitted for chemical analysis to determine if surface water and sediment have been impacted at the site.

2.20.4 Summary of Analytical Results

Nine soil samples, four groundwater samples, and two surface water and sediment samples were collected from SEAD-70 for chemical testing. All the samples were analyzed for TCL VOCs, SVOCs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. Results of the chemical analyses can be found in **Appendix S, Tables S-1** through S-4 for soil, groundwater, surface water, and sediment respectively.

Soil

Twelve soil samples were collected from SEAD-70. Arsenic, copper, nickel, and zinc were detected in 1 to 2 samples each at levels that exceeded TAGMs. Copper, nickel and zinc detections were only 1 or 2 mg/Kg above the TAGMs. Arsenic exceeded the TAGM by 10 times in sample SB70-2-01, taken from a depth of 0-0.2 ft.

Groundwater

Four groundwater samples were collected from SEAD-70. Aluminum, iron and manganese were detected in one or more samples at levels that exceeded their respective comparative criteria levels. Manganese exceeded its Secondary Drinking Water criteria level (50 ug/L) in all four of the samples collected while aluminum surpassed its criteria level in three of the samples. Iron was found in one sample at a concentration (2140 ug/L) that exceeded its GA criteria level of 300 ug/L.

Surface Water

Two surface water samples were collected from SEAD-70. Aluminum, arsenic, cobalt, and iron were detected in both samples at levels that exceeded the surface water criteria. Thallium was detected in one of the two samples at levels that exceeded the surface water criteria. The majority of the exceedances were by more than two times the respective criteria.

Sediment

Two sediment samples were collected from SEAD-70. Copper, nickel, and manganese were each detected in one sample at a concentration that exceeded the criteria by less than 1.5 times.

2.21 SEAD-120B – OVID SMALL ARMS RANGE

2.21.1 Site Description

SEAD-120B is located in the southeast portion of the Depot (**Figure 2-1**). The site is comprised of a 200-foot long arcuate soil berm that opens to the southwest. There is approximately 250 feet of dirt road leading from the patrol road to the base of the berm, which is covered with brush and vines. At the base of the berm, beneath the brush, there are three steel posts that are believed to be the supports for target mounting frames. Three buried 4-inch diameter clay pipes (which protruded a few inches above the ground surface) are also located at the base of the berm. These may have been used as removable target-post receptacles.

2.21.2 Summary of Historic Operations

Interviews with SEDA personnel state that this area had been used as a small arms range. Data collected during the 1995 EBS further support this claim.

2.21.3 Summary of Field Investigations

Field investigations were conducted at SEAD-120B as part of the EBS. Sample locations are shown in **Figure 2-19**.

Three test pits were excavated at SEAD-120B. Test pits TP120B-1, TP120B-2, and TP120B-3 were excavated in the central, south-central, and north-central portions of the arcuate berm, respectively.

Test pits were located behind target mounting posts (potential bullet impact area). The mound soils consisted of greenish brown silt and clay. Small arms bullets, of various caliber, were found lodged into the mound at each test pit site. A total of six soil samples were collected where the most small arms projectiles (50 caliber or less) were found, and from the zone directly below this location.

The excavated material was continuously screened for organic vapors with an OVM-580B. No readings above background levels (0 ppm of organic vapors) were observed during the excavation.

2.21.4 Summary of Analytical Results

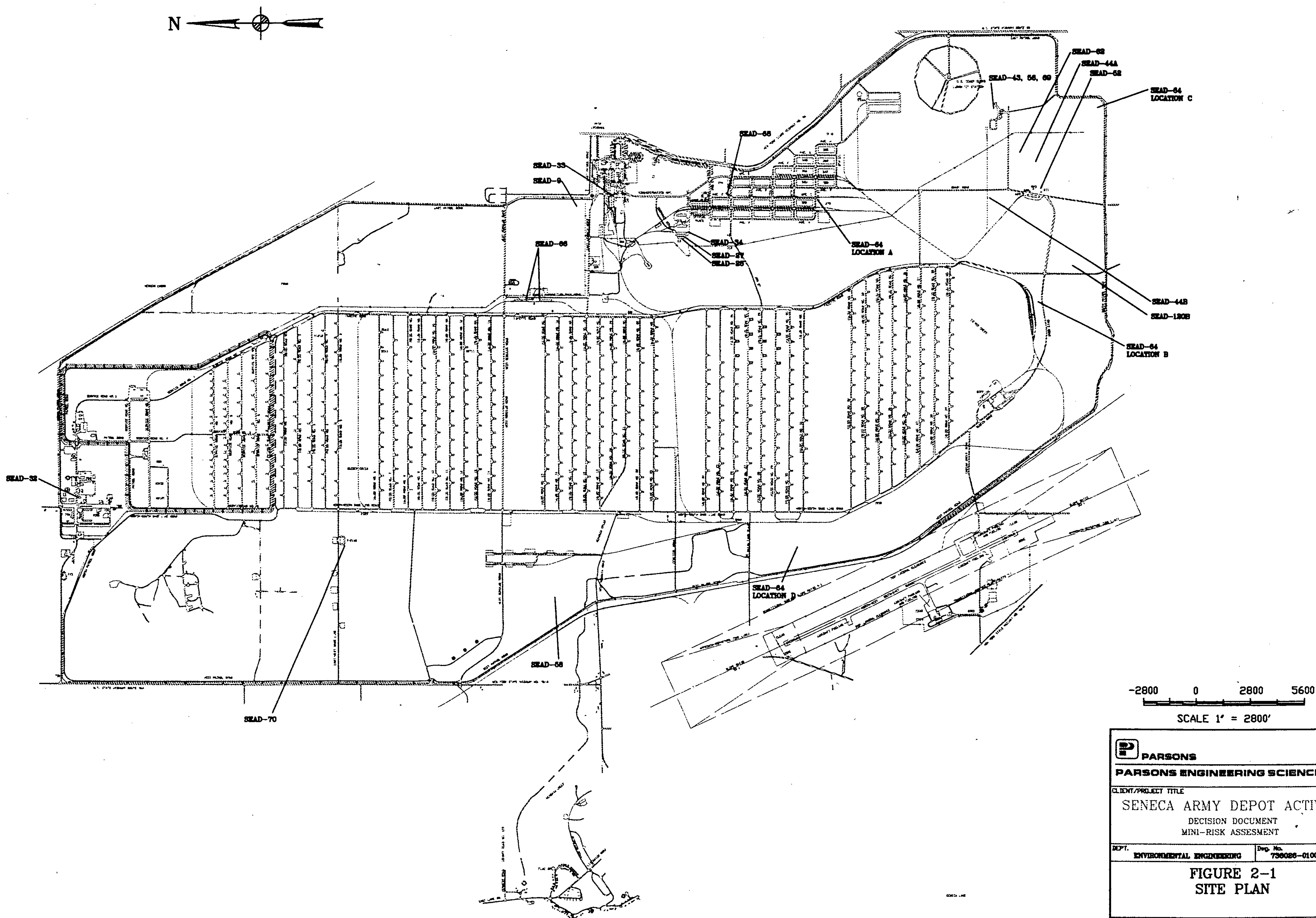
A limited sampling and analysis program was designed for SEAD-120B in order to provide the initial data for confirmation of potential concerns raised during the EBS. All the samples were analyzed for the following: SVOCs, metals, and explosives according to NYSDEC CLP SOW.
All of the samples were analyzed and compared to NYSDEC TAGMs. Results of the chemical analyses for soil can be found in **Appendix T, Table T-1.**

Soil

A total of seven SVOCs were detected, all at estimated concentrations, in the soil samples collected at SEAD-120B. The compounds included many PAHs and two phthalate compounds. None of the detected concentrations were above the TAGMs.

No explosive compounds were detected in the samples collected from the soil berm.

Twenty-two metals were detected in the soil samples collected at SEAD-120B. Of these, four metals exceeded their respective TAGMs. Lead was the only metal that exceeded the TAGM in all six samples. Samples from test pits TP120B-1 and TP120B-2 had lead concentrations that were in the several hundred ppm range. The maximum concentration for lead was 522 mg/Kg at TP120B-2, which is 21 times the TAGM value of 24.4 mg/Kg. Copper was the next most frequently detected metal to exceed its TAGM in the SEAD-120B samples. The exceedances for copper, which ranged from 1.7 times to 6.4 times the TAGM value, were found at test pits TP120B-1 and TP120B-2. The other two metals, arsenic and thallium, exceeded the TAGM in only a few samples and the exceedances were relatively low compared to those of lead and copper.



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CLIENT/PROJECT TITLE

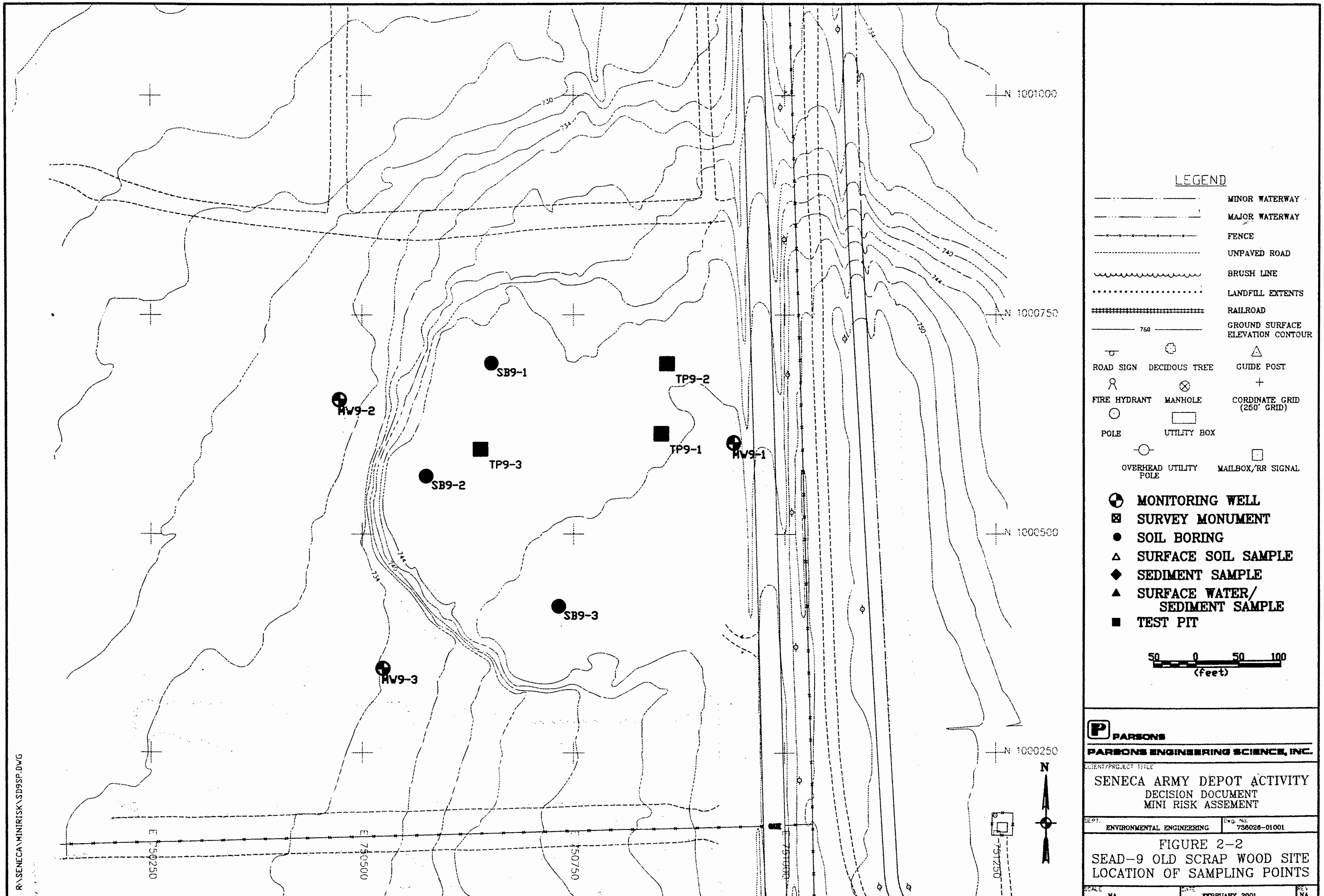
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI-RISK ASSESMENT

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	736026-01001

FIGURE 2-1
SITE PLAN

SCALE	DATE	REV
AS NOTED	FEBRUARY 2001	A

R:\SENECA\MINIRISK\SITEPLN.DWG


N 1001000
N 1000750
N 1000500
N 1000250
E 750250
E 750500
E 750750
E 751000
E 751250
730
734
740
744
750
SB9-1
SB9-2
SB9-3
TP9-1
TP9-2
TP9-3
MW9-1
MW9-2
MW9-3
LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
760
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
CORDINATE GRID (250' GRID)
POLE
UTILITY BOX
OVERHEAD UTILITY POLE
MAILBOX/RR SIGNAL
MONITORING WELL
SURVEY MONUMENT
SOIL BORING
SURFACE SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER/ SEDIMENT SAMPLE
TEST PIT
50 0 50 100
(feet)
N
R:\SENECA\MINIRISK\SD9SP.DWG
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PARSONS ENGINEERING SCIENCE, INC.
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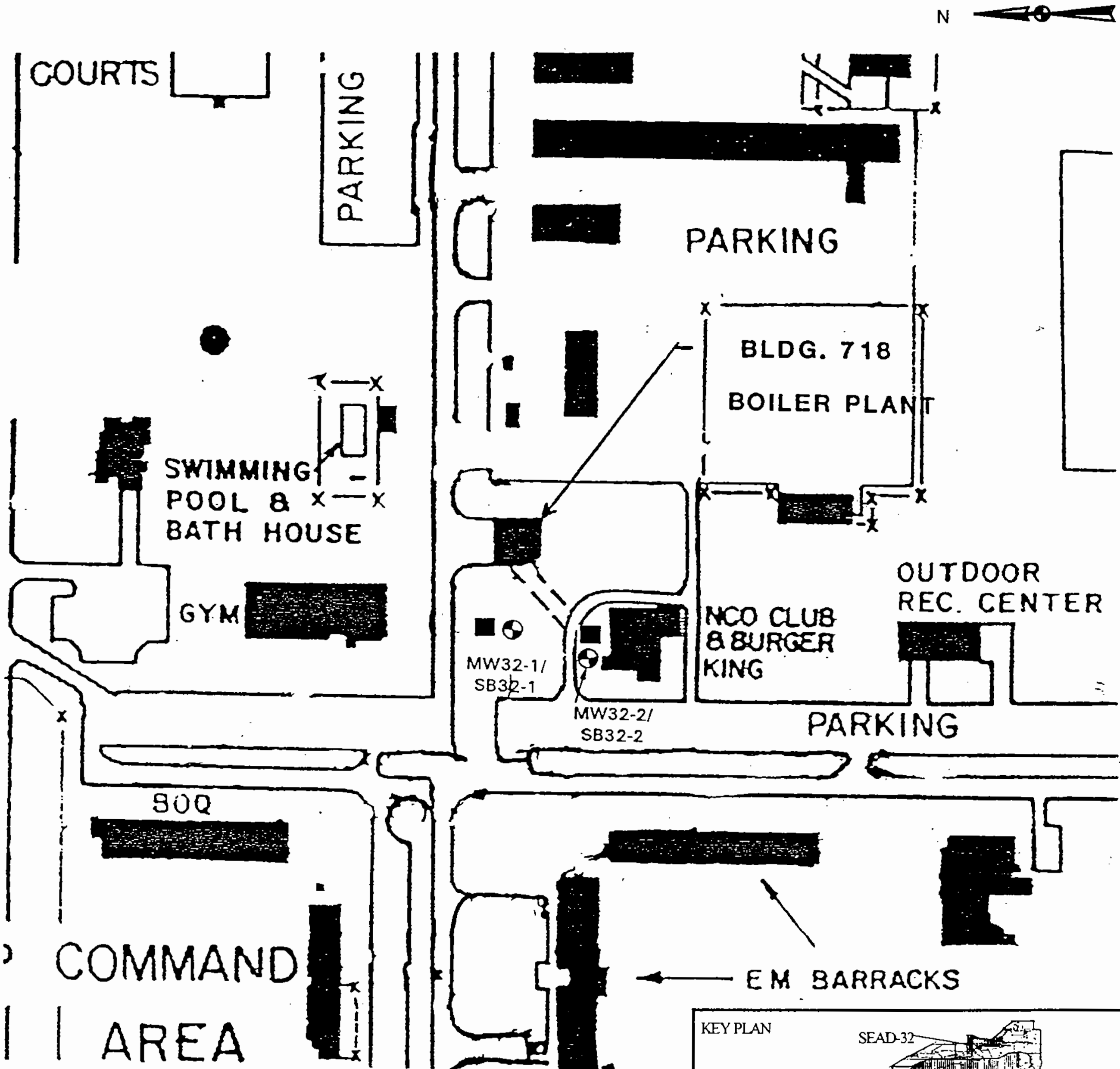
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSEMENT
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No.
736026-01001
FIGURE 2-2
SEAD-9 OLD SCRAP WOOD SITE
LOCATION OF SAMPLING POINTS
SCALE
NA
DATE
FEBRUARY 2001
REV.
NA



LEGEND

- MONITORING WELL
- SOIL BORING
- SURFACE SAMPLE

KEY PLAN

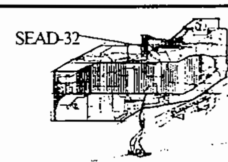


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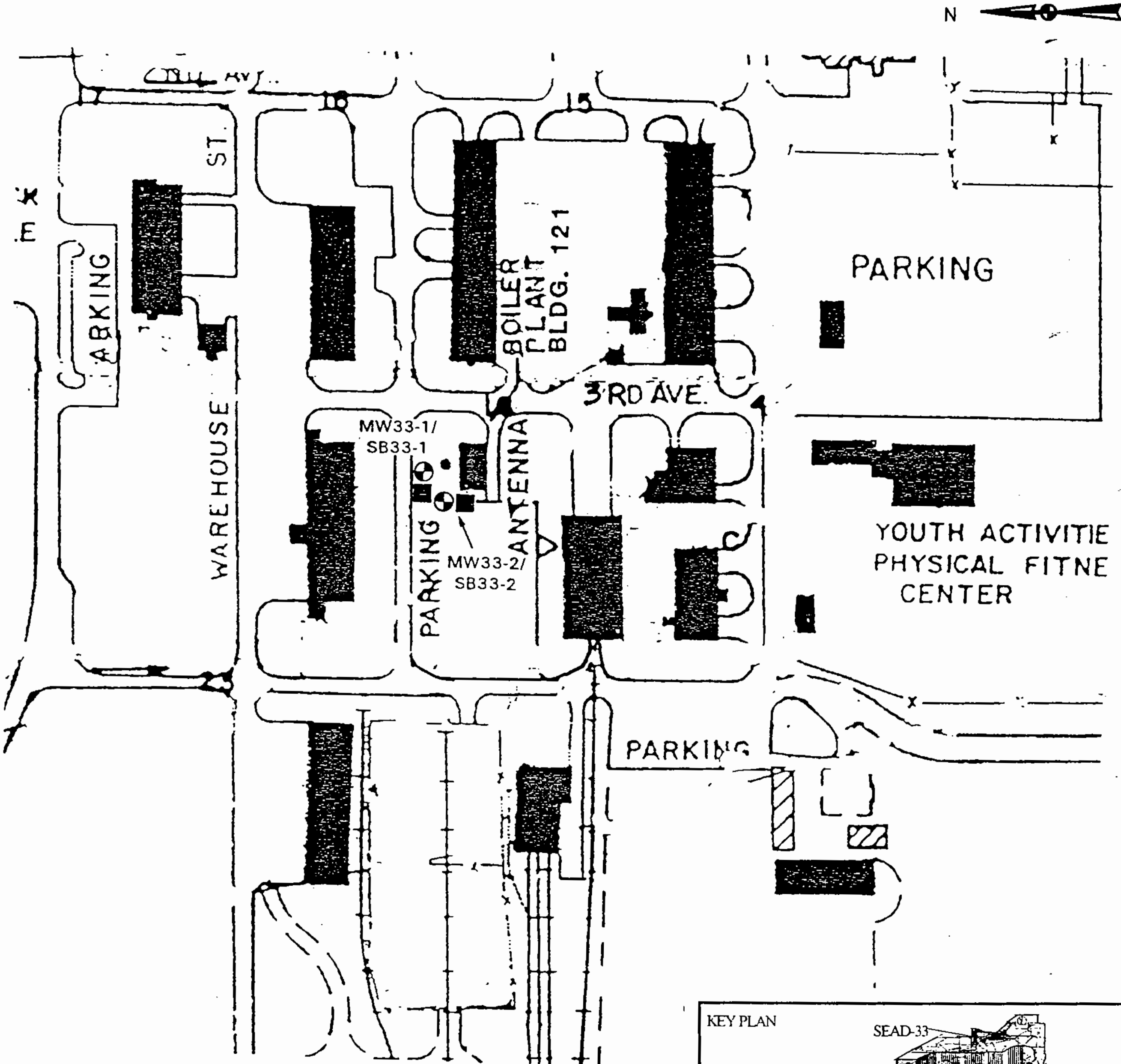
FIGURE 2-3

SEAD-32
LOCATIONS OF SAMPLING POINTS

JOB NUMBER: 736026-01001 | DATE: APRIL 2002

o:\seneca\minirisk\mrisk1.apr



LEGEND

- MONITORING WELL
- SOIL BORING
- SURFACE SAMPLE

KEY PLAN

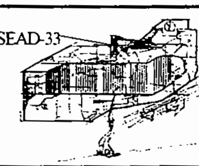


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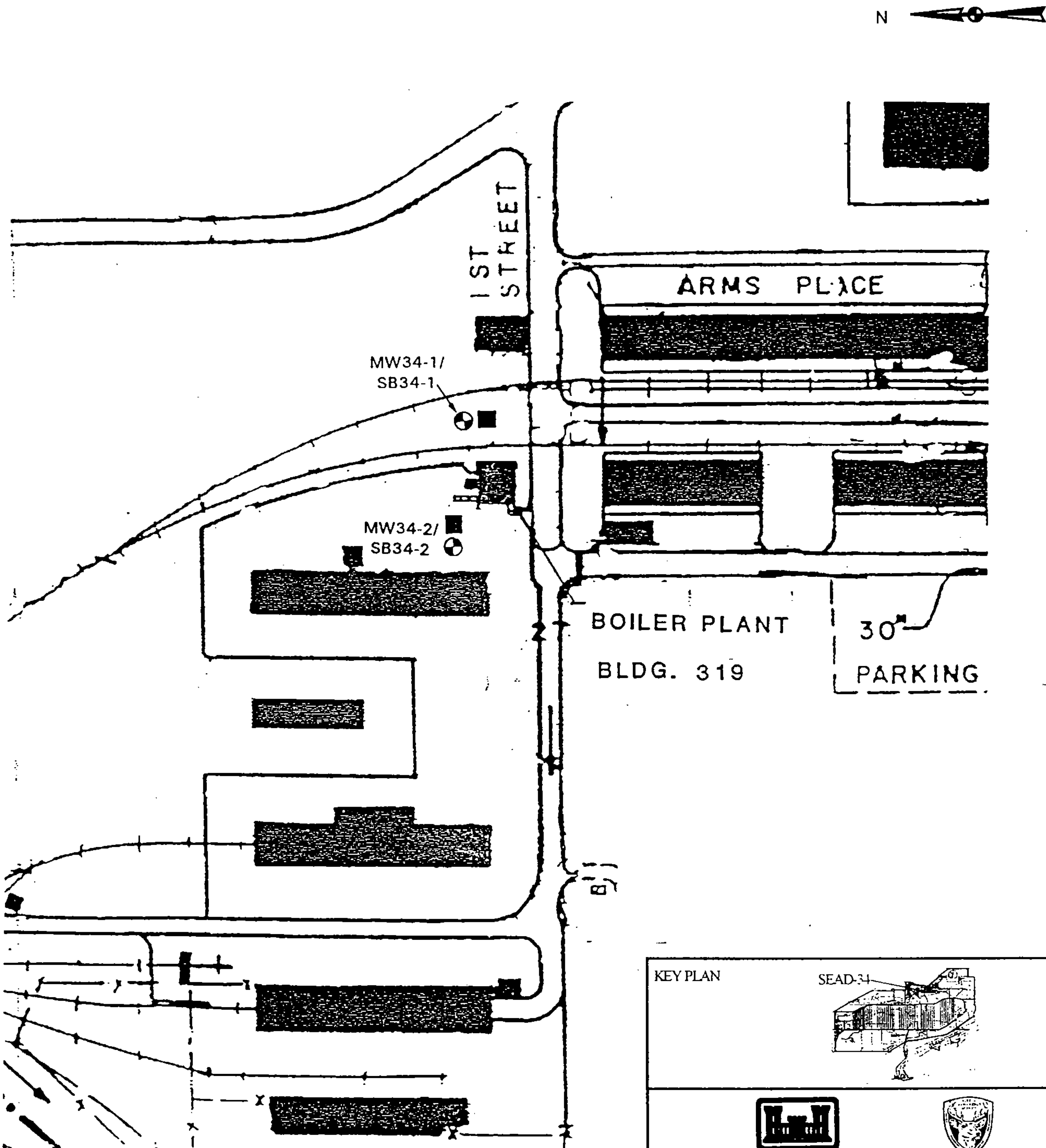
FIGURE 2-4

SEAD-33
LOCATION OF SAMPLING POINTS

JOB NUMBER: 736026-01001	DATE: APRIL 2002

o:\seneca\minirisk\mrisk1.apr



LEGEND

MONITORING WELL

SOIL BORING

SURFACE SAMPLE

KEY PLAN

SEAD-34

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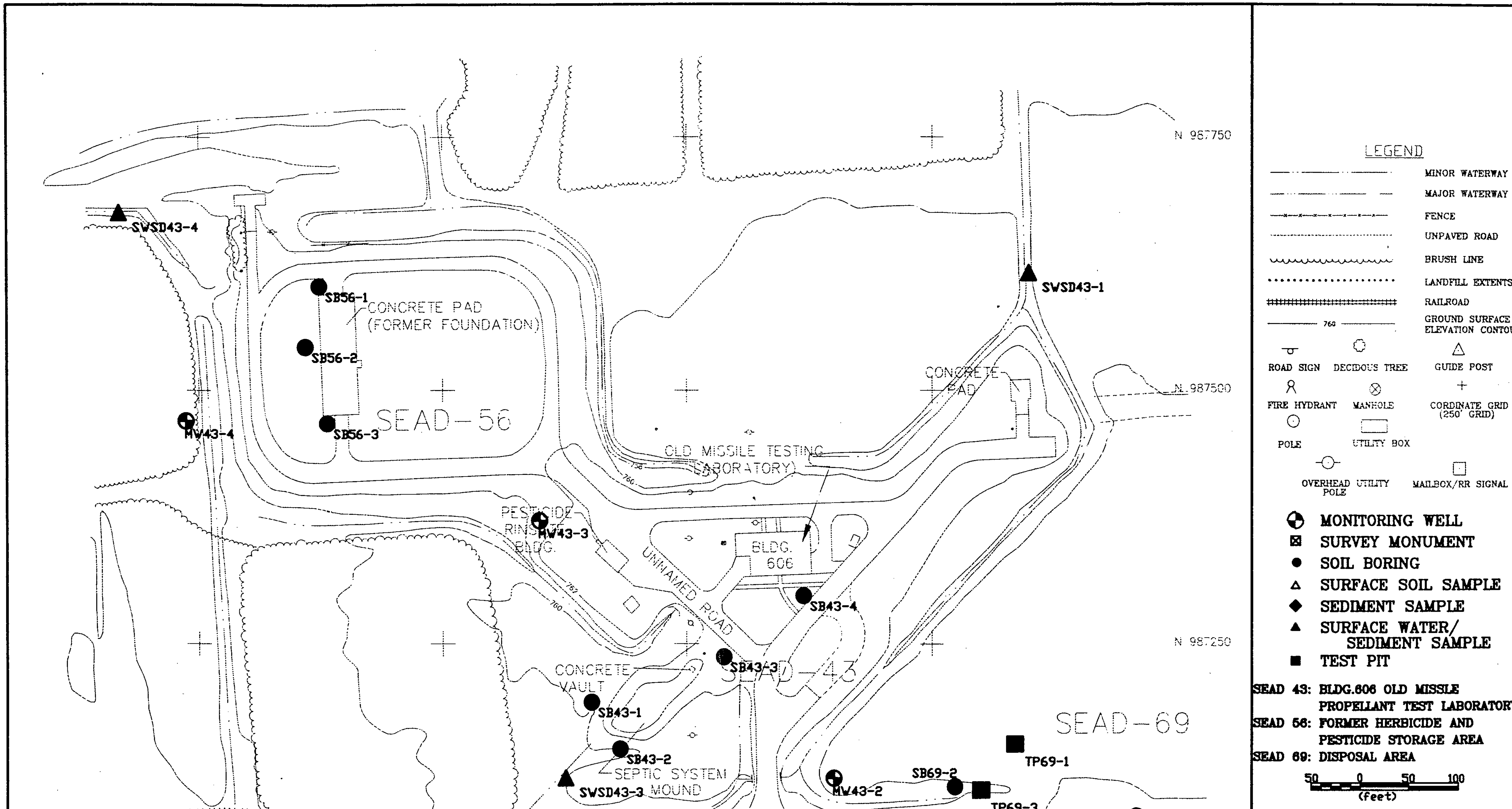
FIGURE 2-5

SEAD-34
LOCATIONS OF SAMPLING POINTS

JOB NUMBER: 736026-01001 | DATE: APRIL 2002

o:\seneca\minirisk\mrisk1.apr



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DECISION DOCUMENT
MINI RISK ASSESSMENT

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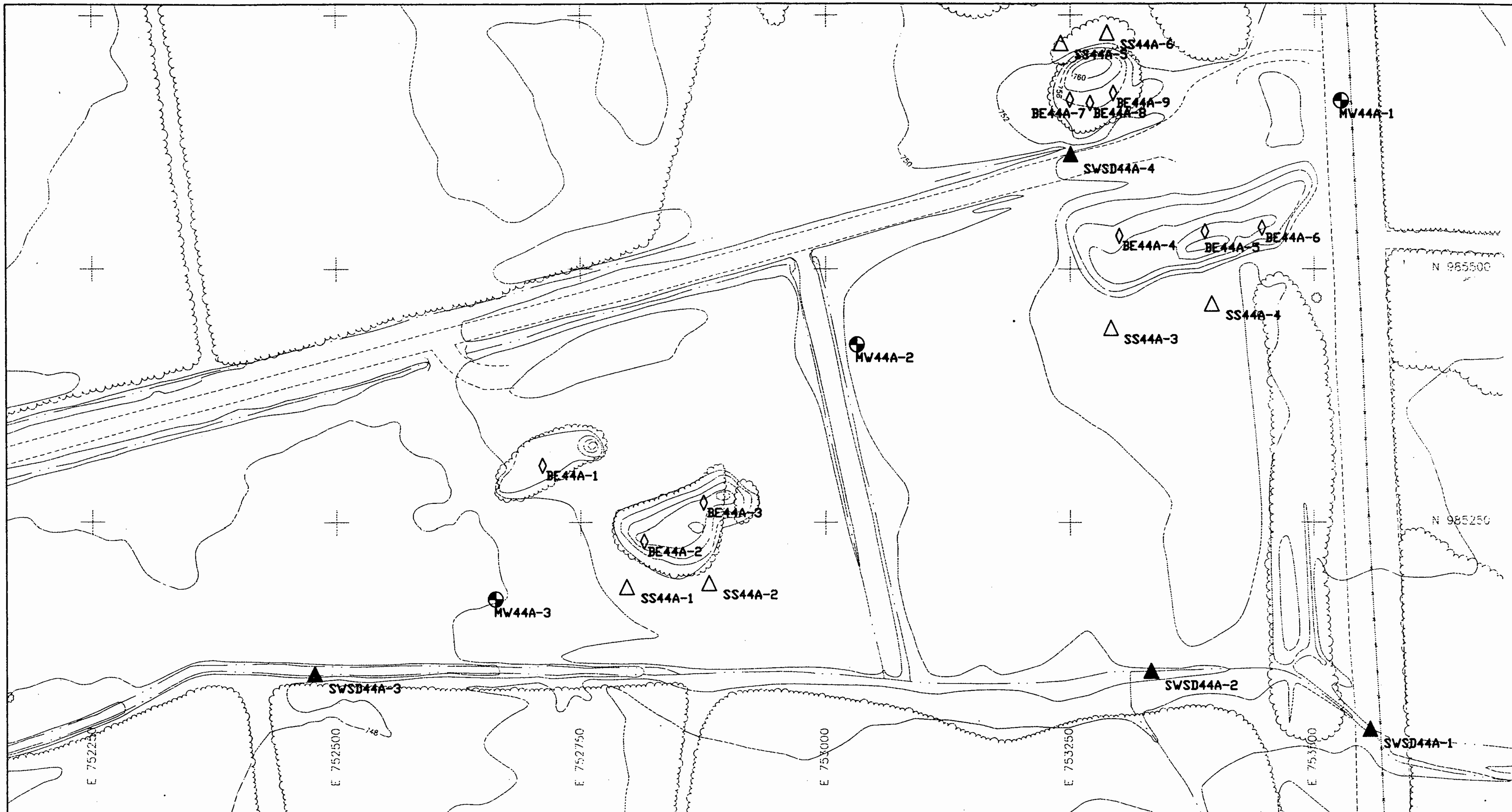
FIGURE 2-6
SEAD-43, 56 AND 69
LOCATION OF SAMPLING POINTS

SCALE 1" = 100' | DATE FEBRUARY 2001 | REV A



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENTS
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR

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

MONITORING WELL
SURVEY MONUMENT
SOIL BORING
SURFACE SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER/ SEDIMENT SAMPLE
TEST PIT
BERM EXCAVATION

N

50 0 50 100
(feet)

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SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESMENT

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Dwg. No. 736026-01001

FIGURE 2-7
SEAD-44 QUALITY ASSURANCE TEST LABORATORY
LOCATION OF SAMPLING POINTS

SCALE: 1" = 100'
DATE: FEBRUARY 2001
REV: A

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MINI RISK ASSESMENT

DEPT	Dwg. No.
ENVIRONMENTAL ENGINEERING	736026-01001

FIGURE 2-8
SEAD-44B QUALITY ASSURANCE TEST LABORATORY
LOCATIONS OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	FEBRUARY 2001	A

R:\SENECA\MINIRISK\SD52SP.DWG

LEGEND

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

▲ SURFACE SOIL SAMPLE

100 0 100 200
(feet)

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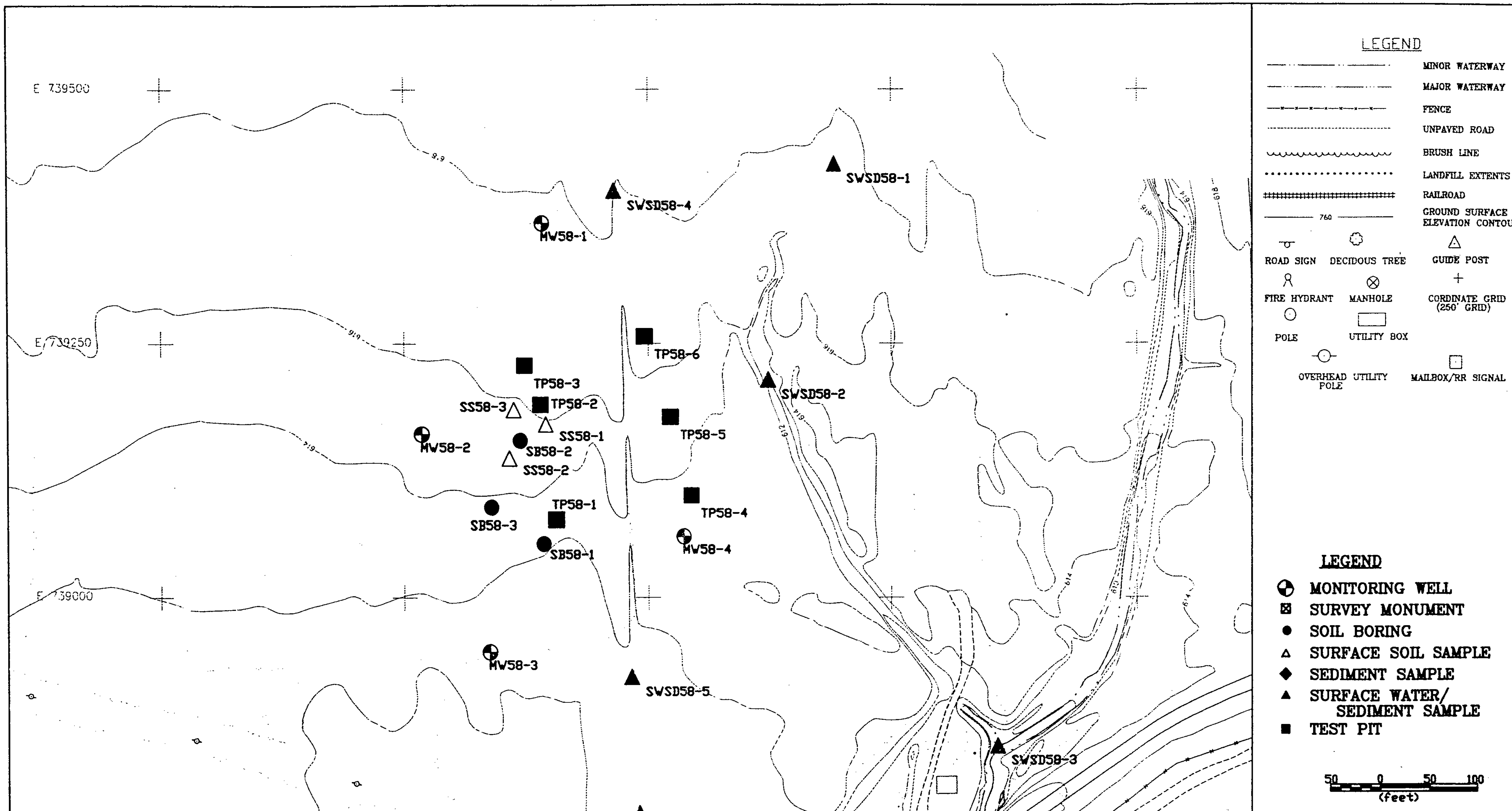
FIGURE 2-9
LOCATION OF SAMPLE POINTS
FOR SEAD-52

SCALE 1" = 200'
DATE FEBRUARY 2001
REV A



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DECISION DOCUMENT - MINI RISK ASSESMENT

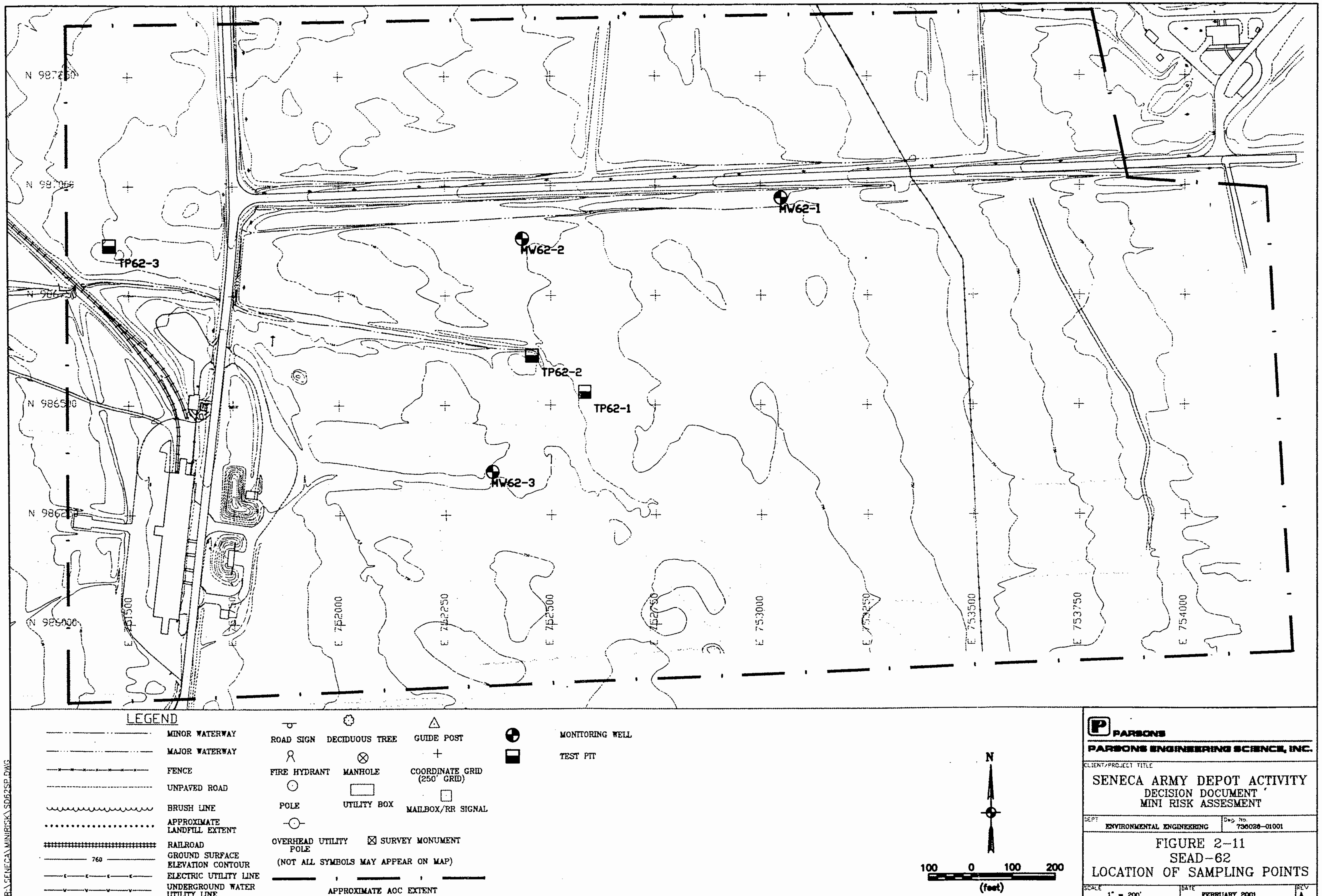
DEPT: ENVIRONMENTAL ENGINEERING | DWG NO. 738026-01001

FIGURE 2-10

SEAD-58 DEBRIS AREA NEAR BOOSTER STA. 2131

LOCATION OF SAMPLING POINTS

SCALE 1" = 100'-0" | DATE FEBRUARY 2001 | REV. A



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DECISION DOCUMENT
MINI RISK ASSESMENT

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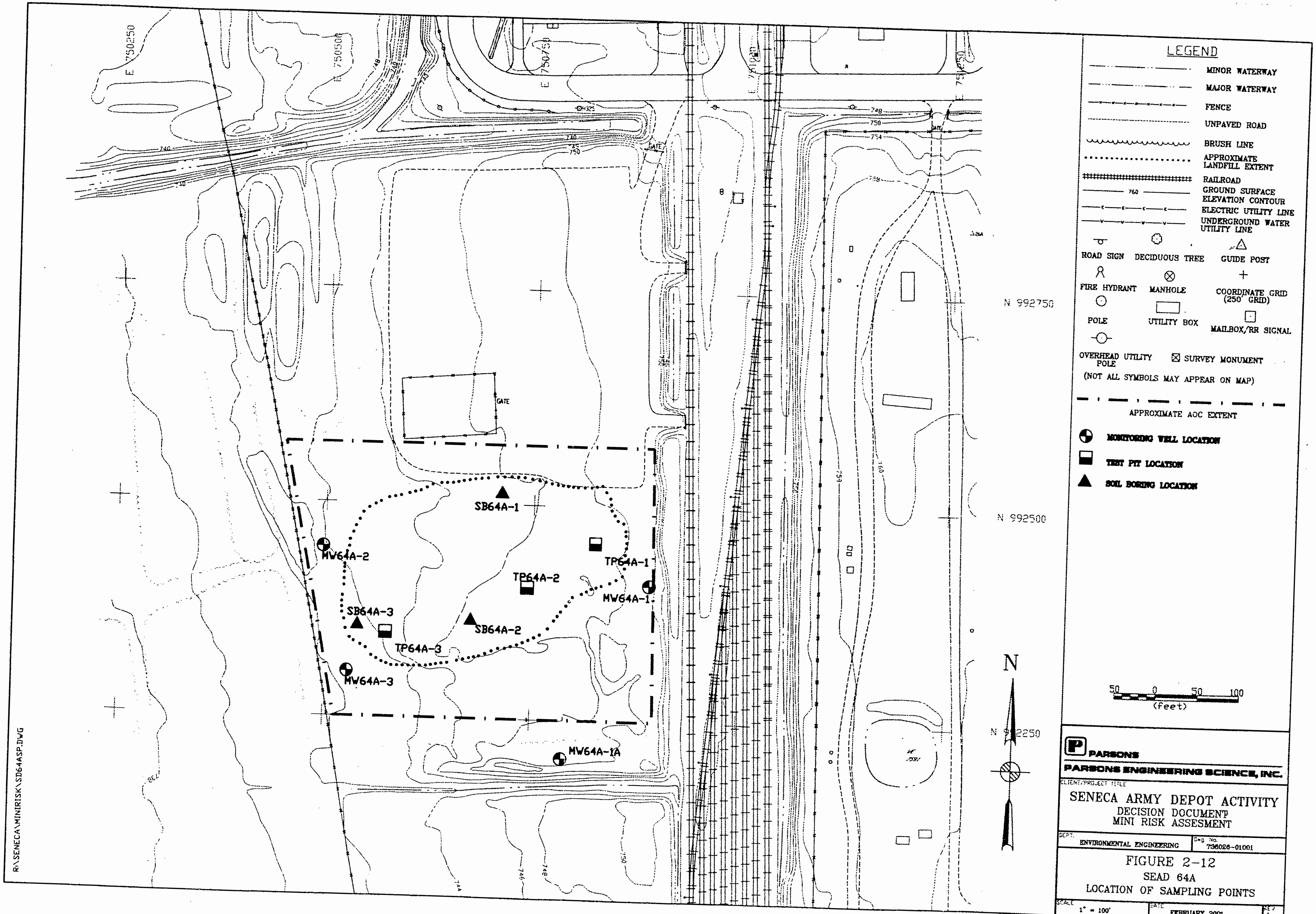
FIGURE 2-11
SEAD-62
LOCATION OF SAMPLING POINTS

SCALE 1" = 200' | DATE FEBRUARY 2001 | REV A



LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
APPROXIMATE LANDFILL EXTENT
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
ELECTRIC UTILITY LINE
UNDERGROUND WATER UTILITY LINE
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
(NOT ALL SYMBOLS MAY APPEAR ON MAP)
APPROXIMATE AOC EXTENT
MONITORING WELL LOCATION
TEST PIT LOCATION
SOIL BORING LOCATION
SB64A-1
SB64A-2
SB64A-3
TP64A-1
TP64A-2
TP64A-3
MW64A-1
MW64A-1A
MW64A-2
MW64A-3
GATE
N 992750
N 992500
N 992250
E 750250
E 750500
E 750750
N
50 0 50 100
(feet)
R:\SENECA\MINIRISK\SD64ASP.DWG
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PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESMENT
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg No.
736026-01001
FIGURE 2-12
SEAD 64A
LOCATION OF SAMPLING POINTS
SCALE
1" = 100'
DATE
FEBRUARY 2001
REV
A

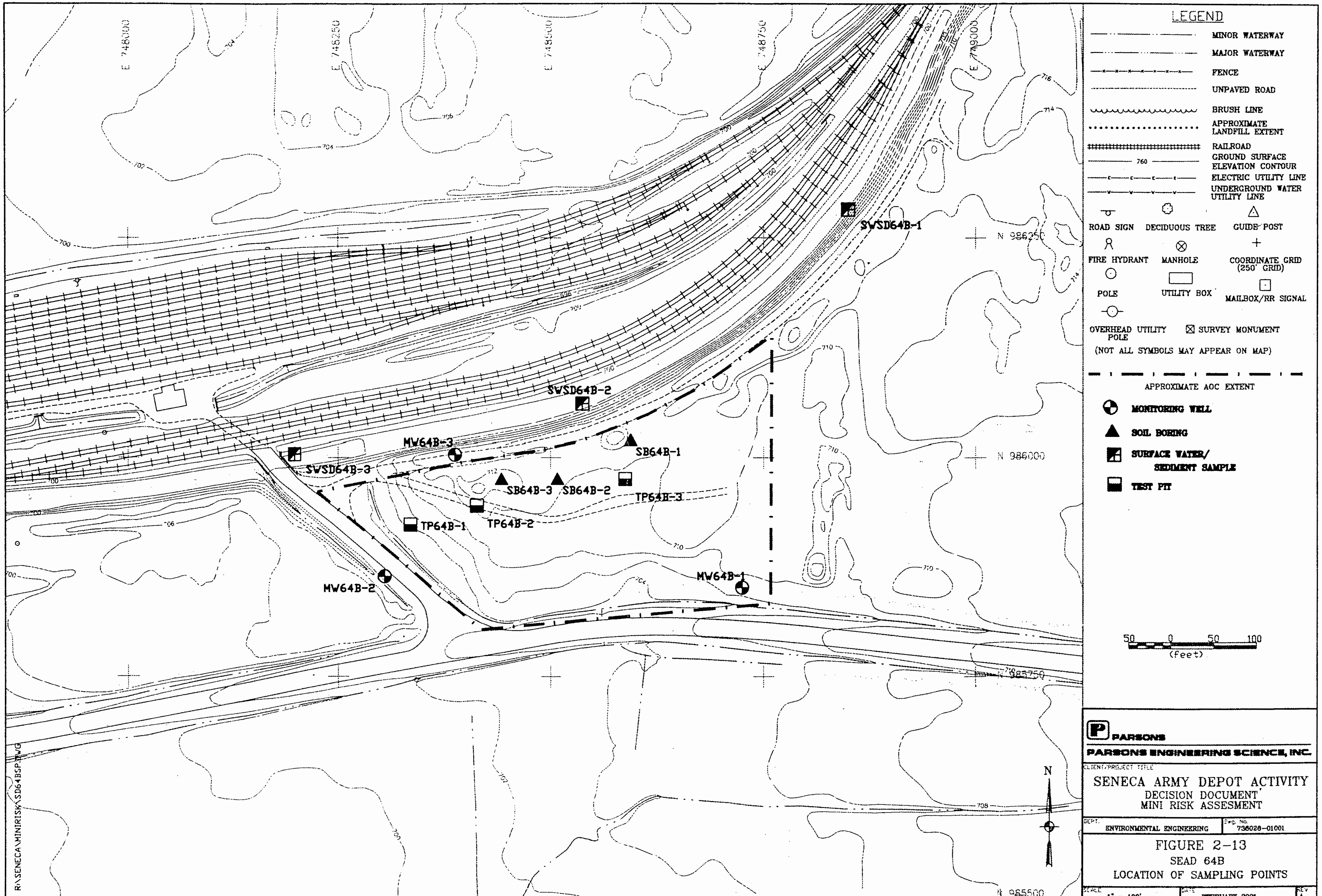
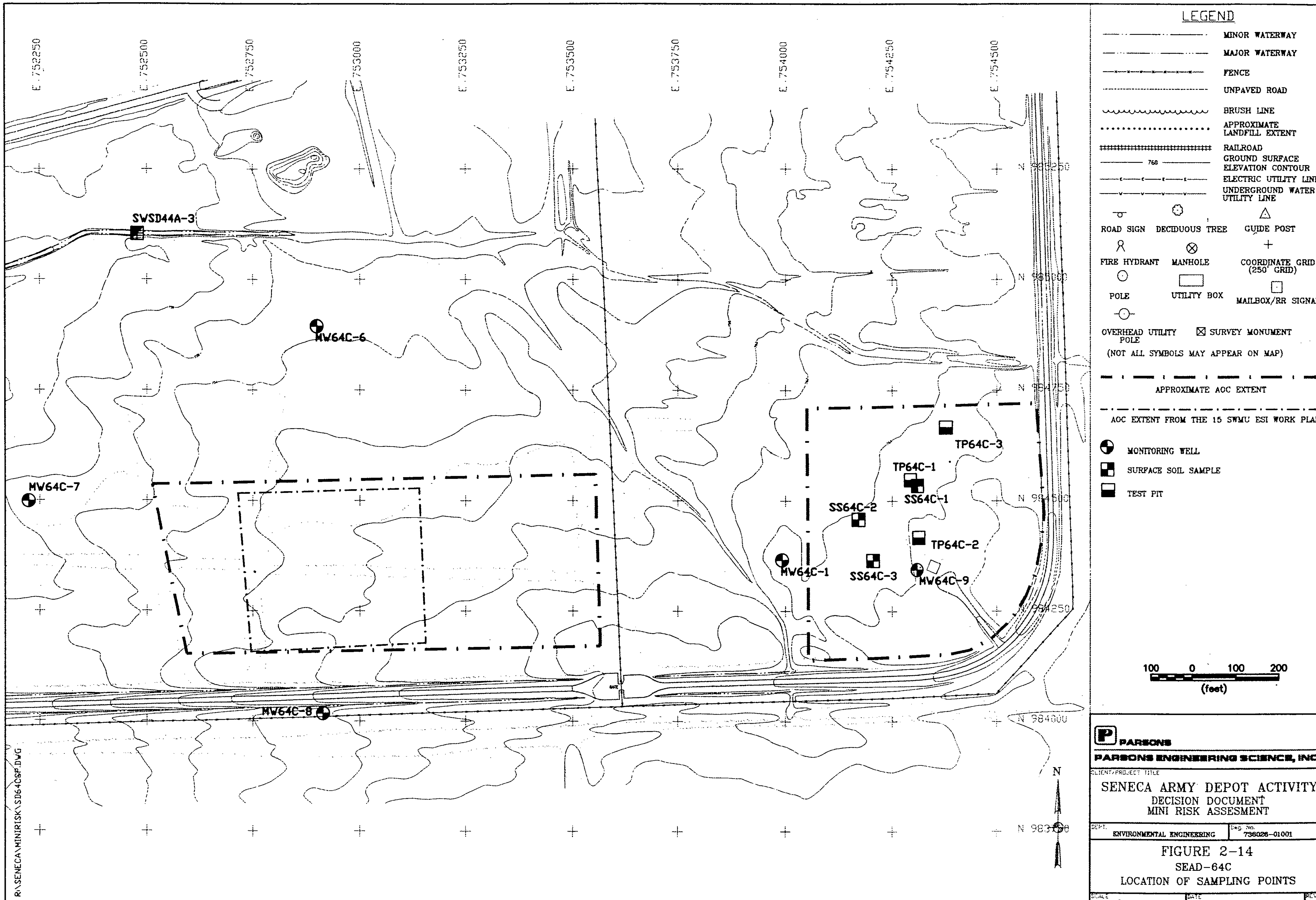


FIGURE 2-13
SEAD 64B
LOCATION OF SAMPLING POINTS



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DECISION DOCUMENT
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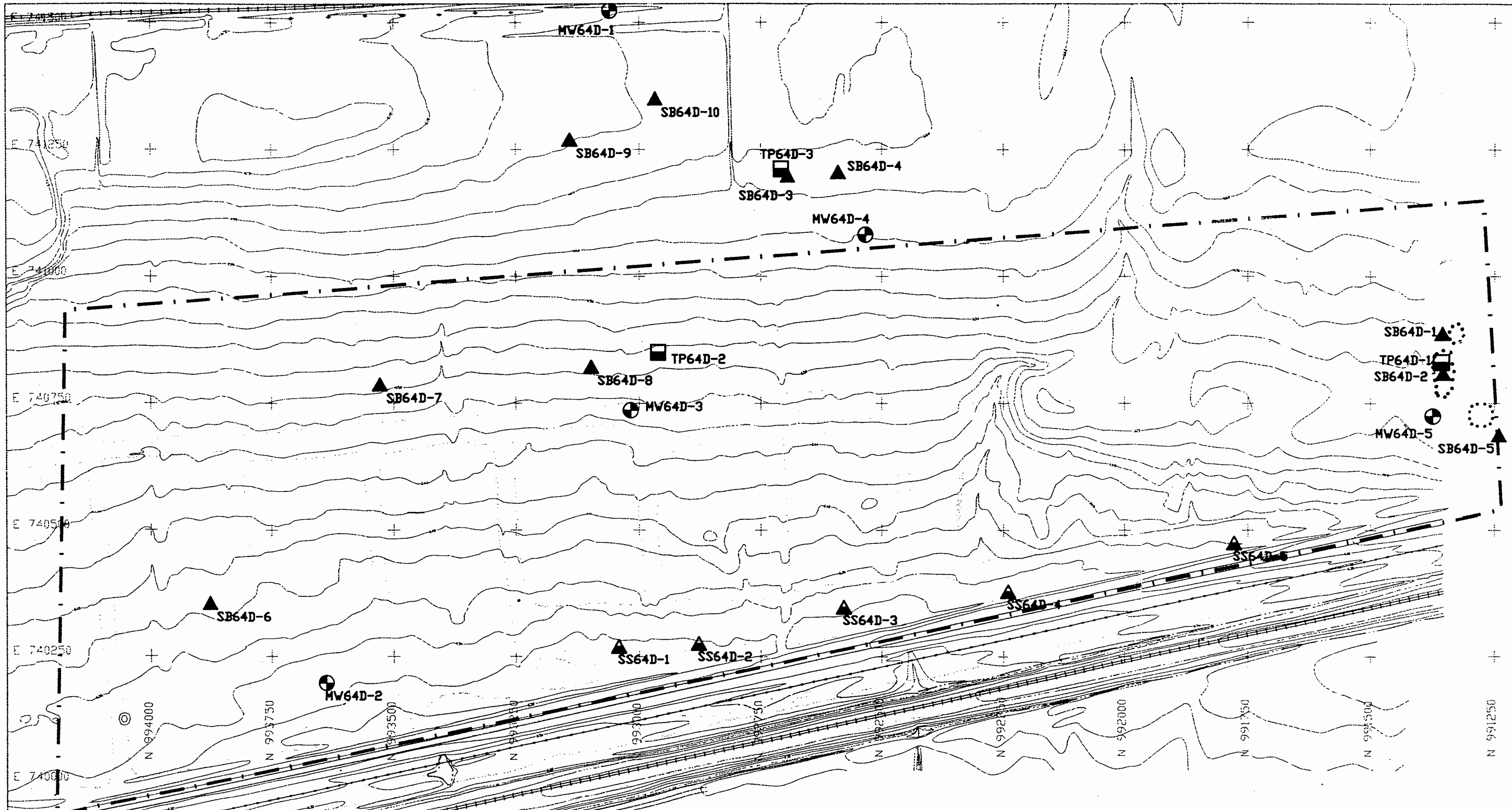
FIGURE 2-14
SEAD-64C
LOCATION OF SAMPLING POINTS

SCALE 1" = 200 | DATE FEBRUARY 2001 | REV. A



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LEGEND

- MONITORING WELL
- SOIL BORING
- SURFACE SOIL SAMPLE
- TEST PIT
- APPROXIMATE AOC EXTENT

100 0 100 200
(feet)

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE
- ROAD SIGN
- DECIDUOUS TREE
- GUIDE POST
- FIRE HYDRANT
- MANHOLE
- COORDINATE GRID (250' GRID)
- POLE
- UTILITY BOX
- MAILBOX/RR SIGNAL
- OVERHEAD UTILITY POLE
- SURVEY MONUMENT

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

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DECISION DOCUMENT
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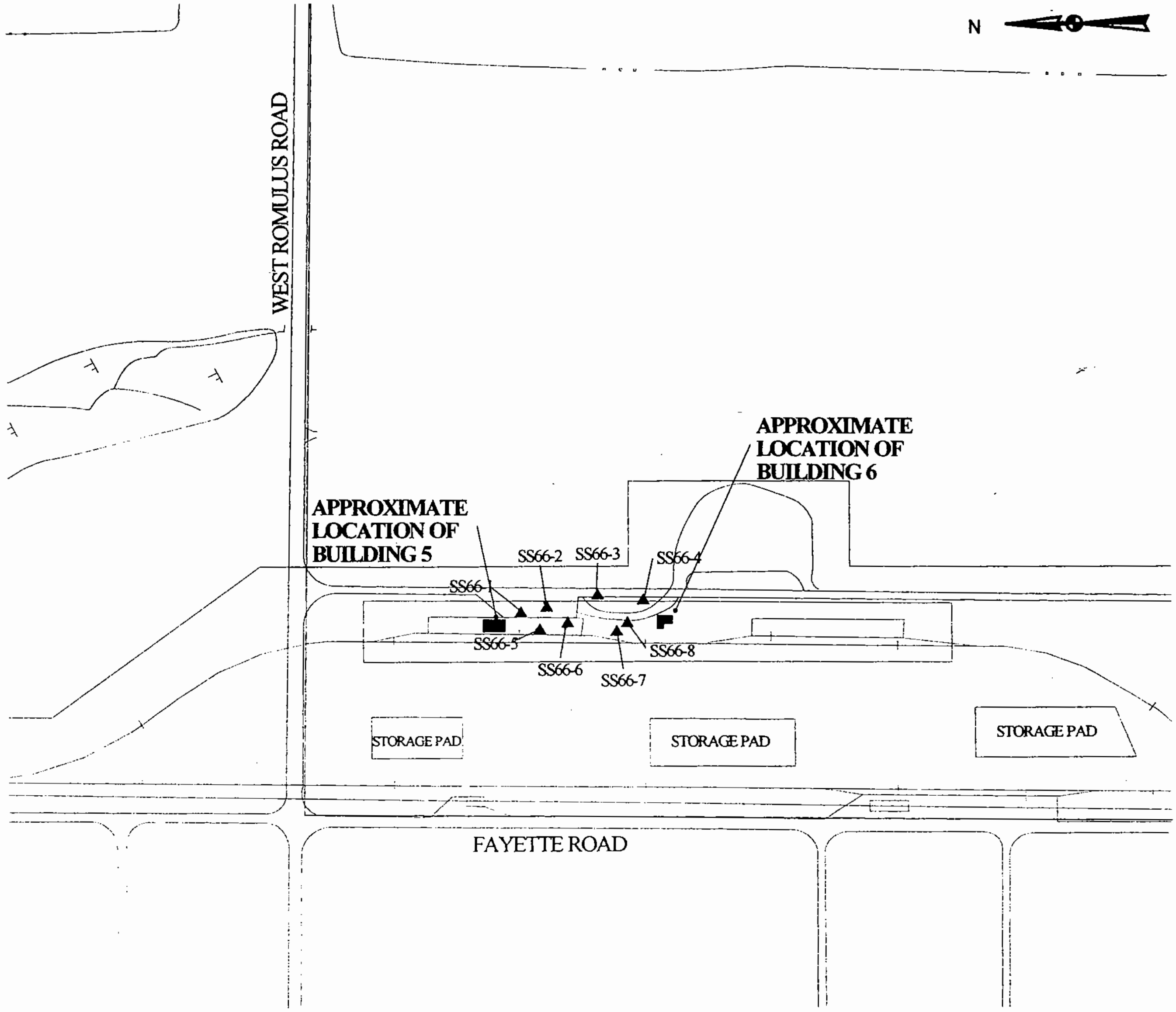
FIGURE 2-15
SEAD-64D
LOCATION OF SAMPLING POINT

SCALE 1" = 200' | DATE FEBRUARY 2001 | REV B



KEY PLAN

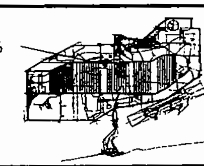


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FIGURE 2-16

SEAD-66
LOCATIONS OF SAMPLING POINTS

JOB NUMBER: 736026-01001 | DATE: APRIL 2002

LEGEND:

▲ SURFACE SAMPLE

400 0 400 Feet

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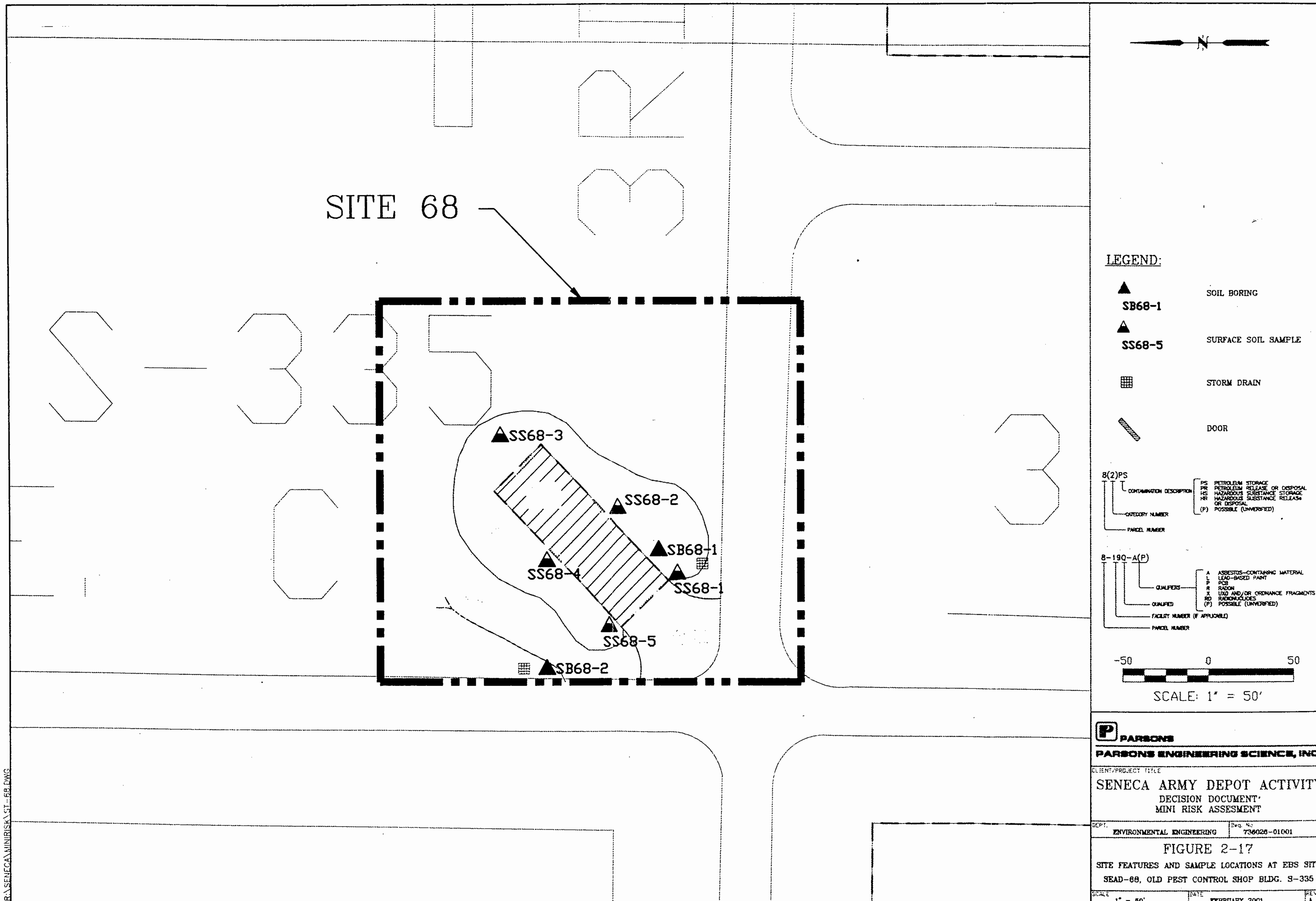

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DECISION DOCUMENT'

MINI RISK ASSESMENT

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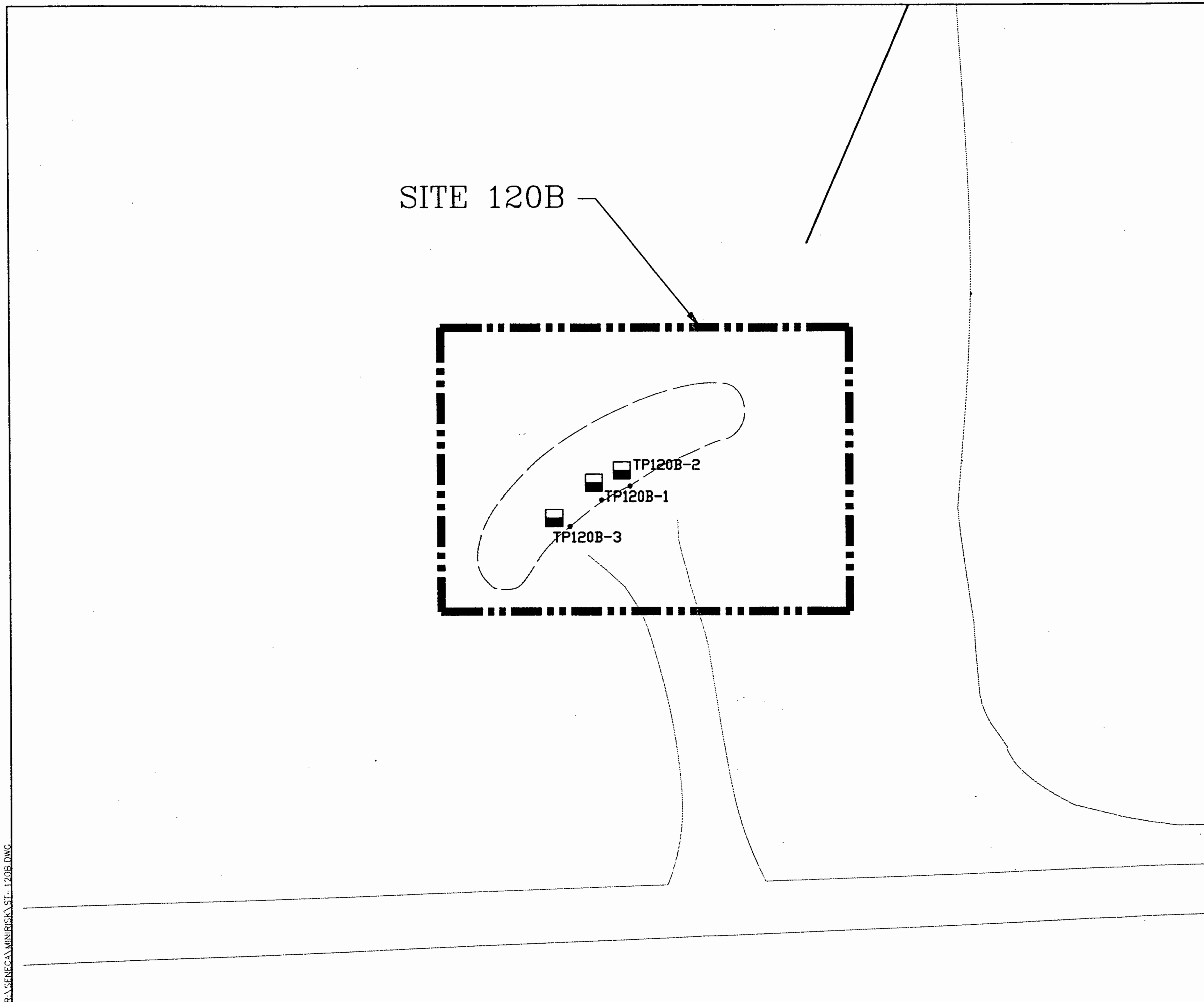
FIGURE 2-17

SITE FEATURES AND SAMPLE LOCATIONS AT EBS SITE SEAD-68, OLD PEST CONTROL SHOP BLDG. S-335

SCALE 1" = 50' | DATE FEBRUARY 2001 | REV A


LEGEND
MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
APPROXIMATE LANDFILL EXTENT
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
ELECTRIC UTILITY LINE
UNDERGROUND WATER UTILITY LINE
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
(NOT ALL SYMBOLS MAY APPEAR ON MAP)
APPROXIMATE AOC EXTENT
AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
MONITORING WELL
SOIL BORING
SURFACE WATER/ SEDIMENT SAMPLE
TEST PIT
SB70-2
MW70-2
MW70-1
SWSD70-1
SB70-3
SB70-1
MW70-3
TP70-1
TP70-2
MW70-4
TP70-3
SWSD70-2
N 1007500
N 1007250
N 1007000
E 740000
E 740250
E 740500
E 740750
E 741000
628
630
632
634
50 0 50 100
(feet)
N
R:\SENECA\MINIRISK\SD70SP.DWG
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
MINI RISK ASSESMENT
DEPT
ENVIRONMENTAL ENGINEERING
DWG No
736026-01001
FIGURE 2-18
SEAD 70
LOCATION OF SAMPLING POINTS
SCALE
1" = 100'
DATE
FEBRUARY 2001
REV
B



LEGEND:

TP120A-1 TEST PIT

● TARGET MOUNTING FRAME SUPPORT POST

8(2)PS
- CONTAMINATION DESCRIPTION
  - PS PETROLEUM STORAGE
  - PR PETROLEUM RELEASE OR DISPOSAL
  - HS HAZARDOUS SUBSTANCE STORAGE
  - HR HAZARDOUS SUBSTANCE RELEASE OR DISPOSAL
  - (P) POSSIBLE (UNVERIFIED)
- CATEGORY NUMBER
- PARCEL NUMBER

8-19Q-A(P)
- QUALIFIERS
  - A ASBESTOS-CONTAINING MATERIAL
  - L LEAD-BASED PAINT
  - P PCB
  - R RADON
  - X UXO AND/OR ORDNANCE FRAGMENTS
  - RD RADIONUCLIDES
  - (P) POSSIBLE (UNVERIFIED)
- QUALIFIED
- FACILITY NUMBER (IF APPLICABLE)
- PARCEL NUMBER

-50 0. 50

SCALE: 1" = 50'

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DEPT ENVIRONMENTAL ENGINEERING | Seq. No. 736028-01001

FIGURE 2-19

SITE FEATURES AND SAMPLE LOCATIONS AT EBS SITE 120B OVID ROAD SMALL ARMS RANGE

SCALE 1" = 50' | DATE FEBRUARY 2001 | REV A

R:\SENECA\MINIRISK\ST-120B.DWG

3.0 MINI-RISK ASSESSMENTS

The threat from a site can be quantified using risk assessment techniques. Risk assessments have been performed at several of the higher priority sites and have been a useful tool in evaluating site conditions. Since future land use scenarios have been described as part of the Base Realignment Plan these scenarios have been incorporated into the risk assessment. Risk assessments are appropriate for developing and supporting planning decisions regarding the disposition of the remaining sites that exist at the Seneca Army Depot Activity.

This section of the Decision Document presents the mini-risk assessments that have been performed for each of the 21 SWMUs and 1 EBS site. These risk assessments provide an understanding of the potential threats that these sites may pose. The results of these evaluations are used to support decisions regarding site disposition. Sites with risk above the EPA target risk levels will be considered further, while sites with risk below these criteria may be eliminated from further consideration. Procedures for conducting a mini-risk assessment were presented to EPA and NYSDEC in the Decision Criteria Document dated March 1998.

The mini-risk assessment is a conservative, screening-level risk assessment. The intent of this mini-risk assessment process is to expediently distinguish sites with a potential for human health or ecological risks from those that clearly pose no significant risk. Due to the conservative nature of the mini-risk assessment, it is likely that a more traditional risk assessment would estimate even lower risks.

The methods used to conduct the mini-risk assessment are the same as those used in prior baseline risk assessments at several of the other sites, with the exception that the maximum concentration of a component is used instead of the Upper 95^{th} Confidence Limit (UCL) of the mean. The existing database is small at many of these sites. Using the maximum detected value will provide an added degree of conservatism. Biased sampling has been performed, and the data represent "worst case" conditions.

The objectives of the mini-risk assessment are to:

- quantify the threat that a site may pose;
- help determine whether a remedial investigation is necessary;
- provide a basis for determining if a removal action will eliminate the threat; and
- help support selection of the "No Action" remedial alternative, where appropriate.

To meet these objectives, the *Risk Assessment Guidance for Superfund* (RAGS) (EPA, 1989a) was followed when possible and applicable. Technical judgment, consultation with EPA staff, and recent publications were used in the development of the mini-risk assessment.

There are 21 SWMUs and 1 EBS site evaluated in this report. Different future land uses are associated with each of these sites, based on their locations within defined regions of the Seneca Army Depot. The 22 sites, classified by future land use, include:

Planned Industrial Development

- SEAD-9: Old Scrap Wood Site
- SEAD-27: Building 360 - Steam Cleaning Waste Tank
- SEAD-28: Building 360 - Underground Waste Oil Tanks (2)
- SEAD-33: Building 121 - Underground Waste Oil Tank
- SEAD-34: Building 319 - Underground Waste Oil Tanks (2)
- SEAD-66: Pesticide Storage near Buildings 5 and 6
- SEAD-68: Building S-335 - Old Pest Control Shop

Institutional

- SEAD-32: Building 718 - Underground Waste Oil Tanks (2)

Conservation and Recreation

- SEAD-58: Debris Area near Booster Station 2131
- SEAD-64B: Garbage Disposal Area
- SEAD-64D: Garbage Disposal Area
- SEAD-70: Fill Area Adjacent to Building T-2110

Warehouse

- SEAD-64A: Garbage Disposal Area

Prison

- SEAD-43 - Building 606-Old Missile Propellant Test Laboratory
- SEAD-44A - Quality Assurance Test Laboratory (West of Building 616)
- SEAD-44B - Quality Assurance Test Laboratory (Brady Road)
- SEAD-52 - Ammunition Breakdown Area
- SEAD-56 - Building 606-Herbicide and Pesticide Storage
- SEAD-62 - Nicotine Sulfate Disposal Area
- SEAD-64C: Garbage Disposal Area
- SEAD-69 - Building 606-Disposal Area

- SEAD-120B - Ovid Road Small Arms Range

The 22 sites are shown in **Figure 1-2.**

Mini-risk assessments have already been completed for eight of the nine SEADs in the Prison land use area (three of these SEADs were treated as a single site: SEADs-43, -56, and –59; see *Draft Completion Report for Six Areas of Concern*, February 1999). The risk assessments for these sites are included along with the 14 new sites in this document.

3.1 METHODOLOGY AND ORGANIZATION OF DOCUMENT

The methodology employed for this risk assessment follows EPA guidance. This section contains seven major subsections, as follows:

1. Identification of Chemicals of Potential Concern (**Section 3.2**)

This section provides site-related data along with background chemical data. Detailed summaries and statistical analyses of these data are provided in this section. All chemicals with validated detections in the applicable environmental media were evaluated in the risk assessment. The relevant exposure pathway risks were calculated for each detected chemical. Also included in the Data Evaluation section is an evaluation of site background data. Relevant background data are presented and, where appropriate, statistical analyses were performed to compare on-site chemical concentrations with background concentrations. Based on these analyses, chemicals whose presence at a site is attributable to background were not further evaluated in the mini-risk assessments.

2. Exposure Assessment (**Section 3.3**)

This section includes derivation and presentation of the applicable exposure point concentrations (EPCs) used in the human health risk assessment. Exposure point concentrations for the baseline risk assessment are based on analytical data and modeling results. The EPCs provided are used for future onsite land-use scenarios, and correspond to the applicable exposure pathways for the baseline risk assessment.

The future land-use scenarios for each site are either: Planned Industrial Development, Institutional, Conservation and Recreation, Warehouse, or Prison. Associated with each land use scenario is a specific set of plausible receptors and exposure pathways. In all scenarios, the calculated risk values apply to a hypothetical reasonable maximum exposure (RME) individual working on or visiting the site, and the risk values are dictated by the environmental sampling data used in the risk assessment as exposure point concentrations for the applicable media.

The three primary exposure routes considered in these risk assessments are ingestion, inhalation, and dermal contact. Chemical intake values for future land use are calculated based on exposure pathways, specific exposure values, and assumptions. Equations used to calculate intakes for all applicable exposure pathways are presented in this section.

3. Toxicity Assessment (**Section 3.4**)

This section presents oral, inhalation, and dermal toxicity values used in the human health risk calculations. Appropriate data sources (i.e. IRIS, HEAST and EPA Risk Assessment Issue papers) are provided to support the toxicity values.

4. Risk Characterization (**Section 3.5**)

This section presents the risk calculations for all human health exposure pathways for the expected future land use. Non-carcinogenic and carcinogenic risk estimates are summarized for each receptor and exposure pathway.

3.2 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

Data collected were evaluated for suitability of use in the risk assessment as discussed in RAGS (EPA, 1989a). These decisions were based on analytical methods, quantitation limits, qualifiers, and blank contamination.

The data usability criteria for documentation, analytical methods, data validation, precision, accuracy, representativeness, comparability, and completeness are discussed in past reports, which documented the field investigations at the 21 SWMUs and 1 EBS site. Such discussions may be found in the *ESI for Eight Moderately Low Priority Sites*, *SWMU Classification Report*, the *ESI for Seven Low Priority Sites*, and the *EBS for Non-Evaluated Sites*.

The data used in the mini-risk assessments were collected during four investigations documented in the reports cited in the last paragraph. Data for the ESI for Eight Moderately Low Priority Sites was collected between March and July, 1994. Data for the ESI for Seven Low Priority Sites was collected between June and July, 1994. Data collected for the SWMU Classification Report was collected during December 1993 and data collected for the EBS Report was collected during March, 1998.

Table 3.2-1 summarizes the number of samples from each media collected at each of these areas of concern. Two separate sample counts are provided for soil samples: all soils and shallow soils (i.e., 0 to 2 ft). Shallow soil samples provide the basis for the evaluation of ecological risks in **Section 3.6**. The figures showing these sample locations are found in **Section 2**.

The following sections describe the processes by which the data were analyzed, examined, and reduced to arrive at a list of analytes, for each exposure pathway, that were quantified for use in the human health mini-risk assessment.

3.2.1 Site-Specific Data Evaluation Considerations

The maximum concentration of a component in the database was used as the exposure point concentration in the mini-risk assessment.

NYSDEC CLP Statement of Work methods were used for the analysis of organic and inorganic constituents in soil, sediment, groundwater, and surface water. Herbicides were analyzed using EPA Method 8150. These methods provide data suitable for the mini-risk assessment.

For inorganics, each site dataset was compared against the SEDA background dataset to determine if the site dataset is statistically different from the background dataset. This background comparison was performed for two media: soil and groundwater. One of the two following methods was used for these comparisons:

For the eight sites in the Prison area originally evaluated in the *Draft Completion Report for Six Areas of Concern*, a rigorous statistical technique, The Wilcoxon Rank Sum Test, was used. Based on this test, certain constituents were eliminated from further consideration (the test demonstrated that there was no statistical difference between the site and background datasets). Refer to the Draft Completion Report for details on the Wilcoxon Rank Sum Test and its application to these eight sites.

For the remaining 14 sites, the following simpler analysis, recommended by EPA Region 2, was used. For each inorganic constituent, the average concentration for the site was compared to 2 times the average background concentration. If the site average concentration for a constituent was less than 2 times the background average concentration, the constituent is considered to be present due to background conditions, and it was eliminated from further consideration in the risk assessment.

Removing analytes from further consideration is consistent with RAGS (EPA 1989a). The background comparison was only done for soil and groundwater—not for surface water and sediment. All detected compounds in surface water and sediment were conservatively retained for the risk assessment.

Only inorganic constituents were compared to background. Anthropogenic organic constituents have not been considered. Organic compounds were eliminated from further consideration only if they were not detected at a particular site. This has produced a more conservative risk assessment since all organic constituents have been assumed to be present due to previous site activities. Background data sets and the locations from which the data were collected are provided in **Appendix U**.

Eight inorganic analytes were found to occur in the soil at one or more sites at concentrations that tend to be above those observed in the background soil measurements. They are arsenic, cadmium, copper, lead, mercury, potassium, selenium, and zinc. Different analytes were found to be above background at each site. These inorganic constituents in soil were retained for further analysis in the individual mini-risk assessments, as appropriate.

With the exception of SEAD-64D, no more than one inorganic analyte was found to occur in the groundwater at a site at concentrations deemed to be higher than background groundwater concentrations. Manganese, magnesium and sodium were found to sporadically exceed background concentrations. In these cases, this inorganic constituent in groundwater was retained for further analysis in the mini-risk assessment performed for each affected site. At SEAD-64D, twelve inorganics in groundwater were found to exceed background concentrations. All twelve constituents were carried through the risk assessment process for SEAD-64D.

3.2.2 Data Quantification for Use in the Risk Assessment

After eliminating inorganic analytes present at background levels from the risk assessment, exposure point concentrations (EPCs) were selected as the maximum detected value for each constituent of concern. When the maximum value occurred in a sample that had a duplicate sample, the maximum value was used in the risk assessment: the samples were not averaged.

Tables 3.2-2 through **3.2-5** list the chemicals of potential concern for the mini-risk assessment for each site in all soils, groundwater, surface water, and sediment, less the inorganic analytes found at background levels in soil and groundwater. The number of analyses performed, the number of times detected, the frequency of detection, and the maximum detected concentration for each chemical of potential concern at each SEAD are provided in **Appendix A** through **T**, respectively.

3.3 EXPOSURE ASSESSMENT

3.3.1 Overview and Characterization of Exposure Setting

The objective of the exposure assessment was to estimate the type and magnitude of exposures to the Chemicals of Potential Concern (COPC) that are present at, or migrating from, the site. This component of the risk assessment can be performed either qualitatively or quantitatively. Quantitative assessment is preferred when toxicity factors necessary to characterize a compound of concern are available.

The exposure assessment consists of three steps (EPA, 1989a):

1) **Characterize Exposure Setting:** In this step, information on the physical characteristics of the site that may influence exposure is considered. The physical setting involves climate, vegetation, soil characteristics, and surface and groundwater hydrology. All potentially exposed populations and sub-populations therein (receptors) are assessed relative to their potential for exposure. Additionally, locations relative to the site along with the current and potential future land use of the site are considered. This step is a qualitative one aimed at providing a general site perspective and offering insight on the surrounding population.

2) **Identify Exposure Pathways:** All exposure pathways, ways in which receptors can be exposed to contaminants that originate from the source, are reviewed in this step. Chemical sources and mechanisms for release along with subsequent fate and transport are investigated. Exposure points of human contact and exposure routes are discussed before quantifying the exposure pathways in step 3.

3) **Quantify Exposure**: In this final step, the exposure levels (COPC intakes or doses) are calculated for each exposure pathway and receptor. These calculations typically follow EPA guidance for assumptions of intake variables or exposure factors for each exposure pathway and EPA-recommended calculation methods.

3.3.2 Physical Setting and Characteristics

The physical setting and characteristics of the site are described in **Section 2** of this document.

3.3.3 Land Use and Potentially Exposed Populations

3.3.3.1 Current Land Use

There is no current land use for each of the sites within the area under consideration. The sites are abandoned and are no longer in use. There are no drinking water supply wells at any of the areas of concern and perimeter chain link fencing restricts access to these sites. These sites have no actual site workers but are occasionally patrolled by site security personnel.

3.3.3.2 Potential Future Land Use

EPA guidance for determining future land uses recommends that, if available, master plans, which include future land uses, Bureau of Census projections and established land use trends in the general area should be utilized to establish future land use trends.

In July 1995, the Base Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Congress approved the recommendation, which became public law on October 1, 1995. According to BRAC regulations, the Army will determine future uses of the site.

In accordance with BRAC regulations, the Army will notify all appropriate regulatory agencies and will perform any additional investigations and remedial actions to assure that any changes in the intended use of the sites is protective of human health and the environment in accordance with CERCLA. Also, Army regulations (Regulation 200-1, paragraph 12-5, Real Property Transactions), require that the Army perform an Environmental Baseline Study (EBS) prior to a transfer of Army property. The EBS is an inventory and a comprehensive evaluation of the existing environmental conditions and consists of scope definition, survey, sampling, investigative and risk assessment.

As part of the 1995 BRAC process, a Land Redevelopment Authority (LRA) comprised of representatives of the local public was established. This group commissioned a study to recommend future uses of the Seneca Army Depot. The Land Reuse Plan produced by the LRA designated various uses for different parcels of SEDA. This Land Reuse Plan is the basis for future land use assumptions for each site included in this risk assessment. **Figure 1-2** shows the intended future land use of each parcel of SEDA, and shows the location of each mini risk assessment site within these parcels.

The land uses for the different areas of SEDA, as shown in **Figure 1-2**, include: Planned Industrial Development, Institutional Area, Conservation/Recreation Land, Warehouse Area, and Prison Area.

3.3.3.3 Potentially Exposed Populations

Potentially exposed populations that are relevant to each future land use are evaluated in this risk assessment. Since current exposure is infrequent and limited, only future receptors under the future land use scenarios are considered in this mini-risk assessment.

The potentially exposed populations for each of the 5 future land uses are as follows:

Planned Industrial Development:	Industrial Worker Construction Worker Worker at On-Site Day Care Center Child at On-Site Day Care Center
Institutional:	Institution Worker Institution Student Construction Worker Worker at On-Site Day Care Center

	Child at On-Site Day Care Center
Conservation and Recreation:	Park Worker Recreational Visitor (Child) Construction Worker
Warehouse:	Warehouse Worker Construction Worker Trespasser (Adolescent)
Prison:	Prison Worker Prison Inmate Construction Worker Worker at On-Site Day Care Center Child at On-Site Day Care Center

3.3.4 Identification of Exposure Pathways

Exposures are estimated only for plausible completed exposure pathways. A completed exposure pathway has the following four elements:

- a source and mechanism for chemical release,
- an environmental transport medium,
- an exposure point, and
- a human receptor and a feasible route of exposure at the exposure point.

A pathway cannot be completed unless each of these elements is present. **Figures 3-2** through **3-6** illustrate the completed exposure pathways for each of the SWMUs and the EBS site. Since the release mechanisms and secondary sources are similar for all of the sites, the primary distinction among these areas is the set of human receptors that may be exposed. Each Exposure Pathway Summary figure represents one of the five future land use scenarios that apply to each site.

3.3.4.1 Sources and Receiving Media

The contaminant source areas for each of the 21 SWMUs and the one EBS site are summarized as follows:

SEAD-9

The suspected potential source(s) are construction debris and scrap wood deposited in this area, and fire department training during which scrap wood was burned. The primary release mechanisms from the site are surface water runoff collected in unnamed ditch running alongside eastern side of apparent debris and exiting north east boundary of site to discharge in Kendig Creek, and infiltration of precipitation through the debris pile. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-27

The suspected potential source is equipment from degreasing activities performed in this area. The primary release mechanisms from the site are surface water runoff, which makes its way into Kendaia Creek watershed and infiltration of precipitation through potential source area. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-28

The suspected potential source is waste oil spillage associated with former underground storage tanks in this area. The primary release mechanisms from the site are surface water runoff discharging into Kendaia Creek and infiltration of precipitation through waste oil spillage. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-32

The suspected potential source is waste oil or fuel spillage or leakage associated with underground storage tanks in this area. The primary release mechanisms from the site are surface water runoff flowing towards Reeder Creek and infiltration of precipitation through waste oil spillage. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-33

The suspected potential source is waste oil or fuel spillage or leakage associated with underground storage tanks in this area. The primary release mechanisms from the site are surface water runoff flowing towards Kendaia Creek and infiltration of precipitation through waste oil or fuel spillage. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-34

The suspected potential source is waste oil or fuel spillage or leakage associated with underground storage tanks in this area. The primary release mechanisms from the site are surface water runoff flowing into Kendaia Creek watershed and infiltration of precipitation through waste oil or fuel spillage. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEADs 43, 56, and 69

The suspected source(s) are explosive materials from former missile propellant test laboratory Building 606, herbicides and pesticides that were also stored in Building 606, and a disposal area associated with these operations. A septic system for these areas is also a suspected source area. The primary release mechanisms from the site area are surface water runoff and erosion collected in a ditch on eastern side of the concrete pad of SEAD-43 and another ditch along Unnamed Road. Water collected in these ditches discharge into Indian Creek. Infiltration and percolation through septic system mound or through the herbicide & pesticide disposal area or through IRFNA (liquid propellant) that may have been released near Building 606 are other potential release mechanisms. If infiltration of precipitation occurs, then groundwater would be a secondary source. Soil, surface water, and sediment are also secondary sources.

SEAD-44A

The suspected source is waste materials associated with munitions and pyrotechnics that may have been disposed of at the site. The primary release mechanisms from the site are surface water runoff collected in ditch on southern side of SEAD-44A running towards the west into Indian Creek and infiltration of precipitation through waste materials. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-44B

The suspected source area at SEAD-44B is waste material associated with munitions and pyrotechnics activities, which have occurred at SEAD-44B. The primary release mechanisms are surface water infiltration and percolation through dilapidated corrugated metal shack, and surface water runoff and erosion collected in ditches on the eastern side and southern side of SEAD-44B both of which discharge into Indian Creek watershed. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, sediment, and to a lesser extent surface water, are also secondary sources.

SEAD-52

The suspected source area at SEAD-52 is the surface soils near the buildings that have been impacted by explosives resulting from handling of ammunition powder and cleaning processes during the ammunition breakdown. The primary release mechanisms are surface water infiltration and percolation through source areas, and surface water runoff and erosion. Runoff is collected in swales that direct water towards the west into Indian Creek. Wind may also release the impacted soil as fugitive dust, but because the area is paved and vegetated, this is not expected to be a significant release mechanism. If infiltration of precipitation occurs then groundwater would be a secondary source. Surface water and sediment are also secondary sources.

SEAD-58

The suspected potential source is debris reportedly dumped in this area. The primary release mechanism from the site is surface water runoff that is collected in a swale on the southern side of SEAD-58. Water captured by the swale discharge into Kendaia Creek at the Booster Station 2131. Infiltration of precipitation through debris material is another release mechanism. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-62

SEAD-62 was potentially used for the disposal of nicotine sulfate. The suspected source(s) on the site are burial pits that contain the nicotine sulfate. Infiltration from precipitation through these burial pits is a primary release mechanism to groundwater. If infiltration of precipitation occurs then groundwater would be a secondary source. Surface water runoff across the site is also a primary release mechanism, although it is considered less significant because the nicotine sulfate is buried on-site. If the nicotine sulfate were buried close to the ground surface, surface water runoff would likely be a more significant release mechanism. Surface water would likely flow towards the west to Indian Creek, since the site slopes to the west. Soil, surface water and sediment are also secondary sources of pollution.

SEAD-64A

The suspected potential sources are household waste disposal, possible industrial-type disposal and possible past operation of small burning pits in this area. The primary release mechanisms from the site are surface water runoff collected in ditch on southern side of site from which water flows towards west into Indian Creek and infiltration of precipitation through disposal area. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-64B

The suspected potential sources are household waste disposal and possible industrial-type disposal in this area. The primary release mechanisms from the site are surface water collected in drainage swales along Ovid Road and Unnamed Road flowing to the west into Indian Creek and infiltration of precipitation through waste material. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-64C

The suspected potential sources are limited past dumping and materials associated with possible buried transmission power lines. The primary release mechanism from the site is surface water runoff collected in a swale along South Patrol Road and in another swale on the west side of SEAD-64C. Runoff from SEAD-64C flows into a drainage ditch at SEAD-44A and eventually to Indian Creek. Infiltration of precipitation through waste material is another potential release mechanism. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-64D

The suspected potential sources are household waste disposal and possible industrial-type disposal in this area. The primary release mechanisms from the site are surface water runoff flowing to the west and infiltration of precipitation through disposed waste. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-66

The suspected potential sources are reported past storage of pesticides in a structure (location unknown) in this area. The primary release mechanisms from the site are surface water runoff directed into Kendig Creek by roadside drainage ditches and infiltration of precipitation through pesticides. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-68

The suspected potential sources are reported past pest control activities and fire fighting training exercises in Building S-335. The primary release mechanisms from the site are surface water runoff flowing to the west into Kendaia Creek and infiltration of precipitation through pesticides. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-70

The suspected potential source is construction debris deposited in this area. The primary release mechanisms from the site are surface water runoff directed to the north into Reeder Creek in ditch along East-West Baseline Road and infiltration of precipitation through construction debris. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, surface water and sediment are also secondary sources.

SEAD-120B

The suspected source area at SEAD-120B is soil berm located behind target post receptacles used for target practice at the small arms range. The primary release mechanisms are surface water infiltration and percolation through soil berm, and surface water runoff and erosion directed to Indian Creek. If infiltration of precipitation occurs then groundwater would be a secondary source. Surface water and sediment are also secondary sources.

3.3.4.2 Fate and Transport

The environmental fate associated with the general classes of COPCs found at the 21 SWMUs and 1 EBS site is discussed briefly below.

3.3.4.2.1 Volatile Organic Compounds

A relatively small number of volatile organic compounds (VOCs) were detected in soil, groundwater, surface water or sediment at any of the areas of concern. VOCs were detected infrequently and in low concentrations. Because of this low prevalence and concentrations, direct volatilization of VOCs was not considered significant in this assessment.

3.3.4.2.2 Semi-Volatile Organic Compounds

The principal semi-volatile compounds found in soil or sediment at the SWMUs/EBS site are polynuclear aromatic hydrocarbons (PAHs). Generally, these constituents are relatively persistent and immobile in the environment. Pesticides were also found in soil at seven of the sites, and in sediment at one site (SEAD-64B). Herbicides were found in soil at one site (SEAD-68).

3.3.4.2.3 Metals

The behavior of metals in soil is unlike organic compounds in many aspects. For example, volatilization of metals from soil is not considered a realistic mechanism for pollutant migration and was not considered. However, leaching and sorption are considered potential mechanisms for transport. Leaching of metals from soil is controlled by numerous factors. Most importantly is its chemical form (base metal or cation) in the soil. The leaching of metals from soils is substantial if the metal exists as a soluble salt. Upon contact with surface water or precipitation, the metals, either as metal oxides or metal salts, can be solubilized, eventually leaching to the groundwater. Multiple metals were found in groundwater at only one site (SEAD-64D).

3.3.4.3 Summary of Exposure Pathways to be Quantified

The pathways presented reflect the projected future onsite use of the SWMUs and EBS site. This section presents the rationale for including these exposure pathways in this risk assessment.

Inhalation of Particulate Matter in Ambient Air

Surface soil particles may become airborne via wind erosion, which in turn may be inhaled by individuals at the site. Construction workers may also be exposed to subsurface soil particles. Therefore, inhalation exposure to soil particulates in ambient air was assessed for all future receptors.

Incidental Ingestion and Dermal Contact to On-Site Surface Soils

During the course of daily activities, workers, inhabitants (prisoners or institution students), and visiting children (recreational, trespassing or attending day care) could come into contact with site surface soils and involuntarily ingest and/or have their skin exposed to them. Therefore, exposure via dermal contact and soil ingestion was assessed for all future receptors.

Incidental Ingestion and Dermal Contact to On-Site Surface and Subsurface Soils

The laboratory analyses of all surface and subsurface soils show the presence of VOCs, semi-volatile organics, pesticides, and metals. During the course of daily activities, an on-site construction worker will come into contact with these surface and subsurface soils during intrusive activities and may involuntarily ingest and have his/her skin exposed to them. Therefore, exposure via both dermal contact and soil ingestion was assessed for the future construction worker.

Ingestion of Groundwater

There is no current use of groundwater as a potable water source at the Depot. The future plan for all areas of SEDA is to obtain potable water from the existing water supply line. Potable water is supplied to the Depot from a water supply line that passes through the Town of Varick. Varick's water is obtained from the water treatment plant at the Town of Waterloo. The source of this water is Lake Seneca. It is unlikely that a groundwater well would be installed for future drinking water use since a potable water pipeline exists. The shallow groundwater aquifer at the site is inadequate for both yield and quality. Nonetheless, since this use is not prevented via an institutional control such as a deed restriction, it was assumed that wells might be installed on-site for potable water at any site where COPCs were detected at levels exceeding background concentrations. Therefore, this is considered a complete pathway for future receptors (future industrial workers, day care center workers and students) that may have extended stays at certain SEADs.

Inhalation and Dermal Contact with Groundwater while Showering

Prison workers and inmates, institution workers and student, and recreational visitors (campers at the conservation area) may be exposed to groundwater while taking daily showers. These receptors may be exposed to all chemicals contained in groundwater during showering by dermal contact and volatile chemicals that partition into the air via inhalation. Therefore, this is considered a complete pathway and data from the on-site wells are used to calculate exposure concentrations.

Incidental Dermal Contact with Surface Water and Sediment

There are few permanent bodies of water at SEDA, and none directly associated with any of the SWMUs considered in this risk assessment. However, pools of surface water may form in drainage ditches near the sites following precipitation. This surface water and the associated wet soil, or sediment, may contain chemicals found in the surface soils, since these ditches will collect runoff and soil eroded by the rainfall. While intentional adult contact with this surface water and sediment is unlikely, a park worker or child recreational visitor could potentially wade in these ditches. Therefore, exposure via dermal contact was assessed for these receptors in the conservation area.

3.3.5 Quantification of Exposure

In this section, each receptor's potential exposures to chemicals of potential concern (COPCs) is quantified for each of the exposure pathways described above. In each case, the exposures are calculated following methods recommended in EPA guidance documents, such as the Risk Assessment Guidance for Superfund (EPA 1989). These calculations generally involve two steps. First, representative chemical concentrations in the environment, or exposure point concentrations (EPCs), are determined for each pathway and receptor. From these EPC values, the amount of chemical that an exposed person may take into his/her body is then calculated. This value is referred to as either the Human Intake or the Absorbed Dose, depending on the exposure route.

This section describes the exposure scenarios, exposure assumptions and exposure calculation methods used in this risk assessment. All calculations are shown in the tables included in **Appendices A** through **T**.

Risk assessment as a whole, and the exposure assessment step in particular, are designed to be health protective. The exposure calculations require estimates and assumptions about certain human exposure parameters, such as inhalation rates, ingestion rates, etc. Generally, values are selected which tend to overestimate exposure. EPA (1993) recommends two types of exposure estimates be used for Superfund risk assessments: a reasonable maximum exposure (RME) and central tendency exposure (CT). The RME is defined as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site, and is intended to account for both uncertainty in the contaminant concentration and variability in the exposure parameters (such as exposure frequency or averaging time). The CT also may be evaluated for comparison purposes and is generally based on mean exposure parameters. Only RME scenarios have been evaluated in this mini-risk assessment.

Superfund risk assessments consider chronic exposures unless specific conditions warrant a short-term or an acute assessment. In this evaluation, long-term exposure to relatively low chemical concentrations is the greatest concern. Short-term (i.e., subchronic) and acute exposures were evaluated only for the construction worker and day care child who have exposure durations of 1 and 6 years, respectively.

Exposure-point concentrations (EPCs) were estimated for all pathways selected for quantitative evaluation. These concentrations are based on the highest measured values (for soil and groundwater) or on calculated estimates (for ambient air and showering). Steady-state conditions were assumed. Therefore, current and future chemical concentrations were assumed identical. This assumption may tend to overestimate long-term exposure concentrations because chemical concentrations are likely to decrease over time from natural processes such as dispersion, attenuation, degradation and dilution.

Estimates of pathway-specific human intakes or absorbed doses for each chemical involve assumptions about patterns of human exposure to contaminated media. These assumptions are integrated with exposure-point concentrations to calculate intakes. Intakes or doses are normally expressed as the amount of chemical at the environment-human receptor exchange boundary in milligrams per kilogram of body weight per day (mg/Kg-day), which represents an exposure normalized for body weight over time. The total exposure is divided by the period of interest to obtain an average exposure. The averaging time is a function of the toxic endpoint: for non-carcinogenic effects, it is the exposure time (specific to the scenario being assessed) and for carcinogenic effects, it is lifetime (70 years).

3.3.5.1 Exposure Assumptions

An important aspect of exposure assessment is the determination of assumptions regarding how receptors may be exposed to contaminants. Extensive listings of exposure factors are provided in EPA guidance, and these were followed throughout this assessment. Standard scenarios and EPA-recommended default assumptions were used where appropriate.

The exposure scenarios in this assessment involve the following future receptors, depending on the expected land use:

- prison worker
- industrial worker
- institution worker
- park worker
- warehouse worker
- day care worker
- construction worker
- prison inmate
- institution student
- child attending day care center
- recreational visitor (child)
- trespasser (adolescent)

The exposure assumptions for these scenarios are intended to approximate the frequency, duration and manner in which receptors are exposed to environmental media. For example, the worker scenarios are intended to approximate the exposure potential of individuals employed at the site.

Details of the exposure assumptions and parameters for each exposure scenario are shown in **Tables 3.3-1** through **3.3-5**. Each table corresponds to one future land use at SEDA.

The primary sources for the RME exposure factors are as follows:

- EPA, 1988: Superfund Exposure Assessment Manual
- EPA, 1989a: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- EPA, 1991a: Supplemental Guidance, Standard Default Exposure Factors
- EPA, 1992: Dermal Exposure Assessment, Principles and Applications

- EPA, 1993a: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- EPA, 1997: Exposure Factors Handbook

In the following sections, the methods used to calculate exposures by each pathway are explained. Tables that show the human intake or absorbed dose values calculated for each exposure scenario are contained in **Appendices A** through **T**. These intakes and doses are used to assess overall carcinogenic and non-carcinogenic risk, as discussed later in the risk characterization section (**Section 3.5**).

3.3.5.2 Exposure Scenarios

The various receptors evaluated in this assessment, and their respective exposure scenarios are described below.

Construction Worker. Future construction workers are assumed to spend one year working at the SWMUs/EBS site, which is a typical duration for a significant construction project. These workers spend each working day at the site. During this time, this worker inhales the ambient air at the sites and may ingest or dermally contact the soil there. Since the construction worker may be digging onsite, the soil ingestion or dermal contact with both surface and subsurface soils was assumed.

Prison Worker. Future prison workers are assumed to work at the prison to be erected near some of the sites. These workers spend each working day at the site (5 days/week for 50 weeks, RME). This exposure period lasts for an entire 25-year career. During this time, this worker inhales the ambient air at the site and may ingest or dermally contact the surface soil there. This worker also drinks groundwater at the site, and is exposed to groundwater via inhalation and dermal contact while showering (once per workday).

Institution Worker. The institution worker has the same work schedule and exposure duration as the future prison worker. Like the prison worker, the institution worker inhales the ambient air, ingests groundwater, inhales and dermally contacts groundwater during showering (once per workday) and ingests and dermally contacts surface soil.

Industrial, Warehouse and Day Care Worker. The various workers at the industrial development, warehouse and day care center have the same work schedule and exposure duration as the prison worker. Like the prison worker, these workers inhale the ambient air, ingest groundwater, and ingest and dermally contact surface soil. These workers differ from the prison and institution workers in that they are assumed to not shower at work.

Park Worker. The park worker's work schedule differs from other workers discussed above. The park worker is assumed to work onsite for only 8 months (35 weeks) per year from Spring through Autumn, when recreational visitors would use the conservation area. The workday (8 hours/day) and exposure duration (25 years) are the same as other workers. Like the industrial, warehouse and day care workers, the park worker inhales the ambient air, ingests groundwater, and ingests and dermally contacts surface soil. In addition, the park worker may occasionally dermally contact surface water and sediment in the conservation area.

Prison Inmate. Future inmates are assumed to reside continuously at the prison (24 hours/day, 365 days/year) for a 24-year incarceration period. During this time, the inmate inhales the ambient air at the site and may ingest or dermally contact the surface soil there. The inmate also drinks groundwater at the site, and is exposed to groundwater via inhalation and dermal contact while showering (once per workday).

Institution Student. Similar to the prison inmate, the institution student is assumed to reside continuously at the institution during his/her residency; however the term is assumed to be just two years long. Like the prison inmate, the institution student inhales the ambient air, ingests groundwater, inhales and dermally contacts groundwater during showering and ingests and dermally contacts surface soil.

Recreational Visitor (Child). While both adults and children may visit the conservation area, potential risks would be expected to be higher for children. This expectation results because the intake computed for adults or children are derived using a simple algebraic equation in which many factors (e.g., exposure concentration, adherence factor, absorption factor, exposure frequency, exposure duration, averaging time) are identical regardless of the recreational visitor's age, and the resulting intake varies only due to differences that exist between and adult's and child's surface area, ingestion quantity, or inhalation rate, which appear in the numerator of the equation, and the visitor's body weight, which appears in the denominator of the equation. Thus, ultimately the amount of intake varies for an adult or child by the ratio of either surface area, ingestion rate or inhalation rate to that of the recreation visitor's body weight. As is shown in **Table 3.3-6**, each multiplier that results for a child is higher than that of an adult; thus, the child recreational visitor has the highest potential exposure during time spent at a recreational site. Therefore, to be conservative, a child recreational visitor receptor is assessed. Other factors use in the computation of intake include that the recreational visitor is assumed to reside at the conservation area, such as in a campground, for a consecutive two-week period (24 hours/day, 14 days/year) each year for 5 years. During each visit, the child inhales the ambient air, ingests groundwater, inhales and dermally contacts groundwater during showering and ingests and dermally contacts surface soil. In addition, the child recreational visitor may occasionally dermally contact surface water and sediment in the conservation area.

Trespasser (Adolescent). Risks to a trespasser are evaluated only in the warehouse area. Trespassing would be prevented at the prison and institution due to their controlled (i.e., fenced) grounds. The conservation area is considered open to all; trespassing does not apply. At the industrial area, other receptors (e.g., day care child) would have higher exposure and risk than a potential trespasser, so assessing the trespasser serves no additional purpose. The adolescent trespasser is assumed to visit the warehouse area 50 days per year (twice a week during warm months) for 5 years. During each visit, the trespasser inhales the ambient air and ingests and dermally contacts surface soil.

Day Care Center Child. It is possible that a day care center could be established onsite as an adjunct to the prison, institution or industrial development. Future day care children are assumed to attend the center 5 days/week, 12 hours/day, and 50 weeks/year for 6 years. During this time, the child inhales the ambient air, ingests groundwater, and ingests and dermally contacts surface soil.

Complete exposure assumptions (exposure factors) for all receptors and exposure scenarios are summarized in **Tables 3.3-1** through **3.3-5**. Each table corresponds with one future land use at SEDA. Most exposure factors used in the exposure assessment were obtained from EPA guidance documents. Other exposure factors were based on conservative professional judgment where no data are available from EPA or other sources.

The duration of the exposure of the construction worker to site conditions in the area of planned prison development has been modified to reflect expectations that this project will be completed in one year. During this time, construction workers will divide their work time (i.e., a total of 250 days) between each of the SEADs (i.e., 43, 44A, 44B, 52, 56, 62, 69 and 120B). To estimate the probable duration of exposure in each SEAD, the ratio of the area of the individual SEAD to the total area of the eight combined SEADs is computed, and used to allocate the duration of the total construction workers' exposure across all SEADs. A summary of this computation and allocation is provided in **Table 3.3-7**.

3.3.5.3 Inhalation of Particulate Matter in Ambient Air

This pathway consists of particulate matter (PM) being released from soils to the air and then being inhaled by future receptors. Ambient PM concentrations for a construction worker were estimated using an emission and dispersion model. PM concentrations for the other workers, prison inmate, institution student, recreational visitor, trespasser and day care receptors were based on existing site air measurements shown in **Table 3.3-8**.

Construction Worker

During construction activities, construction workers may be exposed to chemicals in site soils via inhalation. Construction activities, such as excavation, have the potential to create dust, or suspended particulate matter (PM), originating from the soils being removed. This dust would contain the chemicals present in the soil. Construction workers in the construction area would breathe this PM in the ambient air.

Air concentrations of site chemicals of concern were estimated for this exposure pathway using excavation models recommended in the EPA's "Models for Estimating Air Emission Rates from Superfund Remedial Actions" (EPA 451/R-93-001). Particulate emissions from soil excavation and loading into trucks are estimated with the following equation:

$$E = \frac{k\,(0.0016)\,(M)\,[U/2.2]^{1.3}}{[X/2]^{1.4}}$$

where:
E = emissions (g)
k = particle size multiplier (unitless)
0.0016 = empirical constant (g/Kg)
M = mass of soil handled (Kg)
U = mean wind speed (m/sec)
2.2 = empirical constant (m/sec)
X = percent moisture content (%)

The construction worker receptor is assumed to work at a site for a one-year period. To conservatively estimate potential particulate emissions from construction activities during this period, it was assumed that an area equivalent to the average area of the 14 new SWMUs evaluated in this report (an approximate 27,600 square meter area, as shown in **Table 3.3-9**) is excavated to a depth of two meters over the course of one year as part of the prison construction.

This results in the following mass of soil removed:

Mass = Area x Depth x Soil Bulk Density

= 27,600 square meters x 2 meters x 1.5 g/cm^3 x 10^6 cm^3/m^3
= 8.28×10^{10} grams
= 8.28×10^7 Kg

Other parameter values for the model are as follows:

k = 0.35 for PM_{10} (EPA 1993)
U = 4.4 m/sec, average wind speed for Syracuse, NY (EPA 1985)
X = 10%, recommended default (EPA 1993)

With these values for M, k, U and X, the emission rate (E) from excavation activities is calculated 12,000 grams of PM_{10} over the course of a year. This emission rate would be representative if all soil excavated at the SWMUs were contaminated, and if local climatic factors did not suppress emissions. For example, precipitation, snow cover and frozen soil in the winter will minimize emissions. To account for these climatic/seasonal factors, it was assumed that emissions occur only for half of the construction time. This results in a representative emission rate (E) of 6,000 grams/year. This is equivalent to an average emission rate of 24.0 g/day, 3.0 g/hr or 0.83 mg/sec, assuming emissions occur only during work days: 250 days/yr, 8 hr/day.

Much greater short-term emissions are estimated for site grading with a bulldozer or tractor. This type of activity is assumed to occur for 90 work days (8-hour day) over the course of a year. The model equation for grading emissions is:

$$E = \frac{0.094\,(s)^{1.5}}{X^{1.4}}$$

where:

E = emission rate (g/sec)
0.094 = empirical constant (g/sec)
s = percent silt content (%)
X = percent moisture content (%)

Assuming the EPA-recommended default values of 8% for s, and 10% for X, the emission rate (E) from grading is calculated as 0.085 g/sec. Averaged over the course of a year with 90 8-hour days of grading emissions, this is 38.1 g/hr or 10.6 mg/sec of PM_{10} emissions, assuming all emissions occur during working hours.

Total annual average emissions from excavation and grading are estimated as 0.833 mg/sec + 10.6 mg/sec = 11.4 mg/sec.

Localized exposure concentrations for construction workers are estimated with a simple box model. The model treats a defined surface area as a uniform emission source over the time period of interest. The box, or mixing volume, is defined by this surface area and an assumed mixing height. The emitted PM_{10} is assumed to mix uniformly throughout the box, with dilution from surface winds.

The general model equation is:

$$C = \frac{E}{(U)(W)(H)}$$

where:

E = emission rate, mg/sec
U = wind speed, m/sec
W = crosswind width of the area source, m
H = mixing height, m

E and U are the same as defined or calculated above. The mixing area is based upon the assumption that the construction activity causing worker exposure is being performed within a 100 square meter area. This area is assumed square in shape, and W is the square root of 100 m^2, or 10 meters. H is assumed to equal the height of the breathing zone, or 1.75 meters.

With these values, the PM_{10} exposure concentration for a construction worker is calculated as 0.148 mg/m^3. All of this PM_{10} was assumed to be airborne soil released from each site as represented by total soils (surface and subsurface).

The concentration of particulate-associated chemicals in ambient air, then, is:

$$\mathbf{CA = CS \times PM_{10} \times CF}$$

where:

CA = chemical concentration in air (mg/m^3)
CS = chemical concentration in soil (mg/Kg soil)
PM_{10} = PM_{10} concentration (ug/m^3)
CF = conversion factor (10^{-9} Kg/ug)

These calculated CA values are the inhalation EPCs for the dust inhalation scenarios. Tables in **Appendices A** through **T** show the inhalation EPCs for the future construction workers.

All Other Receptors (All Workers, All Prison Inmate, Institution Student, and All Child Receptors)

Ambient air normally contains particulate matter derived from various natural and anthropogenic sources, including soil erosion, fuel burning, automobiles, etc. The concentrations of airborne particulate matter were measured at SEDA over a four-month period (April-July) in 1995. A summary of the data collected in this air sampling program is shown in **Table 3.3-8**. Both Total Suspended Particulate Matter (TSP) and particulate matter less than 10μm aerodynamic diameter (PM_{10}) were measured. TSP includes all particles that can remain suspended in air, while PM_{10} includes only smaller particles that can be inhaled (particles larger than 10μm diameter typically cannot enter the narrow airways in the lung).

For this assessment, the highest 4-month average PM_{10} concentration measured at any of the four monitoring stations was assumed to represent ambient air at the SWMUs/EBS site. The entire particulate loading was assumed to be airborne soil released from the site as represented by the surface soil EPCs for each site.

The concentration of particulate-associated chemicals in ambient air, (CA) was calculated with the same equation [CA = CS x PM_{10} x CF] used for the construction worker, above.

The ambient air exposure point concentrations used in the intake calculations are shown in Tables in **Appendices A** through **T**.

The equation for intake is as follows (EPA, 1989a):

$$\textbf{Intake (mg/Kg/day)} = \frac{\textbf{CA x IR x EF x ED}}{\textbf{BW x AT}}$$

where:

CA = Chemical concentration in air (mg/m^3)
IR = Inhalation Rate (m^3/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Bodyweight (Kg)
AT = Averaging Time (days)

The results of these calculations are shown in Tables in **Appendices A** through **T**.

For the construction worker at the eight SEADs in the Prison Area originally evaluated in the Draft Completion Report, site-specific exposure frequencies, EFs, were derived for each site. The exposure frequencies reflect the nature of the planned construction at the sites and the relative sizes of the different sites. It was assumed that the one-year long construction project is divided among the eight sites, and the amount of time a construction worker spends excavating or grading each site is proportional to its area. Therefore, the EF for SEAD-62, the largest area, is the longest, while the EF for SEAD-120B, the smallest area, is the shortest. Refer to the Draft Completion Report for details on the derivation of these EFs in the Prison area.

3.3.5.4 Incidental Ingestion of Soil

The soil data collected from each site were compiled and the EPCs were selected for each compound. For all receptors except the construction worker, only surface soil data collected from the 0 to 0.5 foot interval were used in this analysis. For the construction worker exposure, all soil data were used as it is assumed that the construction worker will engage in intrusive activities.

The equation for intake is as follows (EPA 1989a):

$$\textbf{Intake (mg/Kg-day)} = \frac{\textbf{CS x IR x CF x FI x EF x ED}}{\textbf{BW x AT}}$$

where:

CS = Chemical Concentration in Soil (mg/Kg soil)
IR = Ingestion Rate (mg soil/day)
CF = Conversion Factor (1 Kg/10^6 mg)
FI = Fraction Ingested from Contaminated Source (unitless)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Body Weight (Kg)
AT= Averaging Time (period over which exposure is averaged -- days)

The results of these calculations are shown in Tables presented in **Appendices A** through **T**.

3.3.5.5 Dermal Contact with Soils

The same receptors considered to have the potential to ingest soil may also contact the same soils dermally.

As with the soil ingestion scenarios, the chemical concentration of the soils taken from the 0 to 0.5 foot depth were used as the exposure point concentrations for all receptors except the construction worker. The chemical concentration of all soils was used as the exposure point concentration for the construction worker scenario.

The equation for the absorbed dose from dermal exposure is as follows, based on guidance in EPA 1992:

$$\textbf{Absorbed Dose (mg/Kg-day)} = \frac{CS \times CF \times AF \times ABS \times EV \times SA \times EF \times ED}{BW \times AT}$$

where:

CS = Chemical Concentration in Soil (mg/Kg soil)
CF = Conversion Factor (10^{-6} Kg/mg)
AF = Soil to Skin Adherence Factor (mg/cm^2-event)
ABS = Absorption Factor (unitless)
EV = Event Frequency (event/day)
SA = Skin Surface Area Available for Contact (cm^2)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (Kg)
AT = Averaging Time (period over which exposure is averaged - days)

The product of the terms CS, AF, SA, and ABS represents the absorbed dose per event as defined in the EPA 1992 guidance.

The exposure calculations are summarized in Tables presented in **Appendices A** through **T**.

Dermal exposure involves several unique exposure factors discussed briefly here. Specifically, the dermal exposure calculation considers the amount of exposed skin, the amount of soil that adheres to the skin and the degree to which a chemical may be adsorbed through the skin.

The surface area of exposed skin depends on the size of an individual (especially adult vs. child), clothing worn, and the specific parts of the body that may directly contact the medium of concern (e.g., soil or groundwater during showering). EPA recommendations were followed to select exposed skin surface areas for each scenario in this assessment.

The following assumptions were made regarding skin surface areas for dermal exposure, according to EPA 1992:

All Workers and Prison Inmate (Soil): The hands, legs, arms, neck and head may be exposed. These comprise approximately 25% of the total body surface area. EPA 1992 recommends a surface area value of 5800 cm^2 for the RME as representative of these exposed body parts.

Day Care Child (Soil): 25% of total body area was assumed for children age 3-6. This results in a surface area exposure value of 2190 cm^2 for the RME.

Institution Student (Soil): 25% of total body area was assumed for adolescents age 12-18. This results in a surface area exposure value of 4625 cm^2 for the RME.

Recreational Visitor (Child) (Soil): 25% of total body area was assumed for children age 1-12. This results in a surface area exposure value of 2300 cm^2 for the RME.

Trespasser (Adolescent) (Soil): 25% of total body area was assumed for adolescents age 12-18. This results in a surface area exposure value of 4625 cm^2 for the RME.

Prison Worker, Institution Worker and Prison Inmate (Groundwater): The entire body surface may be exposed during showering. EPA 1992 recommends a surface area value of 23,000 cm^2 for the RME as representative of the entire adult body.

Recreational Visitor (Child) (Groundwater): The entire body surface may be exposed during showering. EPA 1992 recommends a surface area value of 9180 cm^2 for the RME as representative of the entire child body.

Park Worker (Surface Water and Sediment): The hands and forearms may be exposed. EPA 1992 recommends a surface area value of 1880 cm^2 for the RME as representative of these parts of the adult body.

Recreational Visitor (Child) (Surface Water Sediment): 25% of total body area was assumed for adolescents age 12-18. This results in a surface area exposure value of 4625 cm^2 for the RME.

The potential magnitude of exposure depends on the amount of soil that adheres to the exposed skin. Again, EPA recommended soil-to-skin adherence factors were used in this assessment.

Certain chemicals may be readily absorbed through the skin while others penetrate much more slowly or not at all. In the case of soil, some chemicals may be strongly bound to the matrix, which reduces their ability to absorb through the skin. Chemical-specific absorption factors as provided by EPA were used in this assessment. EPA Region II recommends quantifying dermal exposure for only cadmium, arsenic, PCBs, dioxins/furans and pentachorophenol (others are under development), since credible values are not available for other chemicals of concern. Of these compounds, only arsenic and PCBs (aroclor 1254) were detected in any soil at levels above background. Absorption factors (ABS) of 1% (0.01) and 6% (0.06) were used for arsenic and aroclor-1254, respectively, as recommended by EPA (EPA, 1992).

No other compounds were considered quantitatively for dermal exposure from soil in this risk assessment.

The reader should note that in the guidance document Dermal Exposure Assessment: Principles and Applications (EPA 1992), EPA cautions that "dermal exposure is the least well understood of the major exposure routes. Very little chemical-specific data are available, especially for soils, and the predictive techniques have not been well validated." EPA further states that dermal exposure/risk estimates have considerable uncertainty, and in some cases may be overly conservative.

3.3.5.6 Groundwater Ingestion

Future receptors may drink groundwater. The groundwater data collected from each site were compiled and the EPCs were selected for each compound.

The equation for intake is as follows (EPA, 1989a):

$$\textbf{Intake (mg/Kg-day)} = \frac{\textbf{CW x IR x EF x ED}}{\textbf{BW x AT}}$$

where:

CW = Chemical Concentration in Water (mg/Liter)
IR = Ingestion Rate (Liters/day)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Bodyweight (Kg)
AT = Averaging time (days)

The results of these calculations are shown in Tables in **Appendices A** through **T.**

3.3.5.7 Dermal Contact to Groundwater while Showering/Bathing

The prison worker, institution worker, prison inmate and recreational visitor may be exposed to groundwater while showering. The EPCs developed for ingestion of groundwater are also used for this exposure route. The equation for the absorbed dose, taken from RAGS (EPA, 1989a) is as follows:

$$\textbf{Absorbed Dose (mg/Kg-day)} = \frac{\textbf{DA x SA x EF x ED x EV}}{\textbf{BW x AT}}$$

where:

DA = Absorbed Dose per event (mg/cm^2 - event)
SA = Skin Surface Area Available for Contact (cm^2)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
EV = Event Frequency (event/day)
BW = Body Weight (Kg)
AT = Averaging Time (period over which exposure is averaged (days)

The absorbed dose per event (DA) was calculated as described in EPA's "Dermal Exposure Assessment: Principles and Applications," (EPA, 1992).

For organics, a parameter, B is first calculated. The B value was adopted from the Bunge Model (Cleek and Bunge, 1992). This value attempts to characterize the relative contribution of each compounds specific permeability coefficient (K_p value) in the stratum corneum and the viable epidermis. The B-values for certain compounds are listed in Table 5-8 of the Dermal Exposure Assessment Manual, EPA, 1992. For any compounds not listed in this table, B-values are derived using the following equation:

$$\mathbf{B \approx \frac{Kow}{10{,}000}}$$

where:

Kow is the octanol-water partitioning coefficient (dimensionless).

Once calculated, the B value is used to calculate time conditions associated with estimates of compound breakthrough time. In accordance with the work of Cleek and Bunge, if the exposure time per event (ET) is less than the breakthrough time (t*) of steady-state conditions specific to each compound, then the absorbed dose is calculated as follows:

$$\mathbf{DA = 2\ K_p\ x\ CW\ x\ CF}\ \sqrt{\frac{6 \times \tau \times ET}{\pi}}$$

If the exposure time is longer than t*, then the absorbed dose is calculated using:

$$\mathbf{DA_{event} = K_p\ x\ CW\ x\ CF}\left[\frac{ET + 2(1 + 3B)\tau}{1 + B}\right]$$

where for both equations:

K_p = Dermal permeability coefficient (cm/hr)
CW = Chemical Concentration in Water (mg/L)
ET = Exposure Time (hours)
B = Bunge Model Value (unitless)
τ = Lag time (hours)
CF = Volume Conversion Factor = 0.001L/cm^3

The exposure times for showering are assumed to be 15 minutes/day (0.25 hr/day) for the RME, as recommended in the Dermal Exposure Assessment Manual, EPA, 1992.

The lag time (τ), is defined as the time it takes a chemical to penetrate to reach a steady-state condition during a dermal exposure in aqueous media. By properly defining the lag time, the permeability coefficient (Kp) can be more properly used in the risk calculation further reducing uncertainty. Lag times and breakthrough times (t*) for each organic compound were taken from a list in Table 5-8 of the Dermal Exposure Assessment Manual, EPA, 1992, or calculated. All chemicals not having lag times were derived using the following equation:

$$\tau = \frac{\int_{sc}^{2}}{6D_{sc}}$$

where:

$\int_{sc}$ = thickness of the stratum corneum, assume (0.001) (cm)
D_{sc} = Stratum corneum diffusion coefficient (cm^2/hr)

The t* value for each organic compound found in ground water is shown below.

Compound	t* (hours)
Acetone	0.47
Benzene	0.63
1,1,2,2-tetrachloroethane	2.2
2,4,5-T	10.1
2,4,5-TP (Silvex)	18.73

The exposure time, 0.25 hour, is less than t* in all cases. Therefore, the first equation for DA, above, was used for all organic compounds.

In the Dermal Exposure Assessment Manual (EPA 1992), EPA cautions that the above approach for calculating dermal exposures to organic chemicals in water may be overly conservative. EPA expressed concern that preliminary testing of this model indicated that for some compounds the absorbed dose from dermal exposure during showering was much greater than the dose from ingestion of 2 L/day of water. EPA further states that model validation is difficult due to a lack of data.

For inorganics, DA was calculated by:

$$\mathbf{DA = K_p \times CW \times ET \times CF}$$

EPA in the Dermal Exposure Assessment & Guidelines (EPA, 1992) recommends Dermal Permeability Coefficients (K_p) for a number of organic and inorganic chemicals. These recommended values were used in these exposure calculations. When no organic K_p value was available, a value was calculated using the following equation:

$$\mathbf{Log\ K_p = -2.72 + 0.71\ (log\ K_{o/w}) - 0.0061\ (MW)}$$

Many inorganic compounds do not have specified recommended K_p values. In this case, K_p was assumed to be 1×10^{-3} as the default value recommended by EPA (EPA, 1992).

Exposure to chemicals in groundwater during showering occurs via two routes: inhalation of volatile chemicals that partition into the air from the hot shower water, and dermal contact. The analysis of these two exposure routes assumes that release of volatile chemicals to the air occurs quickly, and that only the quantities that remain in the water stream are available for dermal contact. The calculations of exposure from inhalation assume that the water from the shower nozzle has the same concentration as groundwater, and the groundwater EPC is used. However, for dermal contact, the EPCs are most correctly first adjusted to subtract the amount of each chemical that partitions into the air. This adjustment prevents "double counting" the potential effect of the portion of certain chemicals that escape the water into the air of the shower.

For the eight prison area SEADs originally assessed in the Completion Report, the water concentration was adjusted as discussed above. For the 14 new SEADs addressed in this report, the groundwater EPC was not adjusted to account for volatile losses during showering before considering dermal exposure. Although inhalation and dermal exposures from showering were assessed for three of the new SEADs (SEADs -64C, -64D, and –70), volatile losses during showering were determined to be one percent or less for any compound, and there were no toxicity factors for any compounds which might be inhaled during showering. For simplicity, the groundwater EPC was used directly to assess dermal exposures from shower water for these three SEADs.

A complete description of the adjustment calculation used for the prison SEADs is contained in the Completion Report.

The dermal exposure calculations, where applicable, are summarized in **Appendices A** through **T**.

3.3.5.8 Inhalation of Groundwater while Showering/Bathing

While showering, a receptor may inhale organic compounds released from the hot water supply. Most inorganic compounds potentially found in groundwater or surface water, such as metals, are nonvolatile. Therefore, this pathway is not complete for inorganics in water.

Acetone, diethyl phthalate and phenol were the only organic compounds found in groundwater at any of the SWMUs/EBS site (detected only at SEAD-64C or SEAD-70). None of these compounds are considered to be toxic by inhalation at environmental concentrations by EPA (they have no inhalation cancer slope factors (CSF) or non-cancer reference doses for inhalation (RfD)). Since these compounds can pose no risk, this pathway was not evaluated further in this risk assessment.

A complete description of the methodology followed to calculate inhalation intakes for the original eight prison SEADs can be found in the Completion Report.

3.3.5.9 Dermal Exposure to Surface Water

At SEADs located in the Conservation/Recreation area, the Park Worker and Recreational Visitor may occasionally be exposed to surface water or sediment. The Park Worker may occasionally put his hands and arms in standing surface water as part of his work. A Child Recreational Visitor may occasionally walk through or play in standing water. Surface water was analyzed at SEADs-58, -64B, and –70. Each of these SEADs was assessed for dermal exposure to surface water.

The equations used to calculate dermally-absorbed doses from surface water are the same as those used for dermal contact with ground water during showering. See **Section 3.3.5.7**, above, for a complete discussion of this methodology.

The exposure time for contact with surface water is assumed to be one hour per day for each receptor. The equation used to calculate the absorbed dose per event (DA) for organic compounds depends on the value of t* for the specific compound. The only organic compound detected in surface water at any of the SEADs was carbon disulfide (only at SEAD-64B). The t* value for carbon disulfide is 0.65 hours. The exposure time, one hour, is greater than this t*. Therefore, the second equation for DA shown in **Section 3.3.5.7** was used for carbon disulfide.

The dermal exposure calculations for surface water at SEADs-58, -64B, and -70 are summarized in **Appendices K**, **N**, and **S**, respectively.

3.3.5.10 Dermal Exposure to Sediment

The same receptors in the Conservation/Recreation area considered to have the potential for dermal contact with surface water may also have dermal contact with sediment. These receptors are the park worker and child recreational visitor.

The absorbed chemical dose from dermal contact with sediment is calculated by the same method used for soils except that CS is the chemical concentration in sediment (mg/Kg-sediment), rather than soil. See **Section 3.3.5.5**, above, for a complete discussion of this methodology.

Similar to soil, the sediment dermal exposure calculation considers the amount of exposed skin, the amount of soil that adheres to the skin and the degree to which a chemical may be adsorbed through the skin. As with soil, this assessment followed EPA guidance regarding the values assigned to each of these exposure parameters.

Of the compounds recommended by EPA Region II for dermal exposure assessment (see discussion in **Section 3.3.5.5**), only arsenic and cadmium were detected. An absorption factor (ABS) of 1% (0.01) was used for both arsenic and cadmium as recommended by EPA (EPA, 1992). No other compounds were considered quantitatively for dermal exposure for sediment.

The dermal exposure calculations for sediment at SEADs-58, -64B, and -70 are summarized in **Appendices K**, **N**, and **S**, respectively.

3.4 TOXICITY ASSESSMENT

The objective of the toxicity assessment is to weigh available evidence regarding the potential of the chemicals to cause adverse effects in exposed individuals, and to provide, where possible, an estimate of the relationship between the extent of exposure to a chemical and the increased likelihood and/or severity of adverse effects. The types of toxicity information considered in this assessment include the reference dose (RfD) and reference concentration (RfC) used to evaluate non-carcinogenic effects, and the slope factor and unit risk to evaluate carcinogenic potential. Most toxicity information used in this evaluation was obtained from the Integrated Risk Information System (IRIS). If values were not available from IRIS, the *Health Effects Assessment Summary Tables* (HEAST) (EPA, 1993b) were consulted. Finally, the EPA Region II was consulted to provide any additional values not included in these two sources. The toxicity factors used in this evaluation are summarized in **Table 3.4-1** for both non-carcinogenic and carcinogenic effects.

3.4.1 Non-carcinogenic Effects

For chemicals that exhibit non-carcinogenic (i.e., systemic) effects, authorities consider organisms to have repair and detoxification capabilities that must be exceeded by some critical concentration (threshold) before the health effect is manifested. For example, an organ can have a large number of cells performing the same or similar functions that must be significantly depleted before the effect on the organ is seen. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without an appreciable risk of adverse effects.

Health criteria for chemicals exhibiting non-carcinogenic effects for use in risk assessment are generally developed using EPA RfDs and RfCs developed by the RfD/RfC Work Group and included in the IRIS. In general, the RfD/RfC is an estimate of an average daily exposure to an individual (including sensitive individuals) below which there will not be an appreciable risk of adverse health effects. The RfD/RfC is derived using uncertainty factors (e.g., to adjust from animals to humans and to protect sensitive subpopulations) to ensure that it is unlikely to underestimate the potential for adverse non-carcinogenic effects to occur. The purpose of the RfD/RfC is to provide a benchmark against which an intake (or an absorbed dose in the case of dermal contact) from human exposure to various environmental conditions might be compared.

Intakes of doses that are significantly higher than the RfD/RfC may indicate that an inadequate margin of safety could exist for exposure to that substance and that an adverse health effect could occur.

3.4.1.1 References Doses for Oral and Inhalation Exposure

The types of toxicity values used to evaluate the non-carcinogenic effects of chemicals include RfDs for oral exposure, and RfCs for inhalation exposure. RfDs and RfCs represent thresholds for toxicity. They are derived such that human lifetime exposure to a given chemical via a given route at levels at or below the RfD or RfC, as appropriate, should not result in adverse health effects, even for the most sensitive members of the population. The chronic RfD or RfC for a chemical is ideally based on studies where either animal or human populations are exposed to a given chemical by a given route of exposure for the major portion of the life span (referred to as a chronic study). Various effect levels may be determined in a study; however, the preferred effect level for calculating non-carcinogenic toxicity values is the no-observed-adverse-effect level, or NOAEL. Second to the NOAEL is the lowest-observed-adverse-effect level, or LOAEL.

The oral RfD is derived by determining dose-specific effect levels from all the available quantitative studies, and applying uncertainty factors and/or a modifying factor to the most appropriate effect level. Uncertainty factors are intended to account for: 1) the variation in sensitivity among members of the human population; 2) the uncertainty in extrapolating animal data to humans; 3) the uncertainty in extrapolating from data obtained in a study that is less than lifetime exposure; 4) the uncertainty in using LOAEL data rather than NOAEL data; and 5) the uncertainty resulting from inadequacies in the data base. The modifying factor may be used to account for other uncertainties such as inadequacy of the number of animals in the critical study. Usually each of these uncertainty factors is set equal to 10, while the modifying factor varies between one and 10. RfDs are reported as doses in milligrams of chemical per kilogram body weight per day (mg/Kg-day).

The inhalation RfC is derived by determining concentration-specific effect levels from all of the available literature and transforming the most appropriate concentration to a human RfC. Transformation usually entails converting the concentration and exposure duration used in the study to an equivalent continuous 24-hour exposure, transforming the exposure-adjusted value to account for differences in animal and human inhalation, and then applying uncertainty factors and/or a modifying factor to the adjusted human exposure concentration to arrive at an RfC. The uncertainty factors potentially used are the same ones used to arrive at an RfD (see above). RfCs are reported as concentrations in milligrams of chemical per cubic meter of air (mg/m^3). To use the RfCs in calculating risks, they were converted to inhalation reference doses in units of milligrams of chemical per kilogram of body weight per day (mg/Kg/day). This conversion was made by assuming an inhalation rate of 20 m^3/day and an adult body weight of 70 Kg. Thus:

$$\textbf{Inhalation Reference Dose (mg/Kg/day)} = RfC\left(\frac{mg}{m^3}\right)x\left(\frac{20m^3}{day}\right)x\left(\frac{1}{70kg}\right)$$

3.4.1.2 Reference Doses for Dermal Exposure

EPA has not derived toxicity values for all routes of exposure. Most of the available toxicity values are for oral exposure. Many inhalation values are also available. No values are currently available for dermal exposure. This is due to the lack of scientific studies available to quantify dermal toxicity and carcinogenic potential for the vast majority of priority pollutants. In addition, until recently, scientists have assumed that the hazards due to dermal exposures were minimal in comparison with those due to oral exposure. However, it appears that in many instances the hazards due to dermal exposure may be as great or greater.

In the absence of dermal reference toxicity values, EPA has suggested (EPA, 1989a) that in some cases it is appropriate to modify an oral RfD so it can be used to estimate the hazard incurred by dermal exposure. This requires that the toxic endpoints observed are the same for both oral and dermal exposure, and that one has quantitative estimates of both dermal and oral absorption of the chemical. This information is not available for most priority pollutants, and oral toxicity values are nevertheless often used to quantify risks associated with dermal exposure. Consequently, any valuation of the contribution of dermal exposure to the overall hazard needs to be viewed as highly tentative at best.

EPA RAGS (1989a) provides guidance for use of oral toxicity values in determining dermal toxicity. RfDs are expressed as the amount of substance administered per unit time and unit body weight (administered-dose), whereas exposure estimates for the dermal route of exposure are expressed as the amount of substance absorbed into the body per unit time and unit body weight (absorbed-dose). Thus, for dermal exposure to contaminants in water or in soil, it is necessary to adjust an oral toxicity value from an administered to an absorbed dose. Where oral absorption efficiencies were available, the oral RfD was converted to a dermal RfD by multiplying by oral absorption efficiency. Oral absorption factors and the calculated dermal RfDs are shown in **Table 3.4-1**.

In the absence of any information on absorption for the substance or chemically related substances, an oral absorption efficiency of 100 percent was assumed in accordance with EPA Region 2 guidance (personal communication between A. Schatz of Parsons and M. Maddeloni of EPA Region 2).

3.4.1.3 Exposure Periods

As mentioned earlier, chronic RfDs and RfCs are intended to be set at levels such that human lifetime exposure at or below these levels should not result in adverse health effects, even for the most sensitive members of the population. These values are ideally based on chronic exposure studies in humans or animals. Chronic exposure for humans is considered to be exposure of roughly seven years or more, based on exposure of rodents for one year or more in animal toxicity studies.

For institution students, recreational visitors, trespassers, day care children and construction workers, chronic RfDs and RfCs were used to conservatively assess risks for shorter exposure periods.

3.4.2 Carcinogenic Effects

For chemicals that exhibit carcinogenic effects, most authorities recognize that one or more molecular events can evoke changes in a single cell or a small number of cells that can lead to tumor formation. This is the non-threshold theory of carcinogenesis that purports that any level of exposure to a carcinogen can result in some finite possibility of generating the disease. Generally, regulatory agencies assume the non-threshold hypothesis for carcinogens in the absence of information concerning the mechanisms of action for the chemical of concern.

EPA's Carcinogen Risk Assessment Verification Endeavor (CRAVE) has developed slope factors and unit risks (i.e., dose-response values) for estimating excess lifetime cancer risks associated with various levels of lifetime exposure to potential human carcinogens. The carcinogenic slope factors can be used to estimate the lifetime excess cancer risk associated with exposure to a potential carcinogen. Risks estimated using slope factors are considered unlikely to underestimate actual risks, but they may overestimate actual risks. Excess lifetime cancer risks are generally expressed in scientific notation. An excess lifetime cancer risk of 1×10^{-6} (one in a million), for example, represents the probability of an individual developing cancer over a lifetime as a result of exposure to the specific carcinogenic chemical. EPA considers total excess lifetime cancer risks within the range of 10^{-4} (one in ten thousand) to 10^{-6} (EPA, 1989a) to be acceptable when developing remedial alternatives for cleanup of Superfund Sites.

In practice, slope factors are derived from the results of human epidemiology studies or chronic animal bioassays. The data from animal studies are fitted to the linearized, multistage model and a dose-response curve is obtained. The upper limit of the 95th percentile confidence-interval slope of the dose-response curve is subjected to various adjustments, and an interspecies scaling factor is applied to conservatively derive the slope factor for humans. This linearized multistage procedure leads to a plausible upper limit of the risk that is consistent with some proposed mechanisms of carcinogenesis. Thus, the actual risks associated with exposure to a potential carcinogen are not likely to exceed the risks estimated using these slope factors, but they may be much lower. Dose-response data derived from human epidemiological studies are fitted to dose-time-response curves on an ad-hoc basis. These models provide rough but plausible estimates of the upper limits on lifetime risk. Slope factors based on human epidemiological data are also derived using very conservative assumptions and, as such, are considered unlikely to underestimate risks. In summary, while the actual risks associated with exposures to potential carcinogens are unlikely to be higher than the risks calculated using a slope factor, they could be considerably lower.

In addition, there are varying degrees of confidence in the weight of evidence for carcinogenicity of a given chemical. The EPA system involves characterizing the overall weight of evidence for a chemical's carcinogenicity based on availability of animal, human, and other supportive data. The weight-of-evidence classification is an attempt to determine the likelihood that the agent is a human carcinogen, and thus qualitatively affects the estimation of potential health risks. Three major factors are considered in characterizing the overall weight of evidence for carcinogenicity: (1) the quality of evidence from human studies, (2) the quality of evidence from animal studies, which are combined into a characterization of the overall weight of evidence for human carcinogenicity; and (3) other supportive information which is assessed to determine whether the overall weight of evidence should be modified. EPA's final classification of the overall weight of evidence includes the following five categories:

Group A - Human Carcinogen – There is sufficient evidence from epidemiological studies to support a causal association between an agent and cancer.

Group B - Probable Human Carcinogen – There is at least limited evidence from epidemiological studies of carcinogenicity to humans (Group B1) or that, in the absence of adequate data on humans, there is sufficient evidence of carcinogenicity in animals (Group B2).

Group C - Possible Human Carcinogen – There is limited evidence of carcinogenicity in animals in the absence of data on humans.

Group D - Not Classified – The evidence for carcinogenicity in animals is inadequate.

Group E - No Evidence of Carcinogenicity to Humans – There is no evidence for carcinogenicity in at least two adequate animal tests in different species, or in both epidemiological and animal studies.

Slope factors and unit risks are developed by the EPA based on epidemiological or animal bioassay data for a specific route of exposure, either oral or inhalation. For some chemicals, sufficient data are available to develop route-specific slope factors for inhalation and ingestion. For chemicals with only one route-specific slope factor but for which carcinogenic effects may also occur via another route, the available slope factor may be used by the EPA to evaluate risks associated with several potential routes of exposure (EPA, 1989b).

A number of the chemicals of potential concern have been classified as carcinogens or potential carcinogens by EPA, and each of these has also been assigned a carcinogenicity weight-of-evidence category, as shown in **Table 3.4-1**. These chemicals are:

Group A - Human Carcinogens

Arsenic
Benzene
Chromium VI

Group B - Probable Human Carcinogens

Chloroform
Methylene Chloride
2,4-Dinitrotoluene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Carbazole
Chrysene
Dibenz(a,h)anthracene
Indeno(1,2,3-cd)pyrene
Pentachlorophenol
bis(2-Ethylhexyl)phthalate
DDD, 4,4'-
DDE, 4,4'-
DDT, 4,4'-
Aldrin
Aroclor 1254
Dieldrin
Heptachlor
Heptachlor epoxide
alpha-Chlordane
gamma-BHC
gamma-Chlordane
Antimony
Beryllium
Cadmium
Lead

Group C - Possible Human Carcinogens

4-Methylphenol

Butylbenzylphthalate
Naphthalene

All remaining chemicals of concern are either not found to have weight of evidence rankings or are Group D or E. Group D classification means that the data are insufficient to make a determination regarding carcinogenic potential while Group E compounds have been conclusively found to be non-carcinogenic. Chemicals of potential concern found at the SEADs with potential carcinogenic effects are shown in **Table 3.4-1** along with their cancer slope factors.

3.4.2.1 Cancer Slope Factors for Oral and Inhalation Exposure

The types of toxicity values used to evaluate the carcinogenic effects of chemicals include slope factors (SFs) for oral exposure, and unit risk factors (URFs) for inhalation exposure. Oral slope factors are reported as risk per dose $(mg/Kg\text{-}day)^{-1}$. Inhalation unit risk factors are reported in units of risk per concentration $(mg/m^3)^{-1}$. To make use of the unit risk factors in calculating risks they first had to be converted to inhalation slope factors in units of $(mg/Kg\text{-}day)^{-1}$. This conversion was made by assuming an inhalation rate of 20 m^3/day and an adult bodyweight of 70 Kg. Thus:

$$\textbf{Inhalation slope factor (mg/Kg-day)}^{-1} = UnitRisk\left(\frac{ug}{m^3}\right)^{-1} \times \frac{day}{20m^3} \times 70kg \times \frac{1000ug}{mg}$$

3.4.2.2 Cancer Slope Factors for Dermal Exposure

As discussed above, EPA has not derived toxicity values for the dermal route of exposure. In the absence of dermal reference toxicity values, EPA has suggested (EPA, 1989a) that, in some cases, it is appropriate to modify an oral slope factor so it can be used to estimate the risk incurred by dermal exposure. The oral slope factors were converted to dermal slope factors by dividing by the oral absorption efficiency. The same values presented in **Section 3.4.1.2** were used, however, if chemical specific modification factors were unavailable, oral values are used without adjustment. As discussed previously any valuation of the contribution of dermal exposure to the overall risk needs to be viewed as highly tentative at best. This is particularly true for PAH's which are carcinogens at the point of contact, i.e., to skin.

3.4.2.3 Toxic Equivalency Factors

When slope factors and unit risks were not available for all potentially carcinogenic members of a chemical class, toxicity values were calculated using toxicity equivalency factors (TEFs). TEFs are values that compare the carcinogenic potential of a given chemical in a class to the carcinogenic potential of a chemical in the class that has a verified slope factor and/or unit risk. EPA has provided TEFs for PAHs (EPA, 1993b). TEF values are as follows:

PAH	TEF
Benzo(a)pyrene	1.0
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Dibenzo(a,h)anthracene	1.0
Chrysene	0.001
Indeno(1,2,3-cd)pyrene	0.1

To calculate a slope factor or unit risk for a given PAH the appropriate TEF value is multiplied by the slope factor or unit risk for benzo(a)pyrene.

3.5 RISK CHARACTERIZATION

3.5.1 Introduction

To characterize risk, toxicity and exposure assessments were summarized and integrated into quantitative and qualitative expressions of risk. To characterize potential non-carcinogenic effects, comparisons were made between projected intakes of substances and toxicity values. To characterize potential carcinogenic effects, probabilities that an individual will develop cancer over a lifetime of exposure are estimated from projected intakes and chemical-specific dose-response information. Major assumptions, scientific judgments, and, to the extent possible, estimates of the uncertainties embodied in the assessment are also presented.

3.5.1.1 Non-carcinogenic Effects

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified period with an RfD derived for a similar exposure period. This ratio of exposure to toxicity is called a hazard quotient according to the following equation:

Noncancer Hazard Quotient = E/RfD

where:

E = Absorbed dose or intake (mg/Kg-day), and
RfD = Reference Dose (mg/Kg-day)

The noncancer hazard quotient assumes that there is a level of exposure (i.e., an RfD) below which it is unlikely for even sensitive populations to experience adverse health effects. If the exposure level (E) exceeds the threshold (i.e., If E/RfD exceeds unity) there may be concern for potential noncancer effects.

To assess the overall potential for non-carcinogenic effects posed by more than one chemical, a hazard index (HI) approach has been developed by the EPA. This approach assumes that simultaneous sub-threshold exposures to several chemicals could result in an adverse health effect. It also assumes that the magnitude of the adverse effect will be proportional to the sum of the ratios of the subthreshold exposures to respective acceptable exposures.

This is expressed as:

$$HI = E_1/RfD_1 + E_2/RfD_2 + ... + E_i/RfD_i$$

where:

E_i = the exposure level or intake of the i toxicant, and
RfD_i= reference dose for the i^{th} toxicant.

While any single chemical with an exposure level greater that the toxicity value will cause the HI to exceed unity, for multiple chemical exposures, the HI can also exceed unity even if no single chemical exposure exceeds its RfD. The assumption of dose additivity reflected in the HI is best applied to compounds that induce the same effects by the same mechanisms. Applying the HI to cases where the known compounds do not induce the same effect may overestimate the potential for effects. To assess the overall potential for non-carcinogenic effects posed by several exposure pathways, the total HI for chronic exposure is the sum of the HI's for each pathway, for each receptor.

3.5.1.2 Carcinogenic Effects

For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen (i.e., excess individual lifetime cancer risk). The slope factor converts estimated daily intakes averaged over a lifetime of exposure directly to incremental risk of an individual developing cancer. It can generally be assumed that the dose-response relationship will be linear in the low-dose portion of the multistage model dose-response curve. Under this assumption, the slope factor is a constant, and risk will be directly related to intake. Thus, the following linear low-dose equation was used in this assessment:

$$Risk = CDI \times SF$$

where:

Risk = A unitless probability of an individual developing cancer,
CDI = Chronic Daily Intake over 70 years (mg/Kg-day), and
SF = Slope Factor $(mg/Kg\text{-}day)^{-1}$

Because the slope factor is often an upper 95th-percentile confidence limit of the probability of a response and is based on animal data used in the multistage model, the carcinogenic risk will generally be an upper-bound estimate. This means that the "true risk" is not likely to exceed the risk estimate derived through this model and is likely to be less than predicted.

For simultaneous exposure to several carcinogens, the EPA assumes that the risks are additive. That is to say:

$$\mathbf{Risk_T = Risk1 + Risk2 + \ldots + Risk_i}$$

where:

$Risk_T$ = Total cancer risk, expressed as a unitless probability, and
$Risk_i$ = Risk estimate for the ith substance.

Addition of the carcinogenic risks is valid when the following assumptions are met:

- doses are low,
- no synergistic or antagonistic interactions occur, and
- similar endpoints are evaluated.

According to guidance in the National Contingency Plan, the target overall lifetime carcinogenic risks from exposures for determining clean-up levels should range from 10^{-4} to 10^{-6}. For this risk assessment, the cancer risks from all chemicals were added to conservatively estimate the total cancer risk for a specified exposure pathway. In addition, the total cancer risk was assumed to be the sum of the risk from all exposure pathways.

3.5.2 Risk Summary

Human health risks were calculated for site-specific future exposure scenarios at each of the 21 SWMUs and one EBS site. The receptors and exposure scenarios were based on the expected future land use for each site. Each site is located in an area designated for one of the following future land uses:

- Planned Industrial Development;
- Institutional;
- Conservation and Recreation;
- Warehouse; or
- Prison

Cancer and non-cancer risks at each site were calculated for all applicable exposure routes and are presented on a site-by-site basis in **Tables 3.5-1** through **3.5-18**. These tables also serve as a guide to the tables in Appendices A through T which show risk calculations for each exposure route. The following sections, organized by land use classification, highlight the exposure scenarios at each site which result in risks that exceed the EPA defined targets (lifetime cancer risk range of 10^{-4} to 10^{-6}; non-cancer hazard index less than one).

3.5.2.1 Planned Industrial Development

Human health risks were calculated for the following four exposure scenarios at each site located in the Planned Industrial Development area:

- Industrial worker
- Construction worker
- Day care center worker
- Child attending day care center

The potential exposure pathways associated with each receptor are summarized in **Figure 3-2**.

The sites located in the Planned Industrial Development area, and the appendices that contain their respective exposure and risk calculations are:

- SEAD-9 **(Appendix A)**
- SEAD-27 **(Appendix B)**
- SEAD-28 **(Appendix C)**
- SEAD-33 **(Appendix E)**
- SEAD-34 **(Appendix F)**
- SEAD-66 **(Appendix Q)**
- SEAD-68 **(Appendix R)**

The estimated human health risks for each site are discussed below.

3.5.2.1.1 SEAD-9

Table 3.5-1 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within the EPA target range for all four receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all four receptors.

3.5.2.1.2 SEAD-27

Table 3.5-2 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within the EPA target range for all three receptors. The total non-cancer hazard index (HI) from all exposure routes exceeds one for Day Care Center Child (HI=3), but is less than one for the the Industrial Worker (HI=0.7) and the Day Care Center Adult Worker (HI=0.7). The elevated hazard index for the Day Care Center Child is due solely to ingestion of groundwater, with naphthalene, acetone and chromium being the significant risk contributors.

3.5.2.1.3 SEAD-28

No compounds of concern were detected at SEAD-28; therefore, it was not necessary to conduct a mini risk assessment.

3.5.2.1.4 SEAD-33

No compounds of concern were detected at SEAD-33; therefore, it was not necessary to conduct a mini risk assessment.

3.5.2.1.5 SEAD-34

No compounds of concern were detected at SEAD-34; therefore, it was not necessary to conduct a mini risk assessment.

3.5.2.1.6 SEAD-66

Table 3.5-3 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within the EPA target range for all four receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all four receptors.

3.5.2.1.7 SEAD-68

Table 3.5-4 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below or within the EPA target range for all four receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all four receptors.

3.5.2.2 Institutional Area

Human health risks were calculated for the following five exposure scenarios at each site located in the Institutional area:

- Institutional worker
- Institutional student
- Construction worker
- Day care center worker
- Child attending day care center

The potential exposure pathways associated with each receptor are summarized in **Figure 3-3.**

SEAD-32 is the only site located in the Institutional Area. **Appendix D** contains the exposure and risk calculations for SEAD-32. The estimated human health risks for this site are discussed below.

3.5.2.2.1 SEAD-32

Table 3.5-5 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.3 Conservation and Recreation Area

Human health risks were calculated for the following three exposure scenarios at each site located in the Conservation and Recreation area:

- Park worker
- Recreational visitor (child)
- Construction worker

The potential exposure pathways associated with each receptor are summarized in **Figure 3-4.**

The sites located in the Conservation and Recreation Area, and the appendices that contain their respective exposure and risk calculations are:

- SEAD-58 **(Appendix K)**
- SEAD-64B **(Appendix N)**
- SEAD-64D **(Appendix P)**
- SEAD-70 **(Appendix S)**

The estimated human health risks for each site are discussed below.

3.5.2.3.1 SEAD-58

Table 3.5-6 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors.

3.5.2.3.2 SEAD-64B

Table 3.5-7 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors.

3.5.2.3.3 SEAD-64D

Table 3.5-8 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all three receptors. The total non-cancer hazard index (HI) from all exposure routes is less than one for the Construction Worker, but equals or exceeds one for the Park Worker (HI=3) and the Recreational Child Visitor (HI=1). The elevated hazard index for both receptors is due solely to ingestion of groundwater, with iron and manganese being the significant risk contributors.

3.5.2.3.4 SEAD-70

Table 3.5-9 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within the EPA target range for all three receptors. The total non-cancer hazard index (HI) from all exposure routes is less than one for the Park Worker and the Recreational Visitor, but exceeds one for the Construction Worker (HI=2). The elevated hazard index for the Construction Worker is due solely to ingestion of soil, with arsenic being the significant risk contributor.

3.5.2.4 Warehouse

Human health risks were calculated for the following three exposure scenarios at each site located in the Warehouse area:

- Warehouse worker
- Construction worker
- Trespasser (adolescent)

The potential exposure pathways associated with each receptor are summarized in **Figure 3-5**.

SEAD-64A is the only site located in the Warehouse Area. **Appendix M** contains the exposure and risk calculations for SEAD-64A. The estimated human health risks for this site are discussed below.

3.5.2.4.1 SEAD-64A

Table 3.5-10 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors.

3.5.2.5 Prison Area

Human health risks were calculated for the following five exposure scenarios at each site located in the Prison area:

- prison inmate
- prison worker
- construction worker
- day care center child
- day care center adult.

The potential exposure pathways associated with each receptor are summarized in **Figure 3-6**.

The sites located in the Prison area, and the appendices that contain their respective exposure and risk calculations are:

- SEAD-43, 56, 69 **(Appendix G)**
- SEAD-44A **(Appendix H)**
- SEAD-44B **(Appendix I)**
- SEAD-52 **(Appendix J)**
- SEAD-62 **(Appendix L)**
- SEAD-120B **(Appendix T)**
- SEAD-64C **(Appendix Q)**

The estimated human health risks for each site are discussed below.

3.5.2.5.1 SEAD-43, 56, 69

Table 3.5-11 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.2 SEAD-44A

Table 3.5-12 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.3 SEAD-44B

Table 3.5-13 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.4 SEAD-52

Table 3.5-14 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.5 SEAD-62

Table 3.5-15 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.6 SEAD-120B

Table 3.5-16 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.7 SEAD-64C

Table 3.5-17 summarizes the calculated cancer and non-cancer risks for all receptors and exposure routes considered in this risk assessment. The total cancer risk from all exposure routes is below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors.

3.5.2.5.8 Total Construction Worker Risk

The Hazard Indices and Cancer Risks shown in **Tables 3.5-11** through **3.5-17** for the construction worker at the nine SEADs evaluated reflect the exposure that occurs while the construction worker is working in just one specific site. This represents only a portion of the construction worker's entire exposure duration at the sites. (The Hazard Indices and Cancer Risks for the other receptors in **Tables 3.5-11** through **3.5-17** conservatively assume that the receptor is continually exposed to soil and groundwater at the specific site for the entire Exposure Duration.) In order to estimate the construction worker's composite risk from his/her entire exposure during the construction project, the site-specific risks must be added together.

Table 3.5-18 summarizes the calculated cancer and non-cancer risks for the construction worker from his/her combined exposure to all nine SEADs. The total cancer risk from all nine SEADs is below the EPA target range for the construction worker. Likewise, the total non-cancer hazard index from all eight sites is less than one for the construction worker.

3.5.3 Risk Characterization for Lead

The previous analyses of the current and future land use exposure scenarios do not include any quantification of risk for lead since no approved RfD, RfC, slope factor or inhalation unit risk currently are available. Lead was detected at the SWMUs/EBS site in soil and groundwater. This section qualitatively addresses the risk from lead exposure at these sites.

The effects of lead are the same regardless of whether it enters the body through breathing or ingestion. The major health threat from lead arises from the damage it causes to the brain, especially in fetuses, infants and young children, which are not part of the current site users. Young and developing humans are highly sensitive to its effects. Also, young children are prone to ingest more lead as a result of normal mouthing behavior. Decreased IQ and reduced growth may result from childhood exposure. Fetal exposure may result in pre-term birth, reduced birth weight, and decreased IQ. Some of the health effects of lead, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood levels so low as to be essentially without a threshold.

Lead exposures may increase blood pressure in middle-aged men. High-level exposure can severely damage the brain and kidneys in adults or children. In addition, high doses of lead will cause abortion and damage to the male reproductive system. The EPA currently does not provide any toxicity values for lead. The EPA has placed lead in weight-of-evidence Group B2, indicating that it is a probable human carcinogen.

EPA has developed different approaches for assessing risks from adult and child exposure to lead. To address adult exposures, EPA issued "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil" (EPA, December 1996c). To address child exposures, EPA recommends use of the Integrated Exposure Uptake Biokinetic Model for Lead (Version 0.99), and the associated "Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children" (EPA, February 1994). The analysis of potential risk from exposure to lead at the SWMUs/EBS site follows these recommendations for adult and child exposures, respectively.

Child Day Care Center Exposure

EPA has determined that blood lead levels as low as 10-15 ug/dL in infants or young children indicate an increased risk of irreversible neurobehavioral deficits (EPA, 1996c). Where young children may be consistently exposed to lead, such as in a residential scenario, risk may be calculated using the Integrated Exposure Uptake Biokinetic Model (IEUBK) which predicts the blood lead concentrations in children exposed to lead through a variety of media. The model is designed to estimate blood lead levels using a combination of default assumptions and site-specific exposure information where available. The model contains two modules: uptake and biokinetic. The uptake module estimates the quantity of lead taken into the body (uptake) from exposure to lead in five media (air, drinking water, soil/dust, food and paint). The biokinetic module estimates the distribution of this lead among various bodily organs and, most importantly, in the blood.

The IEUBK model calculates a child's uptake and blood lead levels assuming a constant daily exposure in each of several environmental media (air, soil, etc.). The model includes default values for many exposure parameters that change by age, to realistically reflect growth changes in a child (e.g., different inhalation rates and drinking water intakes). The default values used in IEUBK model are based on nationwide surveys of lead distribution in the environment and studies of inhalation and ingestion for each age group modeled (children age 0-7). For the IEUBK simulations performed for this risk assessment, the default values were used for most input parameters.

The IEUBK model was used to estimate the risk associated with a child's ingestion of soil and groundwater while attending a day care center located at the Prison Area. To simulate this scenario, we assumed that a child was exposed to soil and groundwater at the site five days per week. The IEUBK model contains default values for soil ingestion rates based on daily (i.e., seven days per week) exposure. These values were multiplied by 5/7 to reflect exposure only at the day care center. This calculation assumes that the child is not exposed to lead in soil or dust at home (i.e., on the two days per week that the child does not attend the day care center).

The IEUBK model includes default assumptions regarding indoor dust ingestion rates and lead concentrations. The IEUBK manual recommends that soil represents 45% of the total soil plus dust ingestion rate. These default assumptions were used.

The child is potentially exposed to lead via other pathways. The IEUBK model includes default exposures for lead in air and diet. The recommended default values were used for all non-soil/dust/groundwater exposures.

One day care exposure simulation was performed for this assessment. The IEUBK model was run to derive an example allowable soil lead concentration following the approach used by EPA in deriving a target lead concentration for residential soil, in the Office of Solid Waste and Emergency Response (OSWER) Interim Directive #9355.4-12 titled "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities" (EPA, August 1994b). Details of the IEUBK model input and output for this simulation can be found in the Draft Completion Report for Six Areas of Concern. The results of these analyses are discussed below. The IEUBK model parameter input values used for this assessment are summarized in **Table 3.5-19**.

In the Interim Directive document, EPA derived a target lead concentration of 400 mg/Kg lead in soil, based on its IEUBK model simulation. This simulation, which included default assumptions for all exposure pathways, estimated that with residential exposure to soil containing 400 mg/Kg of soil, a child has a 95% probability of having a blood lead level less than 10 ug/dL. A similar calculation was performed for this assessment based on the day care center soil ingestion scenario, as described above. For this day care center scenario, the IEUBK model predicts a 95% probability of having a blood lead level less than 10 ug/dL at a soil lead concentration of 625 mg/Kg.

Figures 3-7 and **3-8** illustrate the IEUBK model results. **Figure 3-7** is a plot of the cumulative probability distribution for exceeding 10 ug/dL lead in blood, associated with day care exposure to an average concentration of 625 mg/Kg lead in soil. This plot shows that the probability of exceeding 10 ug/dL is 5%. **Figure 3-8** shows the median blood lead levels at each age predicted for day care exposure to 625 mg/Kg lead in soil. This figure also shows the IEUBK predictions for EPA's residential scenario target level of 400 mg/Kg lead in soil. It can be seen that the results for the day care scenario and EPA's residential scenario are nearly identical. This result indicates that a target average concentration of 625 mg/Kg lead in soil for day care exposure is consistent with EPA's residential target concentration and equally health-protective. The maximum soil concentrations of lead measured at each of the AOCs are all less than 625 mg/Kg (highest value at SEAD 120B was 522 mg/Kg). The maximum concentrations of lead measured at each of the 14 new SWMUs are also all less than 625 mg/Kg (highest value at SEAD-70 was 391 mg/Kg).

<u>Adult Occupational Exposure</u>

To qualitatively assess risks from adult occupational lead exposure, the site concentrations are compared with risk-based remediation goals (RBRGs) presented in "Recommendations of the

Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil" (EPA, December 1996). In this report, EPA presents a model to calculate target soil concentrations of lead (RBRGs) at which the exposure for a women of child-bearing age would minimize risk to her fetus. Thus, while adult exposure is addressed by EPA's analysis, the most sensitive receptor (i.e., the fetus) is being protected.

EPA has calculated RBRGs for lead in soil using their recommended default parameters as inputs to the model. For a homogeneous, non-urban population exposed for 219 days per year, EPA suggests an RBRG of 1750 mg/Kg lead in soil. The EPA RBRG for urban areas is 750 mg/Kg. While SEDA is more comparable to the non-urban case, the Army believes a more conservative RBRG of 1250 mg/Kg is appropriate for the Seneca.

The maximum concentrations for lead in surface soil and total soils at the SWMUs/EBS site range from 21 to 522 mg/Kg, which are all less than the Army target value of 1,250 mg/Kg discussed above. The highest outdoor air EPC for lead is 0.18 ug/m^3 (at SEAD 120B, during construction activities). This value is lower than the National Ambient Air Quality Standard for lead, which is 1.5 ug/m^3 (based on a 3-month average).

These results suggest that lead does not pose a health risk upon regular exposure to the site soils for any receptor at the site.

3.5.4 Uncertainty Assessment

All risk assessments involve the use of assumptions, judgements, and imperfect data to varying degrees. This results in uncertainty in the final estimates of risk. There are uncertainties associated with each component of the risk assessment from data collection through risk characterization. For example, there is uncertainty in the initial selection of substances used to characterize exposures and risk on the basis of the sampling data and available toxicity information. Other sources of uncertainty are inherent in the toxicity values for each substance and the exposure assessments used to characterize risk. Finally, additional uncertainties are incorporated into the risk assessment when exposures to several substances across multiple pathways are summed. Areas of uncertainty in each risk assessment step are discussed below.

3.5.4.1 Uncertainty in Data Collection and Evaluation

Uncertainties in the data collection/evaluation step of the risk assessment focus on determining whether enough samples were collected to adequately characterize the risk, and if sample analyses were conducted in a qualified manner to maximize the confidence in the results. Results of the sample analyses were used to develop a database that includes a complete list of the chemicals by media and their representative concentrations used in the risk assessment. The sampling and analysis addressed various objectives in addition to the risk assessment. Therefore, the samples were not collected randomly but were collected from areas of the site with the greatest likelihood to be contaminated. This type of non-random sampling biases the data collected toward overestimating chemical concentrations from the site.

All chemicals detected that were potentially site-related were retained in this assessment. Chemicals that were never detected were eliminated from the assessment. This practice may slightly underestimate risks due to low levels (i.e., below the sample quantitation limit) of eliminated chemicals. Since samples were collected at areas where concentrations were expected to be high and the maximum concentrations were used for the assessment, it is very unlikely that any chemicals were present at the site at health-significant levels and not detected in at least one sample. However, if this did occur, this assumption will underestimate risk. The maximum concentrations were used to calculate site-related risks. Since that assumption implies chronic exposure to the maximum concentration, this assumption is likely to overestimate risk.

3.5.4.2 Uncertainty in Exposure Assessment

There are inherent uncertainties in predicting future land uses and future chemical concentrations. Future land use scenarios were based on the Land Reuse Plan developed by the Land Redevelopment Authority.

A large part of the risk assessment is the estimation of risks for a broad set of exposure scenarios and pathways. If exposure does not occur, no risks are present. This assessment does not factor in the probability of the exposure occurring. For certain pathways, exposure may be extremely unlikely. For example, the future receptors are assumed to drink groundwater. It is unlikely that this will occur, since there is a current acceptable water supply, and the aquifer beneath the site is not believed to be productive enough to supply the needs of the future land uses. This assumption yields an overestimate of risk for this scenario.

Once pathways are identified, exposure point concentrations must be estimated. There is always some doubt as to how well an exposure model approximates the actual conditions receptors will be exposed to at a given site. Key assumptions in estimating exposure point concentrations and exposure assumptions and their potential impact on the assessment are described in the following paragraphs.

As summarized in **Tables 3.3-1** through **3.3-5**, there are many factors that determine the level of exposure for each exposure pathway. These factors include inhalation rates, ingestion rates, exposure frequencies, exposure duration, body weight, etc. The values for these exposure factors must be selected by the risk assessor to represent each receptor. For the scenarios in this risk assessment, upper bound values were selected for each exposure factor. In the calculations of exposure, these multiple upper-bound exposure factor estimates compound to yield intakes and absorbed doses that overestimate likely exposure levels.

The EPCs (i.e., maximum concentrations) derived from the measured chemical concentrations are assumed to persist without change for the entire duration of each exposure scenario. It is likely that some degradation would occur over time, particularly for some of the organic compounds that would reduce the current concentrations. Therefore, this steady state assumption tends to overestimate exposure levels.

3.5.4.3 Uncertainty in Toxicity Assessment

Of the chemicals of potential concern, a number had no reference dose or slope factors. They are:

- acenaphthylene
- benzo(g,h,i)perylene

- dibenzofuran
- phenanthrene
- delta-BHC
- calcium
- lead
- magnesium
- potassium
- sodium

Several of these compounds have toxicity information such as weight of evidence classification indicating a strong potential for adverse health effects, particularly lead. The absence of toxicity values for these chemicals tends to underestimate risks.

There is considerable uncertainty inherent in the toxicity values for both carcinogens and non-carcinogens. Many of the studies are based on animals and extrapolated to humans, and in some cases, subchronic studies must be used to assess chronic effects. Most cancer slope factors are calculated using a model that extrapolates low dose effects from high dose animal studies. Because toxicity constants are generally based on the upper limit of the 95th-percentile confidence interval or incorporate safety factors to compensate for uncertainty, chemical-specific risks may be overestimated.

Toxicity information was not available for dermal exposure; hence, several assumptions had to be made which may tend to over- or underestimate risk. Oral toxicity values were used without adjustment to calculate risks from dermal exposure because the EPA has not derived toxicity values for this route of exposure. However, values found in the literature (Owen, 1990) indicate that the uncertainty associated with using oral absorption to estimate dermal absorption is likely less than one order of magnitude. This is due to the lack of scientific studies available to quantify dermal toxicity and carcinogenic potential for the vast majority of priority pollutants and because chemical specific information needed to convert ingested dose to absorbed dose is not available.

3.5.4.4 Uncertainty in Risk Characterization

Uncertainties in the toxicity assessment are compounded under the assumption of dose additivity for multiple substance exposure. That assumption ignores possible synergisms and antagonisms among chemicals, and assumes similarity in mechanisms of action and metabolism. Overall, these assumptions would tend to overestimate risk. Similarly, risks summed for chemicals having various weight-of-evidence classifications as well as different target organs may also tend to overestimate risk.

3.6 ECOLOGICAL RISK ASSESSMENT (ERA)

3.6.1 Objectives and Overview

In addition to the evaluation of human health, this mini-risk assessment considers the risk posed by the site to its ecological communities. This ecological risk assessment (ERA) is intended to indicate the potential, if any, of chemicals found at the 21 SWMUs and one EBS site to pose a risk or stress to plants or animals that may inhabit or visit any of these sites.

Other areas of SEDA have been studied to characterize the ecological communities at SEDA in general and at specific SEADs (e.g., SEADs 16, 17, 25 and 26). Field surveys during the Remedial Investigations of these SEADs produced an understanding of the habitat, vegetative communities and wildlife species present at the site. Since the land at the sites considered in this risk assessment is environmentally similar to the other areas at SEDA that have been studied in depth, the existing ecological characterizations are considered to apply as well to these sites. Therefore, this mini-ERA is based upon the findings of these prior field surveys. An ecological field survey specific to the 21 SWMUs and one EBS site has not been performed.

As preceding sections of this report have indicated, the existing site-specific database of chemical and physical information was developed to characterize the types, locations, and concentrations of chemicals in soil, sediment, surface water, and groundwater. Calculations in this mini-ERA are conservatively based on the maximum concentrations of each chemical detected in each medium of potential concern to ecological receptors (e.g., soil, sediment, and surface water).

The ERA addresses potentially significant risks to the following biological groups and special-interest resources associated with the site: vascular vegetation, wildlife, aquatic life, endangered and threatened species, and wetlands. The focus of the ERA lies in the evaluation of the potential toxicity of each constituent of potential concern (COPC) in soil and defines toxicity benchmark values that will be used to calculate the ecological risk quotient.

The purpose of the ERA is to evaluate the likelihood that adverse ecological effects are occurring or may occur as a result of exposure to chemicals associated with the site based on a weight-of-evidence approach. An ecological risk does not exist unless a given contaminant has the ability to cause one or more adverse effects and it is contacted by, an ecological receptor for a sufficient length of time, or at a sufficient intensity to elicit the identified adverse effect(s) (EPA, 1997a).

In this ERA, ecological receptors were determined based on prior studies at SEDA. Impacts from exposure to these receptors are determined using conservative assumptions to assure that a reasonable degree of protection is maintained. Ecological risk is then presented in terms of a hazard quotient (HQ), which is defined as the ratio of the estimated exposure point concentration to an appropriate toxicity reference value (TRV). Separate HQs are calculated for each contaminant/receptor pair. Uncertainties are the greatest and arise from extrapolation of the available toxicity data and inference regarding exposure. In general, ratios of exposure point concentration to TRV greater than one (1) are considered to indicate a potential risk. Due to the uncertainties associated with using this approach, safety factors are considered in interpreting the findings. HQs between 1 and 10 are interpreted as having some potential for adverse effects; whereas, HQs between 10 and 100 indicate a significant potential for adverse effects. HQs greater than 100 indicate adverse effects can be expected.

3.6.2 Problem Formulation

Problem formulation establishes the goals, breadth, and focus of the ERA through the following:

- Identification of the ecological contaminants of potential concern (COPCs);
- Identification of potential ecological effects;
- Development and review of information about ecosystems potentially at risk, contaminant fate and transport, and complete exposure pathways;
- Selection of assessment endpoints;
- Presentation of an ecological conceptual site model; and
- Selection of an analysis plan (including measures of effects).

Each of these steps is discussed and described in the following sections.

3.6.2.1 Identification of Ecological Constituents of Potential Concern

Chemicals detected in any sample for a given environmental medium of interest (soil, sediment, or surface water) were considered constituents of potential concern (COPCs) for this ERA. Screening analyses designed to reduce the list of COPCs were not performed for this mini-ERA. The highest concentration for each COPC measured in samples from each of the sites was used as the exposure point concentration (EPC) in the calculations presented later in this section for the site.

3.6.2.2 Identification of Potential Ecological Effects

Available state and federal databases and literature sources were reviewed to determine if there were any known threatened or endangered plant or animal species present at or near the Depot. Additionally, a literature search was conducted to obtain information on the identified ecological contaminants of potential concern and their potential ecological effects on species of potential concern at the Depot. Topics reviewed during this assessment included information for exposure profiles, bioavailability or bioconcentration factors for various COPCs, life-history information for the species of concern or the surrogate species, and an ecological effects profile.

3.6.2.3 Ecosystems at Risk, Contaminant Fate and Transport, and Complete Exposure Pathways

3.6.2.3.1 Site Habitat Characterization

Detailed site-specific ecological evaluations of the plant and animal habitats and communities found at the 21 SWMU and 1 EBS sites have not been conducted. Characterizations of the site habitat and ecological communities present at the subject sites are based on general observations made during preliminary site investigations and on the results of detailed ecological evaluations and assessment that have been conducted at other SWMUs at the Depot (i.e., for SEADs-16, 17, 25 and 26 and the Open Burning (OB) Grounds) as part of remedial investigations. The results and findings of the detailed ecological characterizations completed at the other four SWMUs are assumed to be representative of the sites included in this mini-ERA. Key aspects of these characterizations relevant to this mini-risk assessment are presented below.

Ecological site characterizations were based on compilation of existing ecological information and on-site reconnaissance activities. The methods used to characterize the ecological resources included site-walkovers for the evaluation of existing wildlife and vegetative communities; interviews with local, state, and SEDA resource personnel; and review of environmental data obtained from previous Army reports. SEDA has a strong wildlife management program that is reviewed and approved by the New York Fish and Game Agency. The Depot manages an annual white-tailed deer (Odocoileus virginiana) harvest and has constructed a large wetland called the "duck pond" in the northeastern portion of the facility to provide a habitat for migrating waterfowl.

The NYSDEC Natural Heritage Program Biological and Conservation Data System identifies no known occurrences of federal- or state-designated threatened or endangered plant or animal species within a 2-mile radius of the site. No species of special concern are documented within the Depot property.

The only significant terrestrial resource known to occur at SEDA is the population of white-pelaged white-tailed deer (Odocoileus virginiana), which inhabits the fenced portion of the Depot. Annual deer counting conducted at the Depot indicates that the size of the deer herd is approximately 600 animals of which approximately one-third (i.e., 200) are white-pelaged. Since the Depot is totally enclosed, the white-pelaged deer is thought to result from inbreeding within the herd. The depot maintains the herd through an annual hunting season to prevent overgrazing and starvation of the deer. The New York State DFW conducts the management plan of the herd. The normal brown-pelaged deer are also common. White-tailed deer are not listed as a rare or endangered species.

Agricultural crops and deciduous forests comprise the vegetative resources used by humans near SEDA. Although no crops are grown on the Depot, farmland is the predominant land use of the surrounding private lands. Crops including corn, wheat, oats, beans and hay mixtures, are grown primarily for livestock feed. Deciduous forestland on the Depot and surrounding private lands is under active forest management. Timber and firewood are harvested from private woodlots that surround the Depot, but timber harvesting does not occur on the Depot.

Several wildlife species are hunted and trapped on private lands near SEDA. Game species hunted include the eastern cottontail, white-tailed deer, ruffed grouse, ring-necked pheasant and various waterfowl. Gray squirrel and wild turkey are hunted to a lesser extent. Fur-bearing species trapped in the study area include red and gray fox and raccoon. Muskrat and beaver are trapped to a lesser extent (Woodruff 1992). On the Depot, deer, waterfowl and small game hunting is allowed, although the designated waterfowl hunting area is outside the study area. Trapping is also permitted (SEDA 1992) on the Depot.

Animals that have been identified at the depot during prior ecological surveys include beaver, eastern coyote, deer, red and gray fox, eastern cottontail rabbit, muskrat, raccoon, gray squirrel, striped skunk, and the woodchuck. Bird species that have been identified include the bluejay, black-capped chickadee, American crow, mourning dove, northern flicker, ruffed grouse, ring-billed gull, red-tailed hawk, northern junco, American kestrel, white-breasted nuthatch, ring-necked pheasant, American robin, eastern starling, turkey vulture, and pileated woodpecker.

There are no permanent lakes, ponds, streams or wetlands in any of the 22 SWMU or EBS sites. Surface water only exists intermittently in drainage ditches; thus, it does not directly support aquatic life.

No signs of stressed or altered terrestrial biota (vegetation and wildlife species) were observed during the surveys in any of the 22 sites considered in this assessment. There were no indications of unnatural die-off or stunted vegetation.

3.6.2.3.2 Contaminant Fate and Transport

The primary sources of contaminants at the 22 SWMU and EBS sites are the residues of former operations and activities that were conducted in the identified SEADs. These residues reside primarily in the soils that remain at the sites. As is indicated above, permanent ponds, lakes, wetlands, rivers, etc. do not exist on any of the 22 sites covered by this ecological risk assessment; therefore, contaminants found at the site only exists intermittently in surface water that is occasionally found in the drainage ditches present at the subject sites. Similarly, contaminants found in sediments sampled from the drainage ditches are more similar to soil than sediment associated with a surface water body (e.g., river or lake), from an ecological exposure standpoint.

Contamination, if present, in the soil residues may migrate from the original sites of release due to bioturbation or excavation. Volatile compounds can move through the soils. Infiltrating rainwater can leach contaminants and transport them into groundwater, and surface water runoff may also carry contaminants onto adjacent soils or drainage ditches.

3.6.2.3.3 Complete Exposure Pathways

An exposure point is a location where a receptor could potentially come into contact with a contaminated medium. An exposure route is the means by which a receptor comes into contact with a contaminated medium at an exposure point. Exposure to COPCs may occur through the routes of ingestion, inhalation, and dermal contact.

There are five media through which ecological receptors could potentially be exposed to site-related contaminants: air (dust and vapor), soil, surface water, sediment, and organisms in the food chain. Probable exposure routes (i.e., potentially complete pathways) were identified for each medium based on the physical characteristics of the site and the potential ecological receptors that may occur there.

Exposure to soil contaminants may occur directly through ingestion, inhalation, and/or dermal contact. Chemicals also may migrate further in the environment by a variety of pathways following secondary release from surface soil and deeper soil. The following pathways result from these secondary release mechanisms:

- Suspension and dispersal by the wind of particulate contaminants or contaminants adsorbed to surface soil particles.
- Direct volatilization of volatile organic compounds from surface soil to air.
- Uptake of soil contaminants by terrestrial organisms.
- Transport of chemicals to surface water and sediment by surface runoff of water and soil particles.

Exposure routes were also identified for the potential avian and mammalian ecological receptors. Principal pathways for which analytical data were available for quantitative evaluation of soil COPCs include ingestion of soil and ingestion of other animals and plants that have accumulated contaminants. For sediment and surface water, principal pathways include direct contact with surface water and sediment, ingestion of surface water and sediment, and ingestion of other organisms that have accumulated contaminants. However, since permanent surface water bodies do not exist at any of the sites, exposure via ingestion or dermal contact with surface water was considered incidental and not quantitatively evaluated. Similarly, since sediment does not

- Suspension and dispersal by the wind of particulate contaminants or contaminants adsorbed to surface soil particles
- Direct volatilization of volatile organic compounds from surface soil to air
- Uptake of soil contaminants by terrestrial organisms
- Transport of chemicals to surface water and sediment by surface runoff of water and soil particles

Terrestrial animal and bird populations could potentially be directly exposed to soil contaminants through ingestion of, dermal contact with, and/or inhalation from site soils. For species such as deer, raccoon, opossum, rabbits, rodents, and birds, such exposures would likely be associated with foraging activities. Burrowing species, such as rabbits, mice, moles, and shrews, would probably receive the greatest exposures among vertebrates. Invertebrates living on and within the soil also may experience significant exposures. Although ingestion is the principal soil exposure route, dermal contact also may be important, particularly for burrowing species. However, the limited dermal permeability database available for ecological receptors and surrogate species precluded quantitative evaluation of the dermal exposure pathway for either mammals or birds.

Ecological receptors could also potentially be exposed to site-related contaminants via the air medium. Contaminants in air may be in the form of vapor from volatile organic compounds, or in particulate form (as dusts or adsorbed to soil particles) suspended by wind. In either form, ecological receptors could be exposed to contaminants through inhalation. However, the lack of applicable inhalation toxicity data for ecological receptors or similar species precluded quantitative evaluation of potential risks.

Plants may be considered ecological receptors as well as a pathway or medium through which wildlife receptors can be exposed to site contaminants. Plants may absorb site-related contaminants from soil through their roots. Contaminants absorbed by plants may then be transferred to wildlife when the plants are ingested for food. This exposure pathway was addressed by use of chemical-specific soil-to-plant uptake factors (obtained from the scientific literature) in the animal receptor exposure calculations.

Under the future land use scenarios for the 22 sites, it is assumed that contaminated soils may be excavated during construction and distributed on the ground surface. As under current conditions, ecological receptors could potentially be exposed to chemicals in soil through ingestion and dermal contact. Other exposure pathways also were assumed to remain essentially the same as under current conditions, except that possible inhalation exposures are likely to be reduced by paving and vegetation (e.g., lawns). The abundance and diversity of some ecological receptors on the site may likely be reduced due to the development.

3.6.2.6 Analysis Plan

The analysis plan is the final stage of problem formulation. In this step, risk hypotheses presented in the CSM are evaluated to determine how these hypotheses will be assessed using site-specific data. The analysis plan includes three categories of measures to evaluate the risk hypotheses identified in the CSM: measures of effect (also termed measurement endpoints), measures of exposure, and measures of ecosystem and receptor characteristics.

3.6.2.6.1 Measures of Effect

Measurement endpoints are measurable responses to a stressor that are related to the valued characteristics chosen as assessment endpoints (EPA, 1992a). Assessment endpoints generally refer to characteristics of populations and ecosystems. It is usually impractical to measure changes in these characteristics as part of an assessment. Consequently, measurement endpoints are selected that can be measured and extrapolated to predict effects on assessment endpoints (EPA, 1992a). The most appropriate measurement endpoint relating to the assessment endpoint is the lowest concentration of the constituent that, in chronic toxicity tests, is associated with non-lethal effects to a deer mouse, a short-tailed shrew, or an American robin. Because the assessment endpoint focuses on maintenance of the population of deer mice, shrews, or robins, a measure of effect equivalent to "no effect" would be overly conservative, in that it would reflect protection of the individual, not the population. A more appropriate measure of effect, reflecting population level response, is the lowest non-lethal effect level. Toxicity data from tests that measure responses that influence reproduction, health, and longevity of the species will conform to the assessment endpoint. Therefore, the lowest concentration of the constituent that produces such effects will be used as a measure of effects.

Reliable measures of effects are not available for each exposure route for each constituent. Effects from exposure through inhalation and dermal contact are not well developed for ecological receptors; consequently, these exposure routes are analyzed qualitatively.

The measures of ecosystem and receptor characteristics include such characteristics as the behavior and location of the receptor and the distribution of a contaminant, both of which may affect the receptor's exposure to the contaminant. The typical foraging area of the receptor as well as the quality of the habitat in the site have been considered in the estimation of exposure, as discussed in **Sections 3.6.3.2** and **3.6.3.3.**

3.6.2.6.2 Measures of Exposure

Measures of exposure are the amounts, in dosage or concentration, that the receptors are hypothesized to receive. These include concentrations of constituents in the impacted media and concentrations or dosages of the constituents to which the receptor is exposed.

Decision rules are specified for evaluating effects on the assessment endpoints. **Table 3.6-1** shows the decision rules that describe the logical basis for choosing among alternative actions for the assessment endpoints based on the results of the measurement endpoints. Together, the assessment endpoint, measurement endpoint, and decision rule define the following:

- An entity (e.g., deer mouse population)
- A characteristic of the entity (e.g., health of the individuals in the population)
- An acceptable amount of change in the entity (e.g., loss of no more than 20 percent of a population)
- A decision whether the protection goal is or is not met.

For soil exposures, the results of the assessment will be presented in terms of hazard quotients (HQs). The HQ is the ratio of the measured or predicted concentration of an ecological COPC to which the receptors are exposed in an environmental medium, and the measured concentration that adversely affects an organism based on a toxicity threshold. If the measured concentration or estimated dose is less than the concentration or dose expected to have the potential to produce an adverse effect (i.e., the ratio of the two is less than 1), then the risk is considered acceptable (protective of the ecological receptor). Any quotient greater than or equal to 1 indicates that the ecological COPC warrants further evaluation to determine the actual likelihood of harm. COCs are selected only after an additional weight-of-evidence evaluation of the conservatism of the exposure assumptions, toxicity values, and uncertainties is conducted.

Due to the ephemeral nature of surface water accumulation in the drainage ditches and the limited exposure of valued ecological receptors to surface water or sediment in the ditches, these media are not quantitatively assessed in this ERA.

3.6.2.6.3 Measures of Ecosystem and Receptor Characteristics

Section 3.6.3.4 discusses the toxicity reference values associated with the COPCs. Endpoints stated in terms of specific ecological receptors or exposure classes (groups of species exposed by similar pathways) often require data on the processes that increase or decrease the exposure concentration below or above the measured or predicted environmental concentration. Thus, some quotients incorporate exposure factors (e.g., dietary soil fractions and bioaccumulation factors). **Section 3.6.3.3** discusses exposure factors for the site.

3.6.3 Exposure Assessment

The exposure assessment evaluates potential exposure of ecological receptors to site-related constituents through evaluation of the following:

- Description of the spatial distribution of COPCs
- Description of spatial and temporal distribution of ecological receptors
- Quantification of exposure that may result from overlap of these distributions

Each of these components is discussed below.

3.6.3.1 Constituent Distribution

The extent of measured chemical contamination at the site is restricted to the areas sampled within the 22 sites. The total combined area of the sites in the prison area is 128 acres, less than 20 percent of the 700-acre parcel that will constitute the prison facility. The total area of the remaining sites is 96 acres, about 1 percent of the 10,000 acre Depot property. Soil located outside these sites is presumed to be relatively clean.

The magnitude of constituent exposures that may be experienced by ecological receptors is affected by the degree of their spatial and temporal associations with the site, as discussed in the following sections.

3.6.3.2 Receptor Distribution

A variety of factors may affect the extent and significance of potential exposures. Receptor exposures are affected by the degree of spatial and temporal association with the site. For example, the receptors' mobility may significantly affect their potential exposures to site-related contaminants. Many species may only inhabit the study area during seasonal periods (e.g., breeding season, non-migratory periods). Non-migratory species may remain in the vicinity throughout the year. These species, particularly those with longer life spans (and usually larger home ranges), have the greatest potential duration of exposure. However, species with small home range sizes have the greatest potential frequency of exposure. Other factors affecting exposures include habitat preference, behavior (e.g., burrowing, rooting, foraging), individual home range size (larger home ranges correspond to far less frequent use of study area), and diet. Diet is of particular importance in exposure as related to (1) food source availability (larger amount of preferred food sources equals a greater potential for receptor usage) and (2) bioaccumulative contaminants. Contaminants that bioaccumulate may also tend to biomagnify in the food chain. This discussed in more detail in **Section 3.6.3.3**. As a result, predatory species at higher trophic levels may receive their most significant exposures through their prey. However, the possibility of a population of an upper trophic-level predator, or even an individual predator, utilizing any of the 22 sites as a primary source of food is considered extremely remote.

The deer mouse (~ 0.14 acre), short-tailed shrew (~ 0.96 acre), and the American robin (~ 0.4 acre) each have a typical home range that is less than 1 acre (EPA, 1993c). The areas of six of the sites are considerably smaller than this (0.002 – 0.05 acres). These sites are: SEADs-27, -28, -32, -33, -34, and –68). None of these SEADs would be expected to provide the entire diet for any of the target receptor species. The remaining sites, each encompassing at least 1 acre of land, could constitute 100 percent of the home range of a deer mouse, a shrew, or a robin.

3.6.3.3 Quantification of Exposure

Evaluation of the degree to which contaminant and receptor distributions (described in the previous two sections) coincide at the site indicated that the deer mouse, the short-tailed shrew, and the American robin are each receptors likely to have significant potential exposures to COPCs in soil.

To quantify exposures of target receptors to each COPC, a daily intake of each COPC was calculated. Conversion of the environmental concentration of each COPC to an estimated daily intake for a receptor at the site was necessary prior to evaluation of potentially toxic effects. For terrestrial animal and avian receptors, calculation of exposure intake rates relied upon determination of an organism's exposure to COPCs found in soil. Exposure rates for the target receptors were based upon ingestion of contaminants from this medium and also from consumption of other organisms. The ERA did not attempt to measure potential risk from dermal and/or inhalation exposure pathways given the insignificance of these pathways relative to the major exposure pathways (e.g., ingestion) and due to the scarcity of data available for these pathways.

The first step in measuring exposure rates for wildlife receptors was the calculation of food ingestion rates for the deer mouse, short-tailed shrew, and the robin. The EPA's *Wildlife Exposure Factors Handbook* (EPA, 1993c) includes a variety of exposure information for a number of avian, herptile, and mammalian species. Data are directly available for body weight, ingestion rate, and dietary composition of the three selected target receptors.

The means body weight of 0.02 Kg for the female deer mouse and the maximum food ingestion rate of 0.22 g/g-day (0.0044 Kg/day) for a non-lactating mouse were used (EPA, 1993c) to provide conservative exposure rate calculations for the deer mouse. Similarly, the lowest reported mean body weight of 0.015 Kg and the maximum food ingestion rate of 0.6 g/g-day (0.009 Kg/day) for a short-tailed shrew were used (EPA, 1993c) to provide conservative exposure rate calculations for the short-tailed shrew. The year round average body weight of 0.077 Kg and the average food ingestion rate of 1.205 g/g-day (0.0928 Kg/day) for and adult robin (EPA, 1993c) were used to estimate exposure rates for the robin.

The *Wildlife Exposure Factors Handbook* (EPA, 1993c) also presents average values for intake of animal matter and plant matter for the receptors as well as incidental soil ingestion.

Soil ingestion has been measured at less than 2 percent of diet (Beyer et al., 1994) for mammalian species. As might be expected based on the opportunistic habits of mice, the proportion of animal to plant matter in the diet varies from around 65 percent animal : 35 percent plant to 25 percent animal : 75 percent plant depending on season and region of the country. For this ERA, an approximate average of 50 percent animal : 50 percent plant was used, after subtracting the 2 percent for incidental soil ingestion. The dietary intakes calculated for this assessment are as follows:

Total Dietary Intake	=	0.0044 Kg food/day
Plant Matter Intake	=	0.00216 Kg plant matter/day
Animal Matter Intake	=	0.00216 Kg animal matter/day
Incidental Soil Intake	=	0.000088 Kg soil/day

The short-tailed shrew is primarily carnivorous, with its diet consisting largely of insects and other invertebrates found in the soil. Based on information provided in the *Wildlife Exposure Factors Handbook* (EPA, 1993c), 5.3 percent of the shrew's diet is vegetative, with most of the remainder comprised of soil invertebrates. To be conservative in terms of potential bioaccumulation, it was assumed that 94.7 percent of the shrew's intake of food is animal matter (small insects, etc.). The shrew's incidental soil ingestion rate is estimated at 0.0002 Kg of soil/day, which is consistent with Beyer's (Beyer et al., 1994) estimate of incidental soil ingestion by small mammals. Accordingly, the shrew's dietary intakes calculated for this assessment are as follows:

Total Dietary Intake	=	0.009 Kg food/day
Plant Matter Intake	=	0.00048 Kg plant matter/day
Animal Matter Intake	=	0.00852 Kg animal matter/day
Incidental Soil Intake	=	0.0002 Kg soil/day

The American robin's diet includes ground dwelling invertebrates, foliage dwelling insects and fruits. The robin's diet varies significantly throughout the year, exhibiting a high insect and invertebrate intake in the spring and a high plant material intake characteristic in the fall. Averaging the dietary characteristics over these three seasons results in an average invertebrate intake of 44 % and an average plant material intake of 56%. Soil ingestion for the American woodcock (surrogate species) has been measured at approximately 10.4 percent of diet (Beyer et al., 1994). For this ERA, an approximate average of 44 percent invertebrate : 56 percent plant was used, after subtracting the 10.4 percent for incidental soil ingestion. The dietary intakes calculated for this assessment are as follows:

Total Dietary Intake	=	0.093 Kg food/day
Plant Matter Intake	=	0.0466 Kg plant matter/day
Invertebrate Matter Intake	=	0.0366 Kg animal matter/day

Incidental Soil Intake = 0.0096 Kg soil/day

A site-specific exposure dose of each COPC was calculated using a food chain uptake model consistent with EPA Region IV guidance (EPA, 1995). This algorithm accounts for exposure via incidental ingestion of contaminated soil, ingestion of plants grown in contaminated soil, and ingestion of lower trophic level animals associated with contamination. The exposure equation for soil is as follows:

$$ED_{soil} = [(C_s \times SP \times CF \times I_p) + (C_s \times BAF \times I_a) + (C_s \times I_s)] \times SFF / BW$$

where:

ED_{soil}	=	Soil exposure dose for terrestrial receptor (mg/Kg/day)
C_s	=	RME concentration in soil (mg/Kg)
SP	=	Soil-to-plant uptake factor (unitless)
CF	=	Plant wet-weight-to-dry-weight conversion factor (unitless) = 0.2 (used for SP values based on plant dry weight)
I_p	=	Receptor-specific ingestion rate of plant material (Kg/day)
BAF	=	Constituent-specific bioaccumulation factor (unitless)
I_a	=	Receptor-specific ingestion rate of animal material (Kg/day)
I_s	=	Receptor-specific ingestion rate of soil (Kg/day)
SFF	=	Site foraging factor (unitless) (see explanation below)
BW	=	Body weight (Kg)

In evaluating the potential for a contaminant to pose ecological risk, it is important to consider its propensity for bioaccumulation although its concentration in an environmental medium may be below toxic levels. Therefore, all COPCs were evaluated with regard to their ecological persistence and tendency to bioaccumulate.

Bioaccumulation is the process of absorption and retention of a substance by an organism due to both uptake from water (or other surrounding media) and uptake from ingested residues in food, soil, and/or sediment. It is quantified by the calculation of a bioaccumulation factor (BAF). Bioconcentration is a component of bioaccumulation, accounting only for the process of uptake from the surrounding medium (usually water). It is quantified by the calculation of a bioconcentration factor (BCF). Both BAFs and BCFs are proportionality constants relating the concentration of a contaminant in the tissues of an organism to the concentration in the surrounding environment.

Bioaccumulation and bioconcentration may be a significant component of exposure to COPCs for the terrestrial receptors. For the deer mouse, short-tailed shrew, and the robin, bioaccumulation was evaluated by means of contaminant-specific soil-to-plant uptake factors and BAFs. The soil-to-plant uptake factors were obtained from NRC (1992) for metals and for organic compounds by using a regression equation from Travis and Arms (1988). The latter is based on the contaminant-specific octanol/water partition coefficient (log K_{OW}). BAFs were obtained from the scientific literature. Factors reflecting accumulation of COPCs in earthworms were preferentially selected, based on the feeding habits of the deer mouse, shrew, and robin. **Tables 3.6-2** and **3.6-3** show values for soil-to-plant uptake factors and BAFs.

A site foraging factor (SFF) is calculated to account for the reasonably expected use of an exposure group. Because of the small size of their home ranges (i.e., 0.14 acre) and their year-round residence, mice living at most of the sites could potentially use contaminated areas 100 percent of the time. The exposure dose calculations assumed the mouse would be exposed to the contaminants at the site in proportion to the size of the site (0.04 to 30.11 acres) compared to the typical size of a deer mouse foraging area (0.14 acres). Therefore, a SFF of either 0.672 (i.e., at SEAD-68 site area is 0.988 acre) or 1 (i.e., all SEADs larger than 0.14 acres in size) was used. Similarly, for the short-tailed shrew whose home range is 0.963 acres and who is also a year- round resident, SFFs of 0.103 (SEAD-68), 0.949 (SEAD-70, size 0.914 acre), and 1 (all other SEADs) were used. Finally, Site Foraging Factors of 0.146 (SEAD-68) and 0.583 were used for the robin based on its seasonal residence (7 months out of the year) at the site, and its average territory size (i.e., 0.395 acres).

3.6.3.4 Effects Assessment

The effects assessment defines and evaluates the potential ecological response to ecological COPCs in terms of the selected assessment and measurement endpoints. The effects assessment for soil exposure includes the derivation of toxicity reference values (TRVs) that are the basis of the comparison. **Section 3.6.4** uses the results of the toxicity assessment to identify ecological COCs and characterize ecological risk.

For soil, the methodology for assessing the potentially toxic effects of COPCs was based on the derivation of a TRV for each COPC. The TRVs were derived to represent reasonable estimates of the constituent concentrations that, if exceeded, may produce toxicity effects in ecological receptors exposed to soil. Ideally, TRV values would be based on site-specific toxicity data. However, in the absence of site-specific data, establishing data selection criteria such that TRVs would be as relevant as possible to assessment endpoints for this site used toxicity data from the literature. Furthermore, the conservativeness of the TRVs was reinforced using the lowest available, appropriate toxicity values and modifying them by uncertainty factors when necessary. The derivation of TRVs for mammals and soil is shown in **Table 3.6-4**. The derivation of TRVs for birds and soil is shown in **Table 3.6-5**.

The toxicity benchmarks used as effects thresholds for the evaluation of the assessment endpoint (maintenance of healthy populations of small mammals or birds) are based on NOAELs for test organisms (Sample et al., 1996). The NOAEL (no observed adverse effect level) is the highest exposure concentration at which no harmful effects were observed. Use of the NOAEL as the toxicity benchmark is more conservative than use of the LOAEL (lowest observed adverse effect level). Exposure of receptors to the LOAEL has been predicted to translate into less than 20 percent reduction in population size (Suter et al., 1994) or Lowest Observed Effects Concentrations.

For the selected receptors, the order of taxonomic preference when choosing TRVs was data from studies using: 1) native species potentially present at the site; or 2) proxy species, such as commonly studied laboratory species. The preferred toxicity test endpoint was the NOAEL from an appropriate chronic study for non-lethal or reproductive effects. When NOAEL values were not available, LOAELs for were used, as available. Values based on chronic studies were preferred. Studies were considered to provide chronic toxicity data if conducted for a minimum duration of 1 year. Studies longer than acute but shorter than chronic are considered subchronic. Studies shorter than 90 days were considered acute. Studies on developmental effects were considered chronic if conducted during a critical gestation period.

The toxicity values selected by this approach were modified through the application of uncertainty factors, as applicable, to derive a TRV for each COPC. The TRVs represent NOAELs with uncertainty factors incorporated for toxicity information derived from studies other than chronic studies and studies on species other than the receptors selected for this risk assessment. Where only a LOAEL was available, an uncertainty factor of 10 was applied, as recommended by EPA Region II, to represent a surrogate NOAEL. In addition, where toxicity information for a surrogate contaminant was used, an uncertainty factor of 10 was applied. Uncertainty factors were applied by dividing the initial toxicity value by the product of the necessary uncertainty factors. Uncertainty factors are listed in **Tables 3.6-4** and **3.6-5** with the TRVs developed for soil COPCs.

3.6.4 Risk Characterization

Risk characterization integrates exposure(s) and effect(s) on receptors using hazard quotients (HQs) (ratios of exposure and effect concentrations). The resulting data are used to define the magnitude of potential risk from COPCs at the site and to assess the risk to ecological receptors. Risk characterization uses the results of the exposure and effects assessments to calculate an HQ for each COPC. The HQs are based on relevant measurement endpoints and are indicative of the COPC's potential to pose ecological risk to receptors. Any COPCs for a given exposure group and medium that were identified as likely to pose significant risk to receptors based on their HQs were classified as ecological chemicals of concern (COCs). Risk assessment related uncertainties are also analyzed and discussed.

Estimation of a COPC's potential to pose significant risk to receptors is based on the magnitude of the HQ value calculated for each constituent, as well as other factors such as the bioaccumulation/biomagnification potential, mechanism of toxicity, physicochemical characteristics, environmental fate, and ecological relevance of each contaminant. The HQ is a ratio of the estimated exposure dose (for receptor species) of a constituent to the TRV. Generally, the greater this ratio or quotient, the greater the likelihood of an effect. Typically, a quotient of 1 is considered the threshold level at which effects may occur. The TRVs on which the HQs were based were derived to be conservative and representative of chronic exposures, as described previously in **Section 3.6.3.4.**

The calculated HQs were used to assess the potential that toxicological effects will occur among the site's receptors. The HQs were compared to HQ guidelines for assessing the risk posed from contaminants (Menzie et al., 1993). These guidelines suggest that HQs less than or equal to 1 present no probable risk; HQs from 1 up to, but less than, 10 present a small potential for environmental effects; HQs from 10 up to, but less than 100 present a significant potential for ecological effects, and HQs greater than 100 present the highest potential for expected effects. The likelihood that a population of receptor species (i.e., deer mice, short-tailed shrews, American robins) could be significantly impacted by the toxicological effect(s) produced by a given COPC was a major factor in the subsequent determination (see **Section 3.6.4.1**) of whether that contaminant should be classified as an ecological COC.

Ecological risk from COPCs was characterized for potential future land use at the site. Risks from constituents found in soil available to terrestrial receptors were assessed quantitatively. Complete exposure and hazard quotient calculations for each site are included in **Appendices A** through **T.** The hazard quotients calculated for each site are also summarized in **Table 3.6-6**. Significant findings are summarized in the sections below for each site, organized by land use area.

Future ecological risks from exposure to drainage ditches (surface water and sediment) were assessed qualitatively. These media are discussed briefly below, in sections following the soil discussions.

3.6.4.1 Surface Soil (0 - 2 ft)

3.6.4.1.1 <u>Planned Industrial Development</u>

3.6.4.1.1.1 SEAD-9: Old Scrap Wood Site

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 30 COPCs detected in surface soils at SEAD-9 were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
Aroclor-1254	1.01	5.29	<1
Benzo(a)pyrene	<1	2.58	<1
Lead	2.46	12.83	17.99
Mercury	<1	<1	1.83

SEAD-9 is located in a portion of the Depot where the future land use is classified as a planned industrial development. As such, this area will probably not represent a preferred habitat for any of the three identified ecological receptors, and the estimated ecological risk will be reduced accordingly.

Aroclor-1254 was detected in just one of three surface soil samples collected at this site at a maximum concentration of 140 J ug/Kg. If the maximum value is replaced by the average concentration (i.e., 59 ug/Kg), the calculated HQ for aroclor-1254 and the mouse would decrease to 0.42, while the reported HQ for the shrew would drop to 2.23. The maximum aroclor-1254 concentration (i.e., 140 J ug/Kg) is lower than the NYSDEC TAGM. The Toxicity Reference Value (TRV) for aroclor-1254 is based on a LOAEL value from a chronic study to which a safety factor of 10 has been applied. Thus, adverse effects may not be noted until the intake is ten times higher than assumed in this ERA. The area of SEAD-9 represented by this sample is localized, perhaps encompassing no more than one-third of an acre. Based on reported population density data (EPA 1993c) that cites a maximum seasonal population density of 12 shrews per hectare (i.e., 2.47 acres), this area would be a potential habitat for 1-2 short-tailed shrews. For these reasons, plus the limited habitat value of this area as described above, aroclor-1254 is not considered a COC in soil at this site.

The HQ calculated for the short-tailed shrew exposed to the maximum concentration of benzo(a)pyrene (i.e., 990 ug/Kg) found in SEAD-9 is 2.58. If the average concentration for benzo(a)pyrene found in the three samples (i.e., ~ 805 ug/Kg) is used, the resulting HQ determined would be reduced to approximately 2.09. The Toxicity Reference Value (TRV) used for benzo(a)pyrene is based on a LOAEL value derived from a chronic study to which a safety factor of 10 has been added. For these reasons, plus the limited habitat value of SEAD-9 as described above, benzo(a)pyrene is not considered a COC in soil at this site.

Lead was measured in all three surface soil samples at levels ranging from 47.4 to 85 mg/Kg (all results estimated or qualified with a "J"), with the highest concentration being used as the EPC for this assessment. If the average of the three samples (i.e., 60.9 mg/Kg) were used in the calculations, the resulting HQs would be: 1.75 (mouse); 9.18 (shrew); 12.8 (robin). Sampling was biased toward a limited area with potential contamination. The mammalian and avian TRVs for lead are based on a NOAEL resulting from chronic studies, so higher soil concentrations than the EPC are probably necessary to cause the lowest level of adverse effects. For these reasons, plus the limited habitat value of this area as described above, lead is not considered a COC in soil at SEAD-9.

Mercury was detected in all three shallow soil samples at concentrations ranging from a low of 0.05 J to 0.1 mg/Kg. If the average concentration (i.e., 0.07 mg/Kg) of the three detected concentrations had been used in the computation of the HQ for the robin, the resulting value would have been 1.3. The average concentration measured for mercury in the three shallow soil samples is less than NYSDEC's TAGM for mercury in soil (0.1 mg/Kg) and less than two times the average concentration (0.09 mg/Kg) reported for mercury in background soil samples collected in the area of SEDA. For these reasons, plus the limited habitat value of this area as described above, mercury is not considered a COC in soil at SEAD-9.

3.6.4.1.1.2 SEAD-27: Building 360 - Steam Cleaning Waste Tank

No compounds of concern were detected in SEAD-27 soils. Therefore, no HQs were calculated for this site.

3.6.4.1.1.3 SEAD-28: Building 360 - Underground Waste Oil Tanks (2)

No compounds of concern were detected in SEAD-28 soils. Therefore, no HQs were calculated for this site.

3.6.4.1.1.4 SEAD-33: Building 121 - Underground Waste Oil Tank

No compounds of concern were detected in SEAD-33 soils. Therefore, no HQs were calculated for this site.

3.6.4.1.1.5 SEAD-34: Building 319 - Underground Waste Oil Tanks (2)

No compounds of concern were detected in SEAD-34 soils. Therefore, no HQs were calculated for this site.

3.6.4.1.1.6 SEAD-66: Pesticide Storage near Buildings 5 and 6

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to eight COPCs detected in surface soils at SEAD-66 were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
4,4`-DDE	<1	<1	12.26
4,4`-DDT	<1	3.17	51.02
Aroclor-1254	<1	3.02	<1
Gamma-BHC (Lindane)	<1	1.11	<1

The compound, 4,4'-DDE was detected in eight of nine shallow soil samples collected. However, concentrations measured in seven of the samples ranged from a low of 2.5 J to a high of 110 J ug/Kg, while the concentration used as the EPC for the robin's HQ calculations for this SEAD was 8700 ug/Kg (i.e., the maximum value detected in the SEAD). The average concentration measured for DDE in all shallow soil samples was approximately 982.5 ug/Kg, and if this value is used in the HQ calculation, the HQ computed for the robin would drop to 1.39. If the average of the other seven samples (i.e., 19.97 J ug/Kg) were used in place of the maximum concentration, the resulting HQ estimated for the robin would be reduced to 0.03.

The area of SEAD-66 represented by the single high concentration of 4,4`-DDE is localized, encompassing approximately 0.5 acres. Based on reported population density data (EPA 1993c) for a campus type (i.e., non-heavily wooded) environment, this area would be potential habitat for less than one robin. Furthermore, the computed HQ is based on a TRV derived from a NOAEL developed from an acute study so a safety factor of 10 was applied to the TRV. Finally, as a planned industrial development, this land would most likely be unattractive habitat for robins. For these reasons, 4,4'-DDE is not considered a COC in soil at this SEAD.

Like DDE, the compound, 4,4'-DDT was detected in eight of nine shallow soil samples collected. Again similar to DDE, concentrations measured in seven of the samples ranged from a low of 2 J to a high of 170 ug/Kg, while the concentration used as the EPC for the shrew's and robin's HQ calculations for this SEAD was 36,000 ug/Kg (i.e., the maximum value detected in the SEAD). The average concentration measured for DDT in all shallow soil samples was approximately 4025.3 ug/Kg, and if this value is used in the HQ calculations, the HQ computed for the shrew would decrease to 0.354, while for the robin it would drop to robin would drop to 5.7. If the average (i.e., ~ 32.2 ug/Kg) of the other seven samples where DDT was detected were used in place of the skewed site-wide average, the resulting HQ calculated for the robin would be reduced to 0.046, while it would be 0.003 for the shrew. The area of SEAD-66 represented by the single high concentration of 4,4`-DDT is localized, encompassing approximately 0.5 acres. Based on reported population density data (EPA 1993c) for a campus type (i.e., non-heavily wooded) environment, this area would be potential habitat for less than 1 robin and between 1 and 3 shrews. Finally, as a planned industrial development, this land would most likely be unattractive habitat for robins or shrews. For these reasons, 4,4'-DDT is not considered a COC in soil at this SEAD.

Aroclor-1254 was detected in four out of nine soil samples at this site. If the maximum concentration measured (i.e., 80 ug/Kg) were replaced by the overall site average concentration (i.e., ~ 54.2 ug/Kg) , the HQ computed for the shrew would decrease to 2.05. The maximum concentration of aroclor-1254 found in soil (i.e., 80 ug/Kg) is much lower than the NYSDEC TAGM (1000 ug/Kg). Also, the TRV for aroclor-1254 is based on a LOAEL value from a chronic study that is adjusted with a safety factor of 10. Thus, adverse effects may not be noted until the intake is ten times higher than assumed in this ERA. The area of SEAD-66 represented by samples with detectable levels of aroclor-1254 is less than an acre. Based on reported population density data (EPA 1993c), this area would be potential habitat for 1-5 short-tailed shrews. As a planned industrial development, this land would most likely be unattractive habitat for shrews. For these reasons, aroclor-1254 is not considered a COC in soil at this site.

Gamma-BHC was detected in one of nine soil samples at this site, at a maximum concentration of 39 ug/Kg. If the maximum concentration measured and used as the EPC in the initial calculations were replaced by the overall site average concentration (i.e., ~ 5.8 ug/Kg), the HQ computed for the shrew would decrease to 0.166. The area of SEAD-66 represented by samples with detectable levels of gamma-BHC is approximately 0.5 acres. Based on reported population density data (EPA 1993c), this area would be potential habitat for 1-3 short-tailed shrews. As a planned industrial development, this land would most likely be unattractive habitat for shrews. For these reasons, gamma-BHC is not considered a COC in soil at this site.

3.6.4.1.1.7 SEAD-68: Building S-335 - Old Pest Control Shop

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 33 COPCs detected in surface soils at SEAD-68 were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	**Deer Mouse Hazard Quotient**	**Short-tailed Shrew Hazard Quotient**	**American Robin Hazard Quotient**
Di-n-octylphthalate	<1	<1	7.07

Di-n-octylphthalate was detected in only one of seven surface soil samples collected at SEAD-68. The concentration measured for di-n-octylphthalate in this sample was 18 J ug/Kg and this value is much lower than the NYSDEC TAGM of 50,000 ug/Kg. The computation of an average value for the seven soil samples using this estimated value and one-half the detection limit for the other six soil samples is not meaningful because the detection limit reported for all of the other samples is at least 3.8 times higher than the estimated result (i.e., 18 J ug/Kg). The TRV used in the calculation of the HQ for the robin is 1.10E00, which is based on a NOAEL for a surrogate chemical species (i.e., bis(2-ethylhexyl)phthalate) during a chronic study; therefore, the actual effect of the di-n-octylphthalate on local bird populations is not clearly known. The area of SEAD-68 where this sample was collected is localized, encompassing approximately 0.02 acres, which is about one-twentieth of the home range of the American robin. Therefore, the foraging in this site (and exposure) would be about one-twentieth the amount assumed in the risk calculations. The area surrounding the building in SEAD-68 is primarily gravel or paved. As a planned industrial development, this land would be unattractive habitat for American robin. For these reasons, di-n-octylphthalate is not considered a COC in soil at this site.

3.6.4.1.2 Institutional

3.6.4.1.2.1 SEAD-32: Building 718 – Underground Waste Oil Tanks (2)

SEAD-32 (Building 718 – Two Underground Waste Oil Tanks) is the only site in the Institutional land use area. No COPCs were found in soil samples taken from a depth of 2-4 feet in the vicinity of the underground tanks (no surface soil samples were collected). Therefore, no HQs were calculated for this site.

3.6.4.1.3 Conservation and Recreation

3.6.4.1.3.1 SEAD-58: Debris Area near Booster Station 2131

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to six COPCs detected in surface soils at SEAD-58 were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
Bis(2-ethylhexyl)phthalate	<1	<1	1.02

Bis(2-ethylhexyl)phthalate was detected in seven of nine surface soil samples collected at SEAD-58 at a maximum concentration of 260 J ug/Kg; the average concentration measured was 103.3 ug/Kg. If the average concentration was substituted for the maximum in the computation of the American robin's HQ, the resulting value would be reduced to 0.40. For this reason, bis(2-ethylhexyl)phthalate is not considered a COC in soil at SEAD-58.

3.6.4.1.3.2 SEAD-64B: Garbage Disposal Area

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 16 COPCs detected in surface soils at SEAD-64B were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were found less than one.

3.6.4.1.3.3 SEAD-64D: Garbage Disposal Area

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 18 COPCs detected in surface soils at SEAD-64D were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
Bis(2-ethylhexyl)phthalate	<1	<1	4.3
Di-n-octylphthalate	2.17	11.39	117.78

Bis(2-ethylhexyl)phthalate was detected in 10 of 24 surface soil samples collected at SEAD-64D at a maximum concentration of 1100 ug/Kg. The overall average concentration measured in all 24 samples (using one-half the detection limit for non-detects) was 189.5 J ug/Kg, and a large component of this average is the inordinately high maximum concentration measured in one sample from SB64D-4. All other samples in which bis(2-ethylhexyl)phthalate was detected ranged from a low of 19 J to a high of 120 J ug/Kg. If the overall average concentration is used to calculate the HQ for robins, the resulting value is 0.74. Review of the available analytical data from SEAD-64D suggests that the distribution of bis(2-ethylhexyl)phthalate is random within the SEAD, and that the location (i.e., SB64D-4) of the maximum concentration is isolated. Therefore, if the average of samples with detects only (i.e., 56 J ug/Kg), exclusive of the site maximum value, is used to compute the HQ for the robin, the resulting HQ is further reduced to 0.22. For these reasons, bis(2-ethylhexyl)phthalate is not considered a COC in soil at SEAD-64D.

Di-n-octylphthalate was detected in only one of 24 surface soil samples (less than 5%) collected at SEAD-64D. The concentration measured for di-n-octylphthalate in this sample was 75 J ug/Kg, which is much lower than the NYSDEC TAGM of 50,000 ug/Kg. The computation of an average value for the 24 surface soil samples using this estimated value and one-half the detection limit for the other 23 surface soil samples is not meaningful because the detection limit reported for all of the other samples is at least 4 to 5 times higher than the estimated result (i.e., 75 J ug/Kg), which means that the computed average value would increase. The TRV used in the calculation of the HQ for the robin is 1.10E00, which is a derived from a NOAEL for a surrogate chemical species (i.e., bis(2-ethylhexyl)phthalate); therefore, the actual effects of di-n-octylphthalate on avian species is not known. The area of SEAD-64D where this sample was collected is localized, encompassing approximately 0.02 acres, which is about one-twentieth of the home range of the American robin. Therefore, the foraging in this site (and exposure) would be about one-twentieth the amount assumed in the risk calculations. The area surrounding the building in SEAD-68 is primarily gravel or paved. As a planned industrial development, this land would be unattractive habitat for American robin. For these reasons, plus the low frequency of detection found for this compound (i.e., less than 5%), di-n-octylphthalate is not considered a COC in soil at this site.

3.6.4.1.3.4 SEAD-70: Fill Area Adjacent to Building T-2110

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to six COPCs detected in surface soils at SEAD-70 were estimated by computing hazard quotients for each species and chemical pair. The maximum concentration for each COPC found in the shallow soil samples collected in the SEAD was used as the EPC in the HQ calculation. The HQs for all constituents found in shallow soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
Bis(2-ethylhexyl)phthalate	<1	<1	2.15
Arsenic	7.48	27.97	3.34

Bis(2-ethylhexyl)phthalate was detected in all four of the surface soil samples collected at concentrations ranging from 21 J to 550 ug/Kg. If the average concentration of the four sample results (i.e., 174.2 J ug/Kg) were used in calculating the HQ for robins, the resulting value would be 0.68. The second highest concentration measured for bis(2-ethylhexyl)phthalate was only 78 J ug/Kg, which is less than half of the average of the four results. This suggests that the maximum concentration results from an isolated condition and that the exposure to bis(2-ethylhexyl)phthalate over the rest of the SWMU would more closely resemble the average of the remaining three results. If this presumption is accepted, the average concentration for the three remaining samples (i.e., 49 J ug/Kg) indicates that the HQ for a robin may not exceed 0.2. For these reasons, bis(2-ethylhexyl)phthalate is not considered a COC in soil at SEAD-64D.

Arsenic was detected in all four of the surface soil samples (4 out of 4) collected during the investigation. However, the maximum value (i.e., 88.5 J mg/Kg) used as the EPC for this assessment is 12-25 times all other measured concentrations, and it is found in the same sample that displayed elevated concentrations of bis(2-ethylhexyl)phthalate. If the average concentration from the four samples is used in place of the maximum, and the HQs for all receptor species are recalculated, the following results are observed: 2.2, mouse; 8.24, shrew; and 0.98, robin. The arsenic concentrations in the three other surface samples at this SEAD were all within background range. These results suggest indicate that the actual average exposure to arsenic would be confined to a limited area of the site. The area of SEAD-70 represented by this sample is estimated to be approximately 0.25 acres. Based on reported population density data (EPA 1993c), this area would be potential habitat for 1-2 short-tailed shrews and 1-2 deer mice. Also, the level of arsenic in soil at this site was only slightly higher than the highest concentration considered to be background. For these reasons, arsenic is not considered a COC in soil at this site.

3.6.4.1.4 Warehouse

3.6.4.1.4.1 SEAD-64A: Garbage Disposal Area

SEAD-64A (Garbage Disposal Area) is the only site in the Warehouse land use area. The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 34 COPCs detected in surface soils at SEAD-64A were estimated by computing hazard quotients for each species and chemical pair. The HQs for all constituents found in soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
Benzo(a)pyrene	3.24	14.05	<1
Bis(2-ethylhexyl)phthalate	<1	4.84	50.87
Fluoranthene	<1	2.56	<1
Lead	11.31	58.95	82.64

Benzo(a)pyrene was measured in four of the five surface soil samples at concentrations ranging from 35 J to a maximum of 5400 ug/Kg. Substituting the average concentration (i.e., 1972 ug/Kg) for the maximum EPC used, results in a reduction in the computed HQs for the mouse to 1.2 and 5.13 for the shrew. The TRV used to determine the HQ for both mammalian species is derived from a LOAEL developed from a chronic study with a safety factor of 10 applied. The elimination of this factor would reduce the both computed HQs for the mammals below the threshold of 1. Finally, as a planned warehouse development, this land would most likely be unattractive habitat for shrews and mice. Therefore, benzo(a)pyrene is not considered a COC in soil at SEAD-64A.

Bis(2-ethylhexyl)phthalate was also detected in four of five surface soil samples collected under this study. However, review of the data indicates that the maximum value (i.e., 13,000 ug/Kg) used as the EPC for this assessment is 17 times the next highest concentration measured (750 ug/Kg), and more than 90 times the concentration measured in the other two samples in which it was detected. The computed average concentration (i.e., 2882 ug/Kg) of bis(2-ethylhexyl)phthalate is less than 25 percent of the maximum value, and if the average concentration was used to compute the HQ in place of the maximum the resulting HQ for the shrew would drop to 1.07, while the robin's HQ would decrease to 11.3. If the average exposure is derived using only the four samples where the bis(2-ethylhexyl)phthalate are more closely related (i.e., the single high value is considered a "hot spot" and eliminated), the calculated HQ for the shrew decreases to 0.2, while it drops to 2.1 for the robin. For these reasons, plus the limited habitat value of this area as described above, bis(2-ethylhexyl)phthalate is not considered a COC in soil at this site.

Fluoranthene was detected in three of five shallow surface soil samples, at a maximum concentration of 6900 ug/Kg and at an average concentration of roughly 2900 ug/Kg (using one half detection limit for samples where it was not found). If the computed average is used as the EPC in place of the maximum, the HQ calculated for the shrew drops to a level of roughly 1.07. The TRV used in this calculation is based on a LOAEL that was developed during a sub-chronic study to which a safety factor of 100 has been applied. For these reasons, plus the limited habitat value of this area as described above, fluoranthene is considered a COC in soil at this site.

Lead was detected in four of the five surface soil samples collected from the area of SEAD-64A (one value rejected during data validation). The maximum value (i.e., 391 mg/Kg) was used as the EPC for this assessment and this results in the HQs for the deer mouse, shrew and American robin presented above. However, the observed maximum is more than 15 times all other measured concentrations and it is located in the same sample in which the anomalous level of bis(2-ethylhexyl)phthalate described above was found. If the average (i.e., 21.5 mg/Kg) of the other three samples is used in place of the maximum, the resulting HQ found for the mouse is 0.62; for the shrew, 3.24; and 4.54 for the American robin. However, the lead concentrations reported for the other samples at this SEAD fall within the background range, which suggests that all species would be exposed to lead at this level throughout the Depot. Therefore, based on this reason, plus the future use of this site as a warehouse area that would not be an attractive habitat for either a shrew or a robin, lead is not considered a COC in soil at this site.

3.6.4.1.5 Prison

Available analytical results from eight (i.e., SEADs-43, -44A, - 44B, -52, -56, -62, – 69 and –120B) of the nine SWMUs identified in the prison area were merged and evaluated as a single data set. This combined analysis was initiated during the preparation of the Draft Completion Report for Six Areas of Concern that was begun roughly three to six months prior to the initial of the preparation of the draft copy of this report. Since the analysis of the combine data predated this document, the original grouping of data was used during this effort, but the number of ecological receptors was expanded to include the deer mouse, short-tailed shrew and American robin required under this evaluation. A separate evaluation of the potential ecological impacts found in the ninth SWMU (i.e., SEAD-64C) located in the prison area is also provided in the following discussion.

3.6.4.1.5.1 Completion Report SEADs (SEADs-43, -44A, - 44B, -52, -56, -62, – 69 and –120B)

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to 44 COPCs detected in surface soils found in eight SEADs located in the area of planned prison construction were estimated by computing hazard quotients for each species and chemical pair. The HQs for all constituents found in soil were less than one, with the exception of those listed below:

Compound	Deer Mouse Hazard Quotient	Short-tailed Shrew Hazard Quotient	American Robin Hazard Quotient
4-Methylphenol	<1	<1	3.48
Benzo(a)pyrene	<1	3.12	<1
Bis(2-ethylhexyl)phthalate	<1	1.01	10.57
Fluoranthene	<1	1.19	<1
2,4-Dinitrotoluene	3.19	1.11	—
Copper	11.83	55.02	1.36
Lead	15.09	78.7	110.32
Selenium	6.1	26.04	9.81
Zinc	2.33	11.93	84.86
MCPP	17.39	48.39	--

The compound, 4-methylphenol, was detected in three of 27 surface soil samples at a maximum concentration of 580 J ug/Kg. The maximum concentration detected was found in one of four shallow soil sample collected in SEAD-69, while the other two samples containing this compound were found in samples collected from SEAD-44A. If the average concentration (i.e., 222.2 ug/Kg) is computed from all samples (using one-half the detection limit for samples where compound is not detected) and used as the EPC, the HQ calculated for the robin is reduced to 1.3. The TRV used to determine the HQ for the robin is derived from an LD_{50} to which a safety factor of 100 has been applied. If this factor was eliminated, the computed HQ for the robin falls below the threshold of 1, suggesting that this compound is does not represent a hazard to the robin. Finally, as a planned prison development, this land would most likely be unattractive habitat for robins. Therefore, 4-methylphenol is not considered a COC in soil at the eight SEADs targeted as prison site.

Benzo(a)pyrene was found in five of 27 shallow soil samples collected from the eight SEADs located in the are of the planned prison development. The maximum concentration found was 1200 ug/Kg that was used as the EPC for the ecological risk assessment. The two other reported concentrations were all less than 100 ug/Kg, and each was "J" qualified or estimated. If the average value (i.e., 245.4 ug/Kg) of all 24 samples is used as the EPC for this risk analysis, the HQ calculated for the short-tailed shrew drops to 0.64. Finally, as a planned prison development, this land would most likely be unattractive habitat for shrews. Therefore, benzo(a)pyrene is not considered a COC in soil at the eight SEADs targeted as future prison sites.

Fluoranthene was found in 10 of 27 shallow soil samples collected from the area of planned prison development. The maximum concentration reported for this compound was 3200 ug/Kg, which was detected in one sample collected from the area of SEAD-43. None of the other seven levels detected exceeded a concentration of 350 J ug/Kg, and the average concentration determined for all 24 samples (using one-half the detection limit for all samples where the compound was not detected) was approximately 350.5 ug/Kg. If the average is used as the EPC in the ecological calculations, the HQ reported for all target species drops below 1. Furthermore, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, and the relatively low HQs derived for this compound, fluoranthene is not considered a COC in soil at these eight SEADs.

Bis(2-ethylhexyl)phthalate was detected in 16 of the 27 shallow soil samples analyzed. The maximum concentration reported was 2700 ug/Kg. The overall average concentration for the 24 soil samples was approximately 236.9 ug/Kg. If the overall average concentration is used as the EPC for the ecological HQ calculations, the reported HQ determined for the shrew drops to roughly 0.088 for the shrew, and to approximately 0.93 for the robin. Furthermore, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, bis(2-ethylhexyl)phthalate is not considered a COC in soil at these eight SEADs.

The compound, 2,4-dinitrotoluene was detected in 10 of the 45 shallow soil samples analyzed. The maximum concentration reported was 2100 J ug/Kg, while the overall average concentration reported was approximately 202.4 ug/Kg. If the average concentration is used as the EPC for the ecological HQ calculations, the HQs determined for both mammalian receptor species drop to less than 1. Furthermore, the TRV used for the mammalian species is derived from a LOAEL to which a safety factor of 10 has been applied. If this factor was eliminated, the HQs reported for the mouse and shrew using the maximum concentration would be less than 1. Finally, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, 2,4-dinitrotoluene is not considered a COC in soil at these eight SEADs.

MCPP was detected in two of 13 shallow soil samples collected from the area of the planned prison development. The maximum concentration detected was 7300 J ug/Kg, while the overall average concentration was 4042 ug/Kg. If the average concentration is used as the EPC in this analysis the HQ resulting for the mouse decreases 9.6 for the mouse and 28 for the short-tailed shrew. The TRV used as the basis of the mammalian HQ calculations was derived from a LOAEL developed during an acute study to which a safety factor of 100 has been applied for conservatism. If this factor was eliminated, the HQs calculated for the mouse and shrew using either the maximum or average concentration would decrease to less than 1. Finally, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, MCPP is not considered a COC in soil at these eight SEADs.

Copper was detected in all 27 of the shallow soil samples collected from the area of the planned prison development. The maximum concentration detected was 191 mg/Kg while the overall average concentration was approximately 31.7 mg/Kg. If the average concentration is used as the EPC in place of the maximum value in this analysis, the HQ resulting for the deer mouse decreases to roughly 1.95, while the HQ reported for the short-tailed shrew drops to approximately 9.1. Comparably, the HQ computed for the robin decreases to roughly 0.23. The TRV used for the mammalian population is derived from NOAEL developed during a subchronic study to which a safety factor of 10 has been applied. If this factor were eliminated, the HQs reported for both species would drop to less than one. Finally, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, copper is not considered a COC in soil at these eight SEADs.

Lead was detected in 25 shallow soil samples collected from the area of the planned prison development. The maximum concentration detected was approximately 522 mg/Kg while the overall average concentration was approximately 53.7 mg/Kg. If the average concentration is used as the EPC in place of the maximum value in this analysis, the HQ resulting for the deer mouse decreases to roughly 1.55, while the HQ reported for the short-tailed shrew drops to approximately 8.1. Comparably, the HQ computed for the robin using the overall average concentration decreases to roughly 11.3.

Review of the available lead data indicates that the results are skewed by three inordinately high lead results found in surface soil samples collected from SEAD-120B. The area investigated in SEAD-120B was a former target backstop used on a small arms firing range. The extent of the backstop was limited to an area measuring roughly 35 to 50 feet wide by 150 feet in length. During the investigation of this site, three test pits were excavated from the area immediately behind target stands and soil samples were collected. Bullet fragments were observed in the soil surround each of the sampling locations and in the samples collected from each of the test pits. Therefore, it is assumed that the source of the lead exposure is very limited. If these results are removed, and the average of the remaining values is re-computed, the resulting average value obtained is approximately 20 mg/Kg. Using this value as the EPC, the resulting HQ found for the mouse decreases to 0.58; to 3 for the shrew; and to 4.22 for the robin. The recalculated average concentration (i.e., 20 mg/Kg) for lead without the three samples from SEAD-120B is also roughly equivalent to the average concentration determined from site background samples (i.e., 17.7 mg/Kg). Finally, as a planned prison, this land would most likely be unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, lead is not considered a COC in soil at these eight SEADs.

Selenium was detected in 22 of 27 shallow soil samples collected from the area of the planned prison development. The maximum concentration detected was 1.8 J mg/Kg while the overall average concentration was approximately 0.95 mg/Kg. If the average concentration is used as the EPC in place of the maximum value in this analysis, the HQ resulting for the deer mouse decreases to roughly 3.2, while the HQ reported for the short-tailed shrew drops to approximately 14. The equivalent HQ for the robin is then found to be approximately 5.2. However, as a planned prison, this land would most likely be an unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For this reason, selenium is not considered a COC in soil at these eight SEADs.

Zinc was detected in all 27 shallow soil samples collected from the area of the planned prison development. The maximum concentration detected was 338 mg/Kg while the overall average concentration was approximately 123.6 mg/Kg. If the average concentration is used as the EPC in place of the maximum value in this analysis, the HQ resulting for the deer mouse decreases to 0.84, while the HQ reported for the short-tailed shrew drops to approximately 4.4. The equivalent HQ for the robin is calculated as 31. However, as a planned prison, this land would most likely be an unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For this reason, zinc is not considered a COC in soil at these eight SEADs.

3.6.4.1.5.2 SEAD-64C: Garbage Disposal Area

The potential effects of the exposure of deer mice, short-tailed shrews, or American robins to five COPCs detected in eight surface soils collected from SEAD-64C located in the area of planned prison construction were estimated by computing hazard quotients for each species and chemical pair. The HQs for all constituents found in soil were less than one, with the exception of those listed below:

Compound	**Deer Mouse Hazard Quotient**	**Short-tailed Shrew Hazard Quotient**	**American Robin Hazard Quotient**
Bis(2-ethylhexyl)phthalate	<1	<1	4.3
Selenium	6.44	27.48	10.35

Bis(2-ethylhexyl)phthalate was detected in six of eight surface soil samples collected from SEAD-64C to a maximum depth of 2 feet. The maximum concentration measured was 1100 ug/Kg, with an overall SEAD average concentration of 436 ug/Kg. If the SEAD average concentration is substituted for the maximum as the EPC the calculated HQ obtained for the American robin decreases to a level of approximately 1.7. Furthermore, as a planned prison, this land would most likely be an unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For these reasons, bis(2-ethylhexyl)phthalate is not considered a COC in soil at SEAD-64C.

Selenium was detected in five of the eight surface soil samples collected from SEAD-64C. The maximum concentration measured in any sample was 1.9 mg/Kg, with an overall SEAD average concentration of 0.88 mg/Kg. If the SEAD average concentration is substituted for the maximum as the EPC the calculated HQs obtained for the deer mouse decreases to approximately 3, for the shrew to 13, and for the robin to 4.8. However, as a planned prison, this land would most likely be an unattractive habitat for any of the three target species (i.e., mice, shrews or robins). For this reason, selenium is not considered a COC in soil at these eight SEADs.

3.6.4.2 Surface Water

Surface water collects intermittently in drainage ditches at several of the sites. Terrestrial receptors, such as mice, may ingest or contact this surface water, when present. However, these occurrences would be expected to be infrequent due to the intermittent nature of the surface water, and the mobility of the receptors. Exposure to this surface water is expected to be less significant than soil exposure for the target receptors (deer mouse and shrew). Therefore, surface water exposure was not assessed quantitatively.

NYSDEC has established ambient water quality guidelines for various water classes and purposes. For instance, the NYSDEC Class C guidelines are designed to protect fish propagation in fresh waters. The drainage ditches at the site are not considered a classifiable water body, and do not sustain valued aquatic life (such as fish) on a continual basis. While the Class C guidelines were compared to the maximum surface water concentrations in ditches at the three sites where surface water was sampled (discussed in **Section 2**) these comparisons are not relevant to receptors of concern at this site.

3.6.4.3 Sediment

Sediment in the drainage ditches was sampled at the three of the sites. In general, the concentrations of chemicals found in sediment were similar to the concentrations measured in soil. In many cases, the sediment concentrations appear to be similar to the background soils at SEDA. Terrestrial receptors, such as mice, may ingest or contact this sediment, similar to soil. Since the sediment is less prevalent than soil at the 22 sites, and since the chemical concentrations are similar for the two media, the quantitative analysis of soil exposure for terrestrial receptors is considered representative of exposure to sediment as well.

NYSDEC has established sediment criteria for the protection of wildlife, considering bioaccumulation (NYSDEC 1993b). None of the compounds measured in sediment at the sites have listed wildlife bioaccumulation sediment criteria. Therefore, the sediment at this site complies with these potentially applicable criteria.

NYSDEC has established other sediment guidelines to protect aquatic life and prevent bioaccumulation in benthic organisms. The maximum concentrations measured in sediment in ditches at the sites were compared with these NYSDEC sediment guidelines in **Section 2**. However, bioaccumulation in lower food chain organisms (as considered by the NYSDEC criteria) is not relevant for direct contact by terrestrial receptors. Therefore, these comparisons are not considered applicable to receptors of concern at this site.

3.6.4.4 Uncertainty

Uncertainty is inherent in each step of the ecological risk assessment process. Major factors contributing to uncertainty in this risk assessment are discussed qualitatively in the following sections.

3.6.4.4.1 Chemicals of Potential Concern

The sampling data may not represent the actual overall distribution of contamination at the site, which could result in underestimation or overestimation of potential risk from identified chemicals. However, the use of maximum concentrations detected as EPC provided conservative exposure estimates and it is, therefore, unlikely that the potential for deleterious levels of contaminants has been underestimated.

3.6.4.4.2 Exposure Assessment

While the potential receptor species selected for the site are inevitably a limited subset of the total list of species that may utilize the site, the potential exposure of the species evaluated in this assessment is considered likely to be representative of the nature and magnitude of the exposures experienced by those species not discussed.

Risk associated with intake of contaminants through the food chain was addressed by modeling food chain transfer of chemical residues through plants and earthworms. The degree of uncertainty in the results of the analysis increases with the increasing distance of the receptor from the base of the food chain. Intakes from dermal contact with and inhalation of contaminants were not quantifiable for ecological receptors. However, this does not significantly increase the uncertainty of the estimated intakes because for most receptors, intakes via these routes are likely to be minimal relative to intakes via ingestion.

3.6.4.4.3 Toxicity Assessment

There is uncertainty associated with the TRVs calculated for this risk characterization because the toxicity data were not site-specific. However, the TRVs used were conservative and were modified by uncertainty factors where necessary to increase the applicability of the data to the assessment. The HQs calculated from these conservative TRVs and maximum concentrations provide confidence that the risk assessment yielded reasonably conservative estimates of the potential risk of adverse ecological effects on the assessment endpoint.

Each COPC was assumed highly bioavailable. However, for most chemicals in most media, this is an overestimation (Dixon et al., 1993) that may result in an overestimation of the potential for ecological risk. Empirical information on bioavailability of the COPCs was not available. No leachability tests in soil or sediment were conducted. No analysis for acid-volatile sulfide/simultaneously extracted metals was conducted as a measure of bioavailability in sediment. It is possible that some of the contaminants, particularly the metals, may be bound to soil or sediment particles and not available for uptake by receptors. This would tend to overestimate risk.

The soil-to-plant uptake equations and the BAFs include a bioavailability factor; however, these data, taken from the scientific literature, are not specific to this site and may under- or overestimate exposure. For several metals, no quantitative bioavailability data could be found, other than an indication from the literature that the constituent does not significantly bioaccumulate. For these metals, a bioaccumulation factor of 1.0 was used in the exposure equation. This is likely to overestimate the actual value.

The potential for toxic effects to be produced in receptor organisms because of exposure to multiple chemicals in a single medium or in multiple media was not evaluated. Therefore, the potential toxic effects in a receptor as a result of exposure to a given medium could be higher or lower than estimated, depending on toxicological interactions. Exposure of a receptor to multiple contaminated media is likely to increase the risk of toxic effects.

3.6.4.4.4 Risk Characterization

The methodology, conservative assumptions, and toxicity benchmarks used in the risk estimation portion of the risk characterization are expected to overestimate, rather than underestimate, the potential for COPCs to pose risk to the ecological assessment endpoint. Maximum environmental concentrations were used, concentrations were assumed to remain constant over time, and the toxicity benchmarks used were the NOAEL values (levels where no toxic effects are expected) or conservative surrogates based on LOAEL values for non-lethal or reproductive effects appropriate for extrapolation to effects on the assessment endpoint.

3.6.4.5 Ecological Risk Summary

The preceding ecological risk assessment was intended to identify whether concentrations of chemicals detected at the 21 SWMUs or at the EBS site posed a potential risk or stress to plants or animals that may inhabit or visit the sites. COPCs found in shallow soil were quantitatively evaluated to assess potential ecological risk under planned future conditions.

A hierarchy of assessment endpoints was selected to assess both proximate and ultimate risks that might be associated with identified, site-related chemicals. The proximate assessment endpoint was chosen to provide protection of the population levels of representative vertebrate species (i.e., deer mouse, short-tailed shrew, and American robin) that use the sites to a significant extent. These species also serve as indicators of potential impacts to the ecological community as a whole. While toxic effects that reduce the indigenous population of representative species are significant to the populations themselves, they are not necessarily significant to the ultimate, more important, assessment endpoint: the community of species that occupy the areas including and surrounding the individual sites.

The ultimate assessment endpoint, maintenance of the health and diversity of the natural community in the area, is the more important ecological component to be protected. Therefore, any COPC estimated to represent a potential for adverse effects to proximate assessment endpoints may subsequently need to be evaluated with regard to the risk they may pose to the overall ecological community.

The ecological setting of the 21 SWMUs and one EBS site is not unique or significant, as described in **Section 3.6.2.3**. There are no endangered, threatened, or special concern species present that are likely to be dependent on, or affected by, the habitat at the sites. The species that inhabit the sites are not rare in the region and are not generally considered to be of special societal value. The habitat in the sites appears to be relatively low in diversity and productivity.

The potential impact of COPCs to the representative terrestrial and avian receptors (i.e., proximate assessment endpoints) were initially assessed by computing hazard quotients (HQs) resulting from the exposure of species to the maximum concentration of each COPC measured at each site. If no apparent impact was determined for the proximate assessment endpoint, as indicated by HQs of 1 or less, then the potential impact of the COPC to the ultimate assessment endpoint was considered low. If, on the other hand, this analysis suggested that a potential threat did exist, a further analysis of severity and the magnitude of potential threat was performed. In this follow-on evaluation, the distribution of the COPC, the representativeness of the toxicity reference value (TRVs) used in determining the HQs, the size of the impacted population, and the future use of the site were all considered and evaluated.

HQs resulting from the exposure of representative species to the maximum concentration found in shallow soils were initially calculated for 517 receptor species/COPC pairs over the 21 SWMUs and one EBS site. This evaluation indicated that no apparent threat existed for 463 of the evaluated pairs, while 30 receptor species/COPC pairs indicated some potential for adverse effects on indigenous receptor populations (i.e., HQs greater than 1 but less than 10), 22 receptor species/COPC pairs indicated a significant potential for adverse effects (i.e., HQs of greater than 10 but less than 100), and two receptor species/COPC pairs indicated that adverse effects were probable (i.e., HQs of greater than 100).

The subsequent re-evaluation of the 54 receptor species/COPC pairs that initially exhibited a potential to affect the proximate endpoints (i.e., representative receptor species) based on site average COPC concentrations (as opposed to maximum concentrations) resulted in the further elimination of 17 receptor species/COPC pairs from consideration. Within the remaining 37 pairs, 28 receptor species/COPC pairs indicated some potential for adverse effects on indigenous receptor populations (i.e., HQs greater than 1 but less than 10), eight receptor species/COPC pairs indicated a significant potential for adverse effects (i.e., HQs of greater than 10 but less than 100), and one receptor species/COPC pair indicated that adverse effects were probable (i.e., HQs of greater than 100). The single instance where adverse effects were probable results from the exposure of an American robin to di-n-octylphthalate at SEAD-64D. However, this determination does not consider that this compound could have been screened out because it was detected infrequently (found in less that 5 percent of the samples collected at SEAD-64D).

Biased soil sampling at these sites and the initial use of maximum concentrations and NOAELs in the risk calculations result in highly conservative numerical hazard quotient estimates. Nevertheless, these results indicate that there are few potential ecological threats to the indigenous receptor populations at the 21 SWMUs and one EBS site. Subsequent HQ determinations based on average site concentrations and NOAELs provide a better assessment of the overall site conditions, but are still conservative. These determinations suggest that the likelihood of adverse impacts to any population are low, and most likely restricted to individual members of the population and not to the population as a whole. Most importantly, no visible evidence has been found at any of the sites of any stress or harm to terrestrial or avian receptors or the environment. Therefore, none of the compounds found in soil is considered a chemical of concern for ecological receptors at any of the sites.

Terrestrial and avian receptor exposure to surface water and sediment are considered less significant than the soil pathway. Therefore, exposures to these media were not evaluated quantitatively. The intermittent surface water in drainage ditches does not support significant aquatic species, and protection of terrestrial and avian species for these sites is considered appropriate and sufficient.

TABLE 3.2-1
SUMMARY OF SAMPLES COLLECTED
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activcity

SEAD Number	Number of Samples Collected				
	Total Soil	Surface Soil	Groundwater	Surface Water	Sediment
SEAD-9	9	3	2	NA	NA
SEAD-27	4	1	10	NA	NA
SEAD-28	1	NA	NA	NA	NA
SEAD-32	2	NA	3	NA	NA
SEAD-33	3	NA	NA	NA	NA
SEAD-34	2	NA	2	NA	NA
SEAD-43, 56, 69	30	13	4	5	5
SEAD-44A	15	7	3	4	4
SEAD-44B	3	3	3	2	2
SEAD-52	19	19	NA	NA	NA
SEAD-58	18	9	4	6	6
SEAD-62	3	2	3	NA	NA
SEAD-64A	12	5	3	NA	NA
SEAD-64B	12	4	3	3	3
SEAD-64C	10	8	5	NA	NA
SEAD-64D	36	24	5	NA	NA
SEAD-66	9	9	NA	NA	NA
SEAD-68	9	7	NA	NA	NA
SEAD-70	12	4	4	2	2
SEAD-120B	6	3	NA	NA	NA

NA = Not Analyzed

TABLE 3.2-2
CHEMICALS OF POTENTIAL CONCERN IN SOIL
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

COMPOUND	SEAD-9	SEAD-27	SEAD-28	SEAD-32	SEAD-33	SEAD-34	SEAD-43,56,69	SEAD-44A	SEAD-44B	SEAD-52	SEAD-58	SEAD-62	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-66	SEAD-68	SEAD-70	SEAD-120B
Volatile Organics																				
1,1,2,2-Tetrachloroethane								x												
2-Hexanone								x												
4-Methyl-2-Pentanone								x												
Acetone							x	x	x					x					x	
Benzene													x					x		
Carbon disulfide														x						
Chlorobenzene	x																			
Chloroform							x											x		
Ethylbenzene	x																			
Methyl ethyl ketone								x	x					x		x			x	
Methylene chloride				x			x				x			x		x				
Tetrachloroethene																		x		
Toluene	x						x	x					x			x		x	x	
Total Xylenes	x																	x		
Trichloroethene													x					x		
Semivolatile Organics																				
2-Methylnaphthalene	x						x	x					x			x		x		
4-Methylphenol							x	x												
Acenaphthene	x						x	x					x					x		
Acenaphthylene	x							x					x							
Anthracene	x						x	x	x				x					x		
Benzo(a)anthracene	x						x	x	x				x	x		x		x		
Benzo(a)pyrene	x						x	x	x				x	x		x		x		
Benzo(b)fluoranthene	x						x	x	x				x	x		x		x		
Benzo(ghi)perylene	x						x	x	x				x	x		x		x		
Benzo(k)fluoranthene							x	x					x	x		x		x		
Bis(2-Ethylhexyl)phthalate	x						x	x	x		x		x	x	x	x		x	x	
Butylbenzylphthalate																		x		
Carbazole	x						x	x					x					x		
Chrysene	x						x	x	x		x		x	x		x		x		
Dibenz(a,h)anthracene	x						x	x	x				x			x		x		
Dibenzofuran	x						x	x					x					x		
Di-n-butylphthalate	x						x	x					x	x	x	x		x	x	
Di-n-octylphthalate											x					x		x	x	
Fluoranthene	x						x	x	x		x	x	x	x		x		x	x	
Fluorene	x							x					x					x		
Hexachlorobenzene								x												
Indeno(1,2,3-cd)pyrene	x						x	x	x				x	x		x		x		
Naphthalene	x						x	x					x			x		x		
Pentachlorophenol																		x		
Phenanthrene	x						x	x	x				x	x		x		x		
Phenol													x			x				
Pyrene	x						x	x	x		x	x	x	x		x		x	x	
Pesticides/PCBs																				
4,4'-DDD	x								x				x				x			
4,4'-DDE	x							x	x				x	x			x	x		
4,4'-DDT	x							x	x				x	x			x	x		
Aldrin	x													x						
Alpha-Chlordane	x						x						x				x	x		
Aroclor-1254	x																x			
Delta-BHC	x																			
Dieldrin	x							x	x				x		x					
Endosulfan I							x	x	x		x		x				x			
Endosulfan II								x									x			
Endrin aldehyde								x												
Endrin ketone								x												
Endosulfan sulfate													x							
Gamma-BHC (Lindane)	x																x			
Gamma-Chlordane	x																	x		
Heptachlor	x														x					
Heptachlor epoxide	x							x					x	x				x		
Nitroaromatics																				
Tetryl										x										
2,4,6-Trinitrotoluene								x		x										
2,4-Dinitrotoluene										x										
Metals																				
Arsenic																			x	
Cadmium							x	x	x			x								x
Copper							x	x	x			x								x
Lead	x						x	x	x				x							x
Mercury	x																			
Potassium							x	x	x			x								x
Selenium							x	x	x			x			x					x
Zinc							x	x	x			x								x
Herbicides																				
2,4,5-T							x					x						x		
2,4-DB																		x		
Dicamba							x					x								
Dichloroprop							x													
MCPP							x													

TABLE 3.2-3
CHEMICALS OF POTENTIAL CONCERN IN GROUND WATER
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

COMPOUND	SEAD-9	SEAD-27	SEAD-28	SEAD-32	SEAD-33	SEAD-34	SEAD-43,56,69	SEAD-44A	SEAD-44B	SEAD-52	SEAD-58	SEAD-62	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-66	SEAD-68	SEAD-70	SEAD-120B
Volatile Organics																				
Acetone								X				X							X	
1,1,2,2-Tetrachloroethane								X												
Semivolatile Organics																				
Diethyl phthalate															X					
Phenol															X					
Metals																				
Aluminum																X				
Barium																X				
Beryllium																X				
Cadmium																X				
Calcium																X				
Cobalt																X				
Copper																X				
Iron																X				
Lead																X				
Magnesium							X	X	X			X								
Manganese													X			X				
Nickel																X				
Sodium	X																			
Zinc																X				
Herbicides																				
2,4,5-TP (Silvex)							X													
2,4,5-T												X								

TABLE 3.2-4
CHEMICALS OF POTENTIAL CONCERN IN SURFACE WATER
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

COMPOUND	SEAD-9	SEAD-27	SEAD-28	SEAD-32	SEAD-33	SEAD-34	SEAD-58	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-66	SEAD-68	SEAD-70	SEAD-120B
Volatile Organics															
Carbon disulfide									X						
Metals															
Aluminum							X		X					X	
Arsenic														X	
Barium							X		X					X	
Calcium							X		X					X	
Chromium							X		X					X	
Cobalt														X	
Copper							X		X					X	
Iron							X		X					X	
Lead							X							X	
Magnesium							X		X					X	
Manganese							X		X					X	
Mercury							X							X	
Nickel							X		X					X	
Potassium							X		X					X	
Sodium							X		X					X	
Thallium							X							X	
Vanadium							X							X	
Zinc							X		X					X	

TABLE 3.2-5
CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

COMPOUND	SEAD-9	SEAD-27	SEAD-28	SEAD-32	SEAD-33	SEAD-34	SEAD-58	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-66	SEAD-68	SEAD-70	SEAD-120B
Volatile Organics															
Methylene chloride									X						
Semivolatiles															
4-Methylphenol							X								
Anthracene							X								
Benzo(a)anthracene							X							X	
Benzo(a)pyrene							X		X						
Benzo(b)fluoranthene							X		X						
Benzo(ghi)perylene							X								
Benzo(k)fluoranthene							X		X						
Bis(2-Ethylhexyl)phthalate							X		X						
Chrysene							X							X	
Dibenz(a,h)anthracene							X								
Di-n-butylphthalate							X								
Fluoranthene							X		X					X	
Indeno(1,2,3-cd)pyrene							X								
Phenanthrene							X		X					X	
Phenol							X								
Pyrene							X		X					X	
Pesticides/PCBs															
4,4'-DDE									X						
Endosulfan I									X						
Heptachlor									X						
Metals															
Aluminum							X		X					X	
Antimony							X		X						
Arsenic							X		X					X	
Barium							X		X					X	
Beryllium							X		X					X	
Cadmium							X		X					X	
Calcium							X		X					X	
Chromium							X		X					X	
Cobalt							X		X					X	
Copper							X		X					X	
Iron							X		X					X	
Lead							X		X					X	
Magnesium							X		X					X	
Manganese							X		X					X	
Mercury							X		X						
Nickel							X		X					X	
Potassium							X		X					X	
Selenium							X								
Sodium							X		X						
Thallium							X							X	
Vanadium							X		X					X	
Zinc							X		X					X	

TABLE 3.3-1
EXPOSURE FACTOR ASSUMPTIONS FOR PLANNED INDUSTRIAL DEVELOPMENT LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	9.6	m3/day	Average inhalation rate for moderate activity is 1.2 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA. 1991.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-1
EXPOSURE FACTOR ASSUMPTIONS FOR PLANNED INDUSTRIAL DEVELOPMENT LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CONSTRUCTION WORKER	**Inhalation of Dust In Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	10.4	m3/day	Average inhalation rate for outdoor worker is 1.3 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
	(Air EPC Calculated from Surface and Subsurface Soils)	Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	480	mg soil/day	Assumed IR for intensive construction work.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface and Subsurface Soils)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface and Subsurface Soils)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1989.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-1
EXPOSURE FACTOR ASSUMPTIONS FOR PLANNED INDUSTRIAL DEVELOPMENT LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
WORKER AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA, 1991.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-1
EXPOSURE FACTOR ASSUMPTIONS FOR PLANNED INDUSTRIAL DEVELOPMENT LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CHILD AT ON-SITE DAY CARE CENTER	**Inhalation of Dust in Ambient Air**	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Inhalation Rate	4	m3/day	Average inhalation rate for children doing light activity is 0.4 m3/hr, exposure time 10 hr/day.	USEPA, 1997.
	(Air EPC Calculated from Surface Soil Only)	Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	2,190	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Ingestion Rate	1	liter/day	Representative upper bound estimate for 0-6 year olds.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

TABLE 3.3-2
EXPOSURE FACTOR ASSUMPTIONS FOR INSTITUTIONAL LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
INSTITUTION WORKER	**Inhalation of Dust in**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
(No Detects in GW)	**Ambient Air**	Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1.0 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
	Surface Soil Only)	Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed. 25% of upper body.	USEPA, 1992.
	Surface Soil Only)	Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-2
EXPOSURE FACTOR ASSUMPTIONS FOR INSTITUTIONAL LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
INSTITUTION STUDENT	**Inhalation of Dust in**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
(No Detects in GW)	**Ambient Air**	Inhalation Rate	16.0	m3/day	Average inhalation rate for males ages 12-18.	USEPA, 1997.
		Exposure Frequency	36.5	days/yr	Resident for 365 days/yr. Exposed to SEAD of concern 10% of time.	BPJ.
	(Air EPC Calculated from	Exposure Duration	2	years	Assumes 2 years for resident period.	BPJ.
	Surface Soil Only)	Averaging Time - Nc	710	days	2 years.	BPJ.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	200	mg soil/day	Maximum IR for child (may be conservative for adolescent.	USEPA, 1993.
	(Soil EPC Calculated from	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
	Surface Soil Only)	Exposure Frequency	36.5	days/yr	Resident for 365 days/yr. Exposed to SEAD of concern 10% of time.	BPJ.
		Exposure Duration	2	years	Assumes 2 years for resident period.	BPJ.
		Averaging Time - Nc	710	days	2 years.	BPJ.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from	Skin Contact Surface Area	4,625	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
	Surface Soil Only)	Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	36.5	days/yr	Resident for 365 days/yr. Exposed to SEAD of concern 10% of time.	BPJ.
		Exposure Duration	2	years	Assumes 2 years for resident period.	BPJ.
		Averaging Time - Nc	710	days	2 years.	BPJ.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-2
EXPOSURE FACTOR ASSUMPTIONS FOR INSTITUTIONAL LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CONSTRUCTION WORKER (No Detects in GW)	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	10.4	m3/day	Average inhalation rate for outdoor worker is 1.3 m3/hr, 8 hr work day.	USEPA, 1997.
	(Air EPC Calculated from Surface and Subsurface Soils)	Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	480	mg soil/day	Assumed IR for intensive construction work.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface and Subsurface Soils)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface and Subsurface Soils)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1989.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-2
EXPOSURE FACTOR ASSUMPTIONS FOR INSTITUTIONAL LAND
Decision Document - Mini Risk Assessment
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RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
WORKER AT ON-SITE DAY CARE CENTER	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
(No Detects in GW)		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1 m3/hr, 8 hr work day.	USEPA, 1997.
	(Air EPC Calculated from Surface Soil Only)	Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	25	days/yr	Works 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-2
EXPOSURE FACTOR ASSUMPTIONS FOR INSTITUTIONAL LAND
Decision Document - Mini Risk Assessment
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RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CHILD AT ON-SITE DAY CARE CENTER (No Detects in GW)	**Inhalation of Dust in Ambient Air**	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Inhalation Rate	4	m3/day	Average inhalation rate for children doing light activity is 0.4 m3/hr, exposure time 10 hr/day.	USEPA, 1997.
	(Air EPC Calculated from Surface Soil Only)	Exposure Frequency	25	days/yr	Attends 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	25	days/yr	Attends 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	2,190	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	25	days/yr	Attends 5 days/wk and 10 days/yr vacation. Exposed to SEAD of concern 10% of time.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

TABLE 3.3-3
EXPOSURE FACTOR ASSUMPTIONS FOR CONSERVATION/RECREATIONAL LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
PARK WORKER	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1.0 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	175	days/yr	Works on-site 5 days/wk, 8 months/yr (35 weeks).	BPJ.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	175	days/yr	Works on-site 5 days/wk, 8 months/yr (35 weeks).	BPJ.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	175	days/yr	Works on-site 5 days/wk, 8 months/yr (35 weeks).	BPJ.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA. 1991.
		Exposure Frequency	175	days/yr	Works on-site 5 days/wk, 8 months/yr (35 weeks).	BPJ.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Surface Water	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Skin Contact Surface Area	1,980	cm2	Adult male hands and forearms.	USEPA, 1992.
		Exposure Time	1	hour/day	Contact time during occasional site maintenance work.	BPJ.
		Exposure Frequency	18	days/yr	Assumes activity occurs 10% of work days.	BPJ.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Sediment	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
		Skin Contact Surface Area	1,980	cm2	Adult male hands and forearms.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	18	days/yr	Assumes activity occurs 10% of work days.	BPJ.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-3
EXPOSURE FACTOR ASSUMPTIONS FOR CONSERVATION/RECREATIONAL LAND
Decision Document - Mini Risk Assessment
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RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
RECREATIONAL VISITOR (CHILD)	**Inhalation of Dust in Ambient Air**	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991 1993.
		Inhalation Rate	8.7	m3/day	Average inhalation rate for a child 1-12 years old.	USEPA, 1997.
		Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
	(Air EPC Calculated from	Exposure Duration	5	years	Assumed.	BPJ.
	Surface Soil Only)	Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
	Surface Soil Only)	Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from	Skin Contact Surface Area	2,300	cm2	Upper bound skin surface exposed to soil.	USEPA, 1992.
	Surface Soil Only)	Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Inhalation of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Inhalation Rate	0.08	m3/day	Inhalation rate for sedentary children ages 3-10, 0.3 m3/hr for 15 minutes.	USEPA, 1997.
		Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA. 1989.
	Ingestion of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Ingestion Rate	1	liter/day	Approximate 90th percentile value for children 1-11 years old.	USEPA. 1997.
		Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Skin Contact Surface Area	9,180	cm2	Upper bound skin surface area for children.	USEPA. 1992.
		Exposure Time	0.25	hours/day	Upper bound bathing duration.	USEPA, 1992.
		Exposure Frequency	14	days/yr	Assumes 2 weeks.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ..
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-3
EXPOSURE FACTOR ASSUMPTIONS FOR CONSERVATION/RECREATIONAL LAND
Decision Document - Mini Risk Assessment
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RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
RECREATIONAL VISITOR (CHILD - CONTINUED)	**Dermal Contact of Surface Water**	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991.
		Skin Contact Surface Area	4,625	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Exposure Time	1	hour/day	Upper bound water contact period.	USEPA, 1992.
		Exposure Frequency	7	days/yr	Assumes contact occurs every second day.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Sediment	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
		Skin Contact Surface Area	4,625	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound water contact period.	USEPA, 1992.
		Exposure Frequency	7	days/yr	Assumes contact occurs every second day.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-3
EXPOSURE FACTOR ASSUMPTIONS FOR CONSERVATION/RECREATIONAL LAND
Decision Document - Mini Risk Assessment
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RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	10.4	m3/day	Average inhalation rate for outdoor worker is 1.3 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
	(Air EPC Calculated from Surface and Subsurface Soils)	Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	480	mg soil/day	Assumed IR for intensive construction work.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface and Subsurface Soils)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface and Subsurface Soils)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1989.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

TABLE 3.3-4
EXPOSURE FACTOR ASSUMPTIONS FOR WAREHOUSE LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
WAREHOUSE WORKER	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1.0 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA, 1991.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-4
EXPOSURE FACTOR ASSUMPTIONS FOR WAREHOUSE LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CONSTRUCTION WORKER	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	10.4	m3/day	Average inhalation rate for outdoor worker is 1.3 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
	(Air EPC Calculated from Surface and Subsurface Soils)	Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	480	mg soil/day	Assumed IR for intensive construction work.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface and Subsurface Soils)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface and Subsurface Soils)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1989.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-4
EXPOSURE FACTOR ASSUMPTIONS FOR WAREHOUSE LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
TRESPASSER (Adolescent)	**Inhalation of Dust in Ambient Air**	Body Weight	50	kg	Mean weight for 13 year old.	USEPA, 1997.
		Inhalation Rate	1.2	m3/day	Average inhalation rate for moderate activity is 1.2 m3/hr, exp. time 1 hr/day.	USEPA, 1997.
		Exposure Frequency	50	days/yr	Assumes 2 days/wk, 25 wk/yr.	BPJ.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	50	kg	Mean weight for 13 year old	USEPA, 1997.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	50	days/yr	Assumes 2 days/wk, 25 wk/yr.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	50	kg	Mean weight for 13 year old.	USEPA, 1997.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	4,625	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	50	days/yr	Assumes 2 days/wk, 25 wk/yr.	BPJ.
		Exposure Duration	5	years	Assumed.	BPJ.
		Averaging Time - Nc	1,825	days	5 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

TABLE 3.3-5
EXPOSURE FACTOR ASSUMPTIONS FOR PRISON LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
PRISON WORKER	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1.0 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Inhalation of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	0.5	m3/day	Inhalation rate for sedentary activity for adults.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA, 1991.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Skin Contact Surface Area	23,000	cm2	Entire adult body skin area.	USEPA, 1992.
		Exposure Time	0.25	hours/day	Upper bound bathing duration.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time for employment at a job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-5
EXPOSURE FACTOR ASSUMPTIONS FOR PRISON LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
PRISON INMATE	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	15.2	m3/day	Average inhalation rate for adults with long term exposure.	USEPA, 1997.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	24	years	Standard adults residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
		Exposure Duration	24	years	Standard adult residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
		Exposure Duration	24	years	Standard adult residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Inhalation of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	0.5	m3/day	Inhalation rate for sedentary activity for adults.	USEPA, 1997.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
		Exposure Duration	24	years	Standard adult residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA. 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	2	liters/day	Standard adult ingestion rate.	USEPA. 1993.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
		Exposure Duration	24	years	Standard adult residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Skin Contact Surface Area	23,000	cm2	Entire adult body skin area.	USEPA. 1992.
		Exposure Time	0.25	hours/day	Upper bound bathing duration.	USEPA, 1992.
		Exposure Frequency	365	days/yr	Assumed.	BPJ.
		Exposure Duration	24	years	Standard adult residential duration.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-5
EXPOSURE FACTOR ASSUMPTIONS FOR PRISON LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CONSTRUCTION WORKER	**Inhalation of Dust In Ambient Air**	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	10.4	m3/day	Average inhalation rate for outdoor worker is 1.3 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
	(Air EPC Calculated from Surface and Subsurface Soils)	Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	480	mg soil/day	Assumed IR for intensive construction work.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface and Subsurface Soils)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface and Subsurface Soils)	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1989.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Site specific based on land area.	USEPA, 1991.
		Exposure Duration	1	year	Upper bound time of employment for construction worker.	USEPA, 1991.
		Averaging Time - Nc	365	days	1 year.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-5
EXPOSURE FACTOR ASSUMPTIONS FOR PRISON LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
WORKER AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Inhalation Rate	8	m3/day	Average inhalation rate for light activity is 1 m3/hr, 8 hr work day.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
	(Air EPC Calculated from	Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
	Surface Soil Only)	Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Upper bound worker exposure to dirt and dust.	USEPA, 1993.
	(Soil EPC Calculated from	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
	Surface Soil Only)	Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from	Skin Contact Surface Area	5,800	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
	Surface Soil Only)	Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adults males.	USEPA, 1991.
		Ingestion Rate	1	liter/day	Standard occupational ingestion rate.	USEPA, 1991.
		Exposure Frequency	250	days/yr	Works 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	25	years	Upper bound time of employment at job.	USEPA, 1991, 1993.
		Averaging Time - Nc	9,125	days	25 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

TABLE 3.3-5
EXPOSURE FACTOR ASSUMPTIONS FOR PRISON LAND
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
CHILD AT ON-SITE DAY CARE CENTER	**Inhalation of Dust in Ambient Air**	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Inhalation Rate	4	m3/day	Average inhalation rate for children doing light activity is 0.4 m3/hr, exposure time 10 hr/day.	USEPA, 1997.
	(Air EPC Calculated from Surface Soil Only)	Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	2,190	cm2	Hands, legs, arms, neck and head exposed, 25% of upper body.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	15	kg	Mean weight for 0-6 year olds.	USEPA, 1993.
		Ingestion Rate	1	liter/day	Representative upper bound estimate for 0-6 year olds.	USEPA, 1997.
		Exposure Frequency	250	days/yr	Attends 5 days/wk and 10 days/yr vacation.	USEPA, 1991.
		Exposure Duration	6	years	Assumes attends from 0-6 years old.	BPJ.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

Table 3.3-6
Adult/Child Visitor Intake Exposure Multiplier Comparison
Decision Document - Mini-Risk Assessment
Seneca Army Depot Activity

Soil				
Dermal Contact		**Surface Area (cm2)**	**Body Weight**	**Intake Multiplier**
	Adult	5800	70	82.86
	Child	2300	15	153.33
Inhalation		**Inhalation Rate (m3/day)**		
	Adult	14.7	70	0.21
	Child	8.7	15	0.58
Ingestion		**Ingestion Rate (mg soil/day)**		
	Adult	100	70	1.43
	Child	200	15	13.33
Groundwater				
Dermal Contact		**Surface Area (cm2)**		
	Adult	23000	70	328.57
	Child	9180	15	612
Ingestion		**Ingestion Rate (Liters/day)**		
	Adult	1	70	0.01
	Child	1	15	0.07

TABLE 3.3-7
AREA OF PRISON AOCs AND EXPOSURE FREQUENCIES FOR CONSTRUCTION WORKER
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Site	Area (square feet)	Percent of Total Area (%)	Exposure Frequency (days)
SEAD-120B	33,750	0.6	1.5
SEAD-43,56,69	540,000	9.7	24.25
SEAD-44A	715,000	12.8	32
SEAD-44B	70,000	1.3	3.25
SEAD-52	280,000	5.0	12.5
SEAD-62	3,934,000	70.7	176.5
TOTAL AREA	5,572,750*	100	250

* Equivalent to 128 acres or 518,000 square meters.

TABLE 3.3-8
SUSPENDED PARTICULATE CONCENTRATIONS MEASURED AT SEDA
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

PARTICULATE DATA	SITE #1 PM 10	SITE #2 PM 10	SITE #3 PM 10	SITE #4 PM 10
Peak Concentration (ug/m3)	37 on 23 July 95	37 on 23 July 95	37 on 5 July 95	37 on 5 July 95
Arithmetic Mean (ug/m3)	16.9	16.6	16.4	15.8
Standard Deviation	21.4	21.1	23.0	23.0
Geometric Mean (ug/m3)	15.1	14.8	14.8	14.2
No. of 24-hr. Avgs. Above 150 ug/m3	0	0	0	0
Number of Valid Samples	29	32	29	31
Percent Data Recovery	90.6	100.0	90.6	96.9

Cumulative Summary for April 1, 1995 through July 31, 1995

TABLE 3.3-9
AVERAGE SITE AREA
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Site	Area (ft^2)	Area (Hectares)
SEAD-9	43,560	0.40
SEAD-27	420	0.00
SEAD-28	67	0.00
SEAD-32	2,005	0.02
SEAD-33	1,003	0.01
SEAD-34	1,671	0.02
SEAD-58	92,561	0.86
SEAD-64A	70,000	0.65
SEAD-64B	131,500	1.22
SEAD-64C	427,500	3.97
SEAD-64D	3,240,000	30.11
SEAD-66	108,000	1.00
SEAD-68	4,000	0.04
SEAD-70	40,000	0.37
AVERAGE AREA (ft^2)	**297,306**	
AVERAGE AREA (m^2)	**27,621**	

TABLE 3.4-1
TOXICITY VALUES
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Analyte	Oral RfD (mg/kg-day)		Inhalation RfD (mg/kg-day)		Carc. Slope Oral (mg/kg-day)-1		Rank Wt. of Evidence	Carc. Slope Inhalation (mg/kg-day)-1		Dermal RfD (mg/kg-day)		Carc. Slope Dermal (mg/kg-day)-1		Oral Absorption Factor	
Volatile Organic Compounds															
1,1,2,2-Tetrachloroethane	NA	a	NA	a	2.00E-01	a	C	2.03E-01	a	NA		2.00E-01	g	1.00	j
Acetone	1.00E-01	a	NA	a	NA	a	D	NA	a	1.00E-01	f	NA		1.00	j
Benzene	3.00E-03	i	1.71E-03	i	2.90E-02	a	A	2.73E-02	a	2.85E-03	f	3.05E-02	g	0.95	k
Carbon disulfide	1.00E-01	a	2.00E-01	a	NA	a	NA	NA	a	6.30E-02	f	NA		0.63	k
Chlorobenzene	2.00E-02	a	5.70E-03	b	NA	a	D	NA	a	NA		NA		1.00	
Chloroform	1.00E-02	a	NA	a	6.10E-03	a	B2	8.05E-02	a	1.00E-02	f	6.10E-03	g	1.00	k
Ethylbenzene	1.00E-01	a	2.86E-01	a	NA	a	D	NA	a	NA		NA		1.00	
Methylene chloride	6.00E-02	a	8.57E-01	b	7.50E-03	a	B2	1.65E-03	a	5.88E-02	f	7.65E-03	g	0.98	k
Methyl ethyl ketone	6.00E-01	a	2.86E-01	a	NA	a	D	NA	a	6.00E-01	f	NA		1.00	j
Methyl isobutyl ketone	8.00E-02	b	2.30E-02	b	NA	a	NA	NA	a	NA		NA		1.00	
Tetrachloroethene	1.00E-02	a	NA	c	5.20E-02	c	NR	2.00E-03	c	1.00E-02	f	5.20E-02	g	1.00	j
Toluene	2.00E-01	a	1.14E-01	a	NA	a	D	NA	a	2.00E-01	f	NA		1.00	j
Trichloroethene	NA	a	NA	c	1.10E-02	c	NA	6.00E-03	c	NA		1.22E-02	g	0.90	k
Total Xylenes	2.00E+00	a	NA	c	NA	a	D	NA	a	1.80E+00	f	NA		0.90	k
Semivolatile Organic Compounds*															
2-Methylnaphthalene	4.00E-02	i	NA	a	NA	a	NA	NA	a	4.00E-02	f	NA		1.00	j
4-Methylphenol	5.00E-03	b	NA	a	NA	a	C	NA	a	NA		NA		1.00	
Acenaphthene	6.00E-02	a	NA	a	NA	a	NA	NA	a	6.00E-02	f	NA		1.00	j
Acenaphthylene	NA	e	NA	a	NA	a	D	NA	a	NA		NA		1.00	j
Anthracene	3.00E-01	a	NA	a	NA	a	D	NA	a	3.00E-01	f	NA		1.00	j
Benzo(a)anthracene	NA	a	NA	a	7.30E-01	c	B2	NA	a	NA		7.30E-01	g	1.00	j
Benzo(a)pyrene	NA	a	NA	a	7.30E+00	a	B2	NA	a	NA		1.46E+01	g	0.50	k
Benzo(b)fluoranthene	NA	a	NA	a	7.30E-01	c	B2	NA	a	NA		7.30E-01	g	1.00	j
Benzo(ghi)perylene	NA	a	NA	a	NA	a	D	NA	a	NA		NA		1.00	j
Benzo(k)fluoranthene	NA	a	NA	a	7.30E-02	c	B2	NA	a	NA		7.30E-02	g	1.00	j
Butylbenzylphthalate	2.00E-01	b	NA	a	NA	a	C	NA	a	2.00E-01	f	NA		1.00	j
Carbazole	NA	a	NA	a	2.00E-02	b	B2	NA	a	NA		2.00E-02	g	1.00	j
Chrysene	NA	a	NA	a	7.30E-03	c	B2	NA	a	NA		7.30E-03	g	1.00	j
Dibenz(a,h)anthracene	NA	a	NA	a	7.30E+00	c	B2	NA	a	NA		7.30E+00	g	1.00	j
Dibenzofuran	NA	a	NA	a	NA	a	D	NA	a	NA		NA		1.00	j
Diethyl phthalate	8.00E-01	b	NA	a	NA	a	D	NA	a	8.00E-01	f	NA		1.00	j
Di-n-butylphthalate	1.00E-01	a	NA	a	NA	a	D	NA	a	9.00E-02	f	NA		0.90	k
Di-n-octylphthalate	2.00E-02	b	NA	a	NA	a	NA	NA	a	NA		NA		1.00	j
Fluoranthene	4.00E-02	a	NA	a	NA	a	D	NA	a	4.00E-02	f	NA		1.00	j
Fluorene	4.00E-02	a	NA	a	NA	a	D	NA	a	4.00E-02	f	NA		1.00	j
Hexachlorobenzene	8.00E-04	a	NA	a	1.60E+00	a	B2	1.61E+00	a	8.00E-04	f	NA		1.00	
Indeno(1,2,3-cd)pyrene	NA	a	NA	a	7.30E-01	c	B2	NA	a	NA		7.30E-01	g	1.00	j
Methylnaphthalene	4.00E-02	i	NA	a	NA	a	NA	NA	a	4.00E-02	f	NA		1.00	j
Naphthalene	2.00E-02	a	8.60E-04	a	NA	a	C	NA	a	2.00E-02	f	NA		1.00	j
Pentachlorophenol	3.00E-02	a	NA	a	1.20E-01	a	B2	NA	a	3.00E-02	f	1.20E-01	g	1.00	j
Phenanthrene	NA	a	NA	a	NA	a	D	NA	a	NA		NA		1.00	j
Phenol	6.00E-01	a	NA	a	NA	a	D	NA	a	5.40E-01	f	NA		0.90	k
Pyrene	3.00E-02	a	NA	a	NA	a	D	NA	a	3.00E-02	f	NA		1.00	k
bis(2-Ethylhexyl)phthalate	2.00E-02	a	NA	a	1.40E-02	a	B2	NA	a	1.00E-02	f	2.80E-02	g	0.50	k
Pesticides/PCBs															
4,4'-DDD	NA	a	NA	a	2.40E-01	a	B2	NA	a	NA		1.20E+00	g	0.20	k
4,4'-DDE	NA	a	NA	a	3.40E-01	a	B2	NA	a	NA		1.70E+00	g	0.20	k
4,4'-DDT	5.00E-04	a	NA	a	3.40E-01	a	B2	3.40E-01	a	1.00E-04	f	1.70E+00	g	0.20	k
Aldrin	3.00E-05	a	NA	a	1.70E+01	a	B2	1.72E+01	a	1.50E-05	f	3.40E+01	g	0.50	k
Aroclor-1254	2.00E-05	a	NA	a	2.00E+00	a	B2	4.00E-01	a	1.80E-05	f	2.22E+00	g	0.90	k
Dieldrin	5.00E-05	a	NA	a	1.60E+01	a	B2	1.61E+01	a	2.50E-05	f	3.20E+01	g	0.50	k
Endosulfan I	6.00E-03	n	NA	a	NA	a	NA	NA	a	6.00E-03	f	NA		1.00	j
Endosulfan II	6.00E-03	n	NA	a	NA	a	NA	NA	a	6.00E-03	f	NA		1.00	j
Endosulfan sulfate	6.00E-03	n	NA	a	NA	a	NA	NA	a	6.00E-03	f	NA		1.00	j
Endrin aldehyde	NA	a	NA	a	NA	a	NA	NA	a	NA		NA		1.00	j
Endrin ketone	NA	a	NA	a	NA	a	NA	NA	a	NA		NA		1.00	j
Heptachlor	5.00E-04	a	NA	a	4.50E+00	a	B2	4.55E+00	a	5.00E-04	f	4.50E+00	g	1.00	j
Heptachlor epoxide	1.30E-05	a	NA	a	9.10E+00	a	B2	9.10E+00	a	1.30E-05	f	9.10E+00	g	1.00	j
alpha-Chlordane	5.00E-04	o	2.00E-04	o	3.50E-01	o	B2	3.50E-01	o	5.00E-04	f	3.50E-01	g	1.00	j
gamma-BHC (Lindane)	3.00E-04	a	NA	a	1.30E+00	a	B2/C	NA	a	3.00E-04	f	1.80E+00	x	1.00	j
gamma-Chlordane	5.00E-04	o	2.00E-04	o	3.50E-01	o	B2	3.50E-01	o	5.00E-04	f	3.50E-01	g	1.00	j
delta-BHC	NA	a	NA	a	NA	a	NA	NA	a	NA		NA		1.00	j
Nitroaromatics*															
2,4-Dinitrotoluene	2.00E-03	a	NA	a	6.80E-01	a	B2	NA	a	2.00E-03	f	6.80E-01	g	1.00	j
2,4,6-Trinitrotoluene	5.00E-04	a	NA	a	3.00E-02	a	C	NA	a	5.00E-04	f	3.00E-02	g	0.60	k
Tetryl	1.00E-02	b	NA	a	NA	a	NA	NA	a	1.00E-02	f	NA		1.00	j
Metals															
Aluminum	1.00E+00	i	1.43E-03	m	NA	a	D	NA	a	NA		NA		0.04	k
Antimony	4.00E-04	a	NA	e	NA	a	B1	NA	a	4.00E-04	f	NA		0.01	k
Arsenic	3.00E-04	a	NA	e	1.50E+00	d	A	1.51E+01	a	2.40E-04	f	1.88E+00	g	0.80	k
Barium	7.00E-02	a	1.43E-04	b	NA	a	D	NA	a	3.50E-02	f	NA		0.50	k
Beryllium	2.00E-03	a	6.00E-06	a	NA	a	B2	8.40E+00	a	2.00E-05	f	NA		0.01	k
Cadmium	5.00E-04	p	NA	a	NA	a	B1	6.30E+00	a	5.00E-05	f	NA		0.10	l
Calcium	NA	a	NA	a	NA	a	NA	NA	a	NA		NA		1.00	j
Chromium	3.00E-03	q	2.80E-05	q	NA	a	A	4.20E+01	q	6.00E-05	f	NA		0.02	k
Cobalt	6.00E-02	m	NA	a	NA	a	NA	NA	a	NA		NA		0.05	k
Copper	4.00E-02	b	NA	a	NA	a	D	NA	a	2.40E-02	f	NA		0.60	k
Iron	3.00E-01	e	NA	a	NA	a	NR	NA	a	6.00E-02	f	NA		0.20	k
Lead	NA	a	NA	a	NA	a	B2	NA	a	NA		NA		0.15	k
Magnesium	NA	a	NA	a	NA	a	D	NA	a	NA		NA		1.00	j

TABLE 3.4-1
TOXICITY VALUES
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Analyte	Oral RfD (mg/kg-day)		Inhalation RfD (mg/kg-day)		Carc. Slope Oral (mg/kg-day)-1		Rank Wt. of Evidence	Carc. Slope Inhalation (mg/kg-day)-1		Dermal RfD (mg/kg-day)		Carc. Slope Dermal (mg/kg-day)-1	Oral Absorption Factor	
Manganese	5.00E-02	r	1.40E-05	a	NA	a	D	NA	a	1.50E-03	f	NA	0.03	k
Mercury	3.00E-04	s	8.57E-05	a	NA	a	D	NA	a	3.00E-06	f	NA	0.01	k
Nickel	2.00E-02	a	NA	n	NA	a	NR	NA	a	8.00E-04	f	NA	0.04	k
Potassium	NA	a	NA	a	NA	a	NA	NA	a	NA		NA	1.00	j
Selenium	5.00E-03	a	NA	a	NA	a	D	NA	a	4.50E-03	f	NA	0.90	k
Sodium	NA	a	NA	a	NA	a	NA	NA	a	NA		NA	1.00	j
Thallium	8.00E-05	t	NA	a	NA	a	D	NA	a	8.00E-05	f	NA	1.00	k
Vanadium	7.00E-03	b	NA	a	NA	a	D	NA	a	7.00E-05	f	NA	0.01	k
Zinc	3.00E-01	a	NA	a	NA	a	D	NA	a	7.50E-02	f	NA	0.25	k
Herbicides														
2,4,5-T	1.00E-02	a	NA	a	NA	a	NA	NA	a	1.00E-02	f	NA	1.00	j
2,4,5-TP (Silvex)	8.00E-03	a	NA	a	NA	a	D	NA	a	8.00E-03	f	NA	1.00	j
2,4-DB	8.00E-03	a	NA	a	NA	a	NA	NA	a	8.00E-03	f	NA	1.00	j
Dicamba	3.00E-02	a	NA	a	NA	a	NA	NA	a	3.00E-02	f	NA	1.00	j
Dichloroprop	NA	a	NA	a	NA	a	NA	NA	a	NA		NA	1.00	j
MCPP	1.00E-03	a	NA	a	NA	a	NA	NA	a	1.00E-03	f	NA	1.00	j
Dalapon	3.00E-02	a	NA	a	NA	a	NA	NA	a	NA	f	NA	1.00	j

a = Taken from the Integrated Risk Information System (IRIS) (Online August 1999)
b = Taken from HEAST 1995
c = Calculated using TEF
d = Calculated from proposed oral unit risk value
e = Provisional health guideline from EPA Risk Assessment Issue Papers (1999) provided by EPA Technical Support Center.
(Inhalation RfD's were derived from EPA RfC's based on the assumption of 20 m3/day inhalation rate and 70 kg body weight.)
f = Calculated from oral RFD value. (Dermal Rfd = Oral Rfd * Oral Absorption Factor)
g = Calculated from oral slope factor (Dermal Slope Factor = Oral Slope Factor/Oral Absorption Efficiency)
h = Slope factor is for the mixture of 2,4/2,6-dinitrotoluene.
i = Provisional health guideline from EPA Risk Assessment Issue Papers (1996-1997) provided by EPA Technical Support Center.
(Inhalation RfD's were derived from EPA RfC's based on the assumption of 20 m3/day inhalation rate and 70 kg body weight.)
j = Where no oral absorption efficiency data are available, EPA Region 2 recommends that no adjustment be made for relative absorption (i.e. assume oral absorption factor = 1.0)
k = Taken from ATSDR Toxicity Profiles (1989 - 1995)
l = EPA Region 2 accepted oral absorption factor for cadmium (personal communication between A. Schatz of Parsons and M. Maddaloni of EPA)
m = RfD is for aroclor-1254.
n = Value for Endosulfan.
o = Value for Chlordane.
p = Two RfDs are available for cadmium and the most conservative is presented.
q = Values for Chromium VI.
r = For managenese, for dietary intake, a RfD of 0.14 mg/kg/day is presented in IRIS. For non-dietary intake (groundwater/soil), IRIS recommends applying a modifying factor of 3, resulting in an RfD of 0.05 mg/kg/day.
s = Value for mercuric chloride.
t = Value for thallium chloride.
NA = Not Available
*Dinitrotoluene, 2,4- and dinitrotoluene, 2,6- were analyzed as both nitroaromatics and semivolatiles.

TABLE 3.5-1
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table A-7	2E-06	1E-10
	Ingestion of Soil	Table A-8	8E-03	4E-06
	Dermal Contact to Soil	Table A-9	3E-02	4E-07
	Ingestion of Groundwater	Table A-10	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-02*	*4E-06*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table A-7	5E-05	5E-11
	Ingestion of Soil	Table A-8	4E-02	2E-06
	Dermal Contact to Soil	Table A-9	3E-02	2E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*7E-02*	*2E-06*
WORKER AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table A-7	2E-06	8E-11
	Ingestion of Soil	Table A-8	8E-03	4E-06
	Dermal Contact to Soil	Table A-9	3E-02	4E-07
	Ingestion of Groundwater	Table A-10	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-02*	*4E-06*
CHILD AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table A-7	4E-06	5E-11
	Ingestion of Soil	Table A-8	7E-02	9E-06
	Dermal Contact to Soil	Table A-9	5E-02	2E-07
	Ingestion of Groundwater	Table A-10	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*1E-01*	*9E-06*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-2
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
INDUSTRIAL WORKER	Ingestion of Groundwater	Table B-6	7E-01	5E-06
	TOTAL RECEPTOR RISK (Nc & Car)		*7E-01*	*5E-06*
WORKER AT ON-SITE DAY CARE CENTER	Ingestion of Groundwater	Table B-6	7E-01	5E-06
	TOTAL RECEPTOR RISK (Nc & Car)		*7E-01*	*5E-06*
CHILD AT ON-SITE DAY CARE CENTER	Ingestion of Groundwater	Table B-6	3E+00	6E-06
	TOTAL RECEPTOR RISK (Nc & Car)		*3E+00*	*6E-06*

NQ= Not Quantified due to lack of toxicity data

TABLE 3.5-3
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table Q-4	1E-07	7E-09
	Ingestion of Soil	Table Q-5	7E-02	5E-06
	Dermal Contact to Soil	Table Q-6	2E-02	2E-07
	TOTAL RECEPTOR RISK (Nc & Car)		*9E-02*	*6E-06*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table Q-4	1E-06	3E-09
	Ingestion of Soil	Table Q-5	4E-01	1E-06
	Dermal Contact to Soil	Table Q-6	2E-02	9E-09
	TOTAL RECEPTOR RISK (Nc & Car)		*4E-01*	*1E-06*
WORKER AT DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table Q-4	1E-07	6E-09
	Ingestion of Soil	Table Q-5	7E-02	5E-06
	Dermal Contact to Soil	Table Q-6	2E-02	2E-07
	TOTAL RECEPTOR RISK (Nc & Car)		*9E-02*	*6E-06*
CHILD AT DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table Q-4	2E-07	3E-09
	Ingestion of Soil	Table Q-5	7E-01	1E-05
	Dermal Contact to Soil	Table Q-6	3E-02	9E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*7E-01*	*1E-05*

TABLE 3.5-4
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
INDUSTRIAL WORKER	Inhalation of Dust in Ambient Air	Table R-5	5E-07	5E-11
	Ingestion of Soil	Table R-6	8E-04	3E-06
	Dermal Contact to Soil	Table R-7	5E-07	6E-10
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-04*	*3E-06*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table R-5	5E-06	2E-11
	Ingestion of Soil	Table R-6	4E-03	6E-07
	Dermal Contact to Soil	Table R-7	5E-07	2E-11
	TOTAL RECEPTOR RISK (Nc & Car)		*4E-03*	*6E-07*
WORKER AT DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table R-5	4E-07	5E-11
	Ingestion of Soil	Table R-6	8E-04	3E-06
	Dermal Contact to Soil	Table R-7	5E-07	6E-10
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-04*	*3E-06*
CHILD AT DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table R-5	1E-06	3E-11
	Ingestion of Soil	Table R-6	7E-03	7E-06
	Dermal Contact to Soil	Table R-7	8E-07	2E-10
	TOTAL RECEPTOR RISK (Nc & Car)		*7E-03*	*7E-06*

TABLE 3.5-5
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-32
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
INSTITUTION WORKER	Inhalation of Dust in Ambient Air	Table D-5	NQ	NQ
	Ingestion of Soil	Table D-6	NQ	NQ
	Dermal Contact to Soil	Table D-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)			
INSTITUTION STUDENT	Inhalation of Dust in Ambient Air	Table D-5	NQ	NQ
	Ingestion of Soil	Table D-6	NQ	NQ
	Dermal Contact to Soil	Table D-7	NQ	MQ
	TOTAL RECEPTOR RISK (Nc & Car)			
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table D-5	2E-12	4E-17
	Ingestion of Soil	Table D-6	8E-09	5E-14
	Dermal Contact to Soil	Table D-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-09*	*5E-14*
WORKER AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table D-5	NQ	NQ
	Ingestion of Soil	Table D-6	NQ	NQ
	Dermal Contact to Soil	Table D-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)			
CHILD AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table D-5	NQ	NQ
	Ingestion of Soil	Table D-6	NQ	NQ
	Dermal Contact to Soil	Table D-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)			

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-6
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PARK WORKER	Inhalation of Dust in Ambient Air	Table K-9	7E-11	4E-14
	Ingestion of Soil	Table K-10	1E-05	9E-10
	Dermal Contact to Soil	Table K-11	NQ	NQ
	Dermal Contact to Surface Water	Table K-12	2E-04	NQ
	Dermal Contact to Sediment	Table K-13	5E-04	6E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-04*	*6E-08*
RECREATIONAL VISITOR (CHILD)	Inhalation of Dust Ambient Air	Table K-9	3E-11	3E-15
	Ingestion of Soil	Table K-10	7E-06	1E-10
	Dermal Contact to Soil	Table K-11	NQ	NQ
	Dermal Contact to Surface Water	Table K-12	9E-04	NQ
	Dermal Contact to Sediment	Table K-13	2E-03	5E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-03*	*5E-08*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table K-9	1E-09	2E-14
	Ingestion of Soil	Table K-10	9E-05	3E-10
	Dermal Contact to Soil	Table K-11	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*9E-05*	*3E-10*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-7
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PARK WORKER	Inhalation of Dust in Ambient Air	Table N-9	7E-11	5E-12
	Ingestion of Soil	Table N-10	8E-05	8E-08
	Dermal Contact to Soil	Table N-11	NQ	NQ
	Dermal Contact to Surface Water	Table N-12	7E-05	NQ
	Dermal Contact to Sediment	Table N-13	6E-04	7E-08
	TOTAL RECEPTOR RISK (Nc & Car)		7E-04	1E-07
RECREATIONAL VISITOR (CHILD)	Inhalation of Dust in Ambient Air	Table N-9	3E-11	4E-13
	Ingestion of Soil	Table N-10	6E-05	1E-08
	Dermal Contact to Soil	Table N-11	NQ	NQ
	Dermal Contact to Surface Water	Table N-12	3E-04	NQ
	Dermal Contact to Sediment	Table N-13	2E-03	6E-08
	TOTAL RECEPTOR RISK (Nc & Car)		3E-03	7E-08
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table N-9	1E-09	9E-12
	Ingestion of Soil	Table N-10	9E-04	3E-08
	Dermal Contact to Soil	Table N-11	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		9E-04	3E-08

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-8
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PARK WORKER	Inhalation of Dust in Ambient Air	Table P-7	3E-08	2E-15
	Ingestion of Soil	Table P-8	5E-05	3E-07
	Dermal Contact to Soil	Table P-9	NQ	NQ
	Ingestion of Groundwater	Table P-11	3E+00	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E+00*	*3E-07*
RECREATIONAL VISITOR (CHILD)	Inhalation of Dust Ambient Air	Table P-7	1E-08	1E-16
	Ingestion of Soil	Table P-8	4E-05	4E-08
	Dermal Contact to Soil	Table P-9	NQ	NQ
	Inhalation of Groundwater	Table P-10	NQ	NQ
	Ingestion of Groundwater	Table P-11	1E+00	NQ
	Dermal Contact to Groundwater	Table P-12	4E-02	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*1E+00*	*4E-08*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table P-7	5E-07	1E-15
	Ingestion of Soil	Table P-8	3E-04	7E-08
	Dermal Contact to Soil	Table P-9	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-04*	*7E-08*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-9
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PARK WORKER	Inhalation of Dust in Ambient Air	Table S-9	NQ	4E-07
	Ingestion of Soil	Table S-10	2E-01	3E-05
	Dermal Contact to Soil	Table S-11	1E-01	2E-05
	Ingestion of Groundwater	Table S-13	8E-04	NQ
	Dermal Contact to Surface Water	Table S-14	2E-03	4E-09
	Dermal Contact to Sediment	Table S-16	3E-04	3E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*4E-01*	*6E-05*
RECREATIONAL VISITOR (CHILD)	Inhalation of Dust Ambient Air	Table S-9	NQ	4E-08
	Ingestion of Soil	Table S-10	2E-01	5E-06
	Dermal Contact to Soil	Table S-11	2E-02	7E-07
	Inhalation of Groundwater	Table S-12	NQ	NQ
	Ingestion of Groundwater	Table S-13	3E-04	NQ
	Dermal Contact to Groundwater	Table S-14	9E-07	NQ
	Dermal Contact to Surface Water	Table S-15	1E-02	4E-09
	Dermal Contact to Sediment	Table S-16	1E-03	3E-08
	TOTAL RECEPTOR RISK (Nc & Car)		*2E-01*	*6E-06*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table S-9	2E-09	3E-07
	Ingestion of Soil	Table S-10	1E+00	9E-06
	Dermal Contact to Soil	Table S-11	2E-01	1E-06
	TOTAL RECEPTOR RISK (Nc & Car)		*2E+00*	*1E-05*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-10
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
WAREHOUSE WORKER	Inhalation of Dust in Ambient Air	Table M-7	6E-07	7E-11
	Ingestion of Soil	Table M-8	1E-03	2E-05
	Dermal Contact to Soil	Table M-9	NQ	NQ
	Ingestion of Groundwater	Table M-10	4E-01	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*4E-01*	*2E-05*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table M-7	7E-05	3E-11
	Ingestion of Soil	Table M-8	9E-03	4E-06
	Dermal Contact to Soil	Table M-9	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*9E-03*	*4E-06*
TRESPASSER (CHILD)	Inhalation of Dust in Ambient Air	Table M-7	2E-08	6E-13
	Ingestion of Soil	Table M-8	8E-04	3E-06
	Dermal Contact to Soil	Table M-9	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-04*	*3E-06*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-11

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-43, 56, 69
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table G-9	6E-07	1E-08
	Ingestion of Onsite Soils	Table G-10	2E-02	6E-06
	Dermal Contact to Onsite Soils	Table G-11	2E-02	NQ
	Ingestion of Groundwater	Table G-12	2E-03	NQ
	Inhalation of Groundwater	Table G-15	NQ	NQ
	Dermal Contact to Groundwater	Table G-14	6E-04	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		5E-02	6E-06
PRISON WORKER	Inhalation of Dust Ambient Air	Table G-9	2E-07	4E-09
	Ingestion of Onsite Soils	Table G-10	1E-02	5E-06
	Dermal Contact to Onsite Soils	Table G-11	2E-02	NQ
	Ingestion of Groundwater	Table G-12	5E-04	NQ
	Inhalation of Groundwater	Table G-15	NQ	NQ
	Dermal Contact to Groundwater	Table G-14	4E-04	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		3E-02	5E-06
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table G-9	8E-07	5E-10
	Ingestion of Onsite Soils	Table G-10	6E-03	1E-07
	Dermal Contact to Onsite Soils	Table G-11	2E-03	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		8E-03	1E-07
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table G-9	5E-07	3E-09
	Ingestion of Onsite Soils	Table G-10	1E-01	1E-05
	Dermal Contact to Onsite Soils	Table G-11	3E-02	NQ
	Ingestion of Groundwater	Table G-12	3E-03	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		1E-01	1E-05
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table G-9	2E-07	4E-09
	Ingestion of Onsite Soils	Table G-10	1E-02	5E-06
	Dermal Contact to Onsite Soils	Table G-11	2E-02	NQ
	Ingestion of Groundwater	Table G-12	5E-04	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		3E-02	5E-06

NQ = Not Quantified

TABLE 3.5-12

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table H-9	4E-10	5E-09
	Ingestion of Onsite Soils	Table H-10	5E-03	8E-07
	Dermal Contact to Onsite Soils	Table H-11	8E-03	NQ
	Ingestion of Groundwater	Table H-12	2E-03	6E-06
	Dermal Contact to Groundwater	Table H-14	9E-06	8E-07
	Inhalation of Groundwater	Table H-15	NQ	1E-07
	TOTAL RECEPTOR RISK (Nc & Car)		2E-02	8E-06
PRISON WORKER	Inhalation of Dust Ambient Air	Table H-9	1E-10	2E-09
	Ingestion of Onsite Soils	Table H-10	4E-03	6E-07
	Dermal Contact to Onsite Soils	Table H-11	5E-03	NQ
	Ingestion of Groundwater	Table H-12	8E-04	2E-06
	Dermal Contact to Groundwater	Table H-14	6E-06	6E-07
	Inhalation of Groundwater	Table H-15	NQ	9E-08
	TOTAL RECEPTOR RISK (Nc & Car)		1E-02	3E-06
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table H-9	2E-06	3E-10
	Ingestion of Onsite Soils	Table H-10	3E-03	1E-07
	Dermal Contact to Onsite Soils	Table H-11	7E-04	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		3E-03	1E-07
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table H-9	3E-10	1E-09
	Ingestion of Onsite Soils	Table H-10	3E-02	1E-06
	Dermal Contact to Onsite Soils	Table H-11	1E-02	NQ
	Ingestion of Groundwater	Table H-12	4E-03	2E-06
	TOTAL RECEPTOR RISK (Nc & Car)		5E-02	4E-06
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table H-9	1E-10	2E-09
	Ingestion of Onsite Soils	Table H-10	4E-03	6E-07
	Dermal Contact to Onsite Soils	Table H-11	5E-03	NQ
	Ingestion of Groundwater	Table H-12	8E-04	2E-06
	TOTAL RECEPTOR RISK (Nc & Car)		1E-02	3E-06

NQ= Not Quantified due to lack of toxicity data.

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table I-9	6E-10	4E-09
	Ingestion of Onsite Soils	Table I-10	5E-03	1E-06
	Dermal Contact to Onsite Soils	Table I-11	6E-03	NQ
	Ingestion of Groundwater	Table I-12	NQ	NQ
	Dermal Contact to Groundwater	Table I-14	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		1E-02	1E-06
PRISON WORKER	Inhalation of Dust Ambient Air	Table I-9	2E-10	1E-09
	Ingestion of Onsite Soils	Table I-10	3E-03	7E-07
	Dermal Contact to Onsite Soils	Table I-11	4E-03	NQ
	Ingestion of Groundwater	Table I-12	NQ	NQ
	Dermal Contact to Groundwater	Table I-14	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		7E-03	7E-07
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table I-9	7E-11	2E-11
	Ingestion of Onsite Soils	Table I-10	2E-04	2E-09
	Dermal Contact to Onsite Soils	Table I-11	5E-05	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		3E-04	2E-09
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table I-9	5E-10	8E-10
	Ingestion of Onsite Soils	Table I-10	3E-02	2E-06
	Dermal Contact to Onsite Soils	Table I-11	7E-03	NQ
	Ingestion of Groundwater	Table I-12	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		4E-02	2E-06
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table I-9	2E-10	1E-09
	Ingestion of Onsite Soils	Table I-10	3E-03	7E-07
	Dermal Contact to Onsite Soils	Table I-11	4E-03	NQ
	Ingestion of Groundwater	Table I-12	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		7E-03	7E-07

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-14

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-52
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table J-5	NQ	NQ
	Ingestion of Onsite Soils	Table J-6	3E-03	7E-07
	Dermal Contact to Onsite Soils	Table J-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-03*	*7E-07*
PRISON WORKER	Inhalation of Dust Ambient Air	Table J-5	NQ	NQ
	Ingestion of Onsite Soils	Table J-6	2E-03	5E-07
	Dermal Contact to Onsite Soils	Table J-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*2E-03*	*5E-07*
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table J-5	NQ	NQ
	Ingestion of Onsite Soils	Table J-6	4E-04	5E-09
	Dermal Contact to Onsite Soils	Table J-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*4E-04*	*5E-09*
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table J-5	NQ	NQ
	Ingestion of Onsite Soils	Table J-6	2E-02	1E-06
	Dermal Contact to Onsite Soils	Table J-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*2E-02*	*1E-06*
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table J-5	NQ	NQ
	Ingestion of Onsite Soils	Table J-6	2E-03	5E-07
	Dermal Contact to Onsite Soils	Table J-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*2E-03*	*5E-07*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-15

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table L-7	NQ	3E-09
	Ingestion of Onsite Soils	Table L-8	3E-03	NQ
	Dermal Contact to Onsite Soils	Table L-9	7E-03	NQ
	Ingestion of Groundwater	Table L-10	2E-02	6E-07
	Inhalation of Groundwater	Table L-13	2E-02	3E-07
	Dermal Contact to Groundwater	Table L-12	3E-03	8E-08
	TOTAL RECEPTOR RISK (Nc & Car)		5E-02	9E-07
PRISON WORKER	Inhalation of Dust Ambient Air	Table L-7	NQ	1E-09
	Ingestion of Onsite Soils	Table L-8	2E-03	NQ
	Dermal Contact to Onsite Soils	Table L-9	5E-03	NQ
	Ingestion of Groundwater	Table L-10	7E-03	2E-07
	Inhalation of Groundwater	Table L-13	1E-02	2E-07
	Dermal Contact to Groundwater	Table L-12	2E-03	5E-08
	TOTAL RECEPTOR RISK (Nc & Car)		3E-02	4E-07
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table L-7	NQ	1E-09
	Ingestion of Onsite Soils	Table L-8	1E-02	NQ
	Dermal Contact to Onsite Soils	Table L-9	5E-03	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		2E-02	1E-09
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table L-7	NQ	7E-10
	Ingestion of Onsite Soils	Table L-8	2E-02	NQ
	Dermal Contact to Onsite Soils	Table L-9	9E-03	NQ
	Ingestion of Groundwater	Table L-10	3E-02	2E-07
	TOTAL RECEPTOR RISK (Nc & Car)		6E-02	2E-07
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table L-7	NQ	1E-09
	Ingestion of Onsite Soils	Table L-8	2E-03	NQ
	Dermal Contact to Onsite Soils	Table L-9	5E-03	NQ
	Ingestion of Groundwater	Table L-10	7E-03	2E-07
	TOTAL RECEPTOR RISK (Nc & Car)		1E-02	2E-07

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-16

CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-120B
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table T-5	NQ	NQ
	Ingestion of Onsite Soils	Table T-6	8E-03	NQ
	Dermal Contact to Onsite Soils	Table T-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*8E-03*	*0E+00*
PRISON WORKER	Inhalation of Dust Ambient Air	Table T-5	NQ	NQ
	Ingestion of Onsite Soils	Table T-6	5E-03	NQ
	Dermal Contact to Onsite Soils	Table T-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*5E-03*	*0E+00*
ON-SITE CONSTRUCTION WORKERS	Inhalation of Dust in Ambient Air	Table T-5	NQ	NQ
	Ingestion of Onsite Soils	Table T-6	2E-04	NQ
	Dermal Contact to Onsite Soils	Table T-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*2E-04*	*0E+00*
DAY CARE CENTER CHILD	Inhalation of Dust in Ambient Air	Table T-5	NQ	NQ
	Ingestion of Onsite Soils	Table T-6	5E-02	NQ
	Dermal Contact to Onsite Soils	Table T-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*5E-02*	*0E+00*
DAY CARE CENTER WORKER	Inhalation of Dust in Ambient Air	Table T-5	NQ	NQ
	Ingestion of Onsite Soils	Table T-6	5E-03	NQ
	Dermal Contact to Onsite Soils	Table T-7	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*5E-03*	*0E+00*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-17
CALCULATION OF TOTAL NONCARCINOGENIC AND CARCINOGENIC RISKS
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	EXPOSURE/RISK CALCULATIONS Table Number	HAZARD INDEX	CANCER RISK
PRISON INMATE	Inhalation of Dust in Ambient Air	Table O-7	NQ	1E-10
	Ingestion of Soil	Table O-8	8E-04	5E-08
	Dermal Contact to Soil	Table O-9	NQ	NQ
	Ingestion of Ground Water	Table O-11	1E-04	NQ
	Inhalation of Ground Water	Table O-10	NQ	NQ
	Dermal Contact to Ground Water	Table O-12	8E-06	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*9E-04*	*5E-08*
PRISON WORKER	Inhalation of Dust in Ambient Air	Table O-7	NQ	4E-11
	Ingestion of Soil	Table O-8	5E-04	4E-08
	Dermal Contact to Soil	Table O-9	NQ	NQ
	Ingestion of Ground Water	Table O-11	4E-05	NQ
	Inhalation of Ground Water	Table O-10	NQ	NQ
	Dermal Contact to Ground Water	Table O-12	5E-06	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*6E-04*	*4E-08*
CONSTRUCTION WORKER	Inhalation of Dust in Ambient Air	Table O-7	NQ	2E-11
	Ingestion of Soil	Table O-8	3E-03	7E-09
	Dermal Contact to Soil	Table O-9	NQ	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*3E-03*	*7E-09*
WORKER AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table O-7	NQ	4E-11
	Ingestion of Soil	Table O-8	5E-04	4E-08
	Dermal Contact to Soil	Table O-9	NQ	NQ
	Ingestion of Ground Water	Table O-11	4E-05	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*6E-04*	*4E-08*
CHILD AT ON-SITE DAY CARE CENTER	Inhalation of Dust in Ambient Air	Table O-7	NQ	2E-11
	Ingestion of Soil	Table O-8	5E-03	8E-08
	Dermal Contact to Soil	Table O-9	NQ	NQ
	Ingestion of Ground Water	Table O-11	2E-04	NQ
	TOTAL RECEPTOR RISK (Nc & Car)		*5E-03*	*8E-08*

NQ= Not Quantified due to lack of toxicity data.

TABLE 3.5-18

TOTAL CONSTRUCTION WORKER RISK FROM EXPOSURE TO ALL AREAS OF CONCERN (AOCs)

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Area of Concern	Hazard Index	Cancer Risk
SEAD-120B	2E-04	1E-12
SEAD-43, 56, 69	8E-03	1E-07
SEAD-44A	3E-03	1E-07
SEAD-44B	3E-04	2E-09
SEAD-52	4E-04	5E-09
SEAD-62	2E-02	1E-09
SEAD-64C	3E-03	7E-09
TOTAL *	3E-02	2E-07

* Total Hazard Index and Cancer Risk are calculated as the risk due to a one-year construction project where exposure occurs at each AOC for a portion of the project.

TABLE 3.5-19
IEUBK LEAD MODEL INPUT VALUES
Decision Document – Mini-Risk Assessment – Other Sites
Seneca Army Depot Activity

Air Concentration	0.100 µg Pb/m^3 (default)
Other Inhalation Parameters	Standard Model defaults for all
Time Outdoors	value varies with age
Inhalation Rate	value varies with age
Lung Absorption	32%
Dietary Lead Intake	Std. Model Defaults: value varies with age
Soil Concentration	625 ppm
Dust Concentration	200 ppm (default)
Soil Ingestion as percent of total soil and dust ingestion	45% (default)
Soil/dust Ingestion rates	5/7 x Std. default values (to represent time at day care center): value varies with age
Maternal blood concentration contribution (for infant)	2.5 µg Pb/dL (default)
Drinking Water Concentration	4.0 µg/L (default)
Drinking Water Ingestion Rate	Std. Model Defaults: value varies with age
Bioavailability Parameters for Ingestion Absorption	Std. Model defaults

TABLE 3.6-1
POLICY GOALS, ECOLOGICAL ASSESSMENT AND MEASUREMENT ENDPOINTS, AND DECISION RULES
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Policy Goals	Assessment Endpoint	Measurement Endpoint	Decision Rule
Policy Goal 1: The conservation of threatened and endangered species (TES) and their critical habitats	**Assessment Endpoint 1:** No reduction in numbers of any state- or federally-designated TES	**Measurement Endpoint 1:** Biosurveys for TES plants and animals; COPC concentration in physical media and predicted concentration in prey species	**Decision Rule for Assessment Endpoint 1:** If TES are not present, or COPC Maximum concentrations in the media do not exceed toxicity screening thresholds or dietary NOAELS (i.e., HQ<1), the assessment endpoint is met and TES are not at risk
Policy Goal 2: The protection of terrestrial and avian populations and ecosystems	**Assessment Endpoint 2:** No substantial adverse effect on populations of small mammals (i.e., deer mouse, short-tailed) or foraging bird species (i.e., American robin).	**Measurement Endpoint 2:** Lowest chronic, dietary, non-lethal effect level of COPCs on mice, shrew, and robins.	**Decision Rule for Assessment Endpoint 2:** If ratios of estimated exposure concentrations predicted from COPC maximum/average concentrations in soil to dietary limits corresponding to NOAEL toxicity reference values for adverse effects on receptor species (HQs) are <1, then Assessment endpoint 2 is met and indigenous receptor species populations are not at risk.

COPC = constituent of potential concern.
TES = threatened and endangered species.
NOAEL = no observed adverse effect level.
LOAEL = lowest observed adverse effect level.
HQ = hazard quotient.

TABLE 3.6-2
WILDLIFE INTAKE RATES
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Receptor	Body Weight (kg) (1)	Trophic Level(2)	Foraging Factor(3)	Dietary Breakdown		
				Plant (kg/day)	Animal (kg/day)	Soil (kg/day)
Deer Mouse	0.020	3	Variable	0.00216	0.00216	0.000088
Short-tailed Shrew	0.015	3	Variable	0.00048	0.00852	0.00020
American Robin	0.077	3	Variable	0.03658	0.04656	0.00965

Notes:

(1) Body weight of deer mouse based on mean body weight for female deer mouse.
Body weight of short-tailed shrew based on mean body weight of adult male short-tailed shrew during fall.

(2) Trophic level: organisms are assigned to trophic levels of 1 (producer), 2 (herbivore), 3 (1st order carnivore), and 4 (top carnivore) within the food web.

(3) Foraging factor: adjustment factor (from 0 to 1) based upon an organism's total time of exposure to unit-based contaminants. Fo this risk assessment, site specific foraging factors have been computed for each receptor. Factors considered include site area receptor species home range, and duration of active residence in New York area. Specific factors listed below.
*Source: Wildlife Exposure Factors Handbook, USEPA 1993 and USEPA 1997.

Site Foraging Factors Inputs: Mouse Home Range = 0.06 hectares, resides in NY 12 months
Shrew Home Range = 0.39 hectares, resides in NY 12 months
Robin Home Range = 0.16 hectares, resides in NY 7 months

SEAD-9: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Prison: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-58: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-64A: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-64B: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-64C: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-64D: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-66: Mouse SFF = 1; Shrew SFF = 1; Robin SFF = 0.583
Sead-68: Mouse SFF = 0.67; Shrew SFF = 0.10; Robin SFF = 0.15
Sead-70: Mouse SFF = 1; Shrew SFF = 0.95; Robin SFF = 0.583

TABLE 3.6-3
ENVIRONMENTAL FATE AND TRANSPORT PROPERTIES
FOR CHEMICALS OF POTENTIAL CONCERN
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Soil to Plant Transfer Factors (STP)			Trophic Level 2 BAF (invertebrates)	
	logKow [1]	STP [2]	Source	BAF	Source
Volatiles					
1,1,2,2-Tetrachloroethane	2.56	1.28E+00	Travis & Arms 1988	1.00E+00	default
Benzene	2.11	2.34E+00	Travis & Arms 1988	2.45E+01	Sample et al. 1996
Methyl isobutyl ketone	1.09	9.08E+00	Travis & Arms 1988	4.73E+00	Sample et al. 1996
Tetrachloroethene	2.60	1.22E+00	Travis & Arms 1988	1.00E+00	default
Trichloroethene	2.60	1.22E+00	Travis & Arms 1988	6.76E+01	Sample et al. 1996
PAHs					
2-Methylnaphthalene	4.11	1.63E-01	Travis & Arms 1988	3.42E-01	Beyer 1990
Acenaphthene	3.92	2.10E-01	Travis & Arms 1988	3.42E-01	Beyer 1990 (BAP as surrogate)
Acenaphthylene	4.07	1.72E-01	Travis & Arms 1988	1.00E+00	default
Anthracene	4.45	1.04E-01	Travis & Arms 1988	5.10E-02	Beyer 1990
Benzo(a)anthracene	5.90	1.51E-02	Travis & Arms 1988	1.25E-01	Beyer 1990
Benzo(a)pyrene	6.04	1.02E+00	USEPA 1994	4.50E+00	USEPA 1994
Benzo(b)fluoranthene	6.57	6.17E-03	Travis & Arms 1988	3.20E-01	Beyer 1990
Benzo(ghi)perylene	7.10	3.05E-03	Travis & Arms 1988	2.40E-01	Beyer 1990
Benzo(k)fluoranthene	6.85	4.25E-03	Travis & Arms 1988	2.53E-01	Beyer 1990
Chrysene	5.61	2.22E-02	Travis & Arms 1988	1.75E-01	Beyer 1990
Dibenz(a,h)anthracene	6.36	8.16E-03	Travis & Arms 1988	1.75E-01	Beyer 1990
Fluoranthene	5.22	3.72E-02	Travis & Arms 1988	7.92E-01	Beyer 1990
Fluorene	4.18	1.49E-01	Travis & Arms 1988	3.42E-01	Beyer 1990
Indeno(1,2,3-cd)pyrene	7.70	1.37E-03	Travis & Arms 1988	4.19E-01	Beyer 1990
Naphthalene	3.36	4.43E-01	Travis & Arms 1988	3.42E-01	Beyer 1990
Phenanthrene	4.46	1.02E-01	Travis & Arms 1988	1.22E-01	Beyer 1990
Pyrene	5.09	4.43E-02	Travis & Arms 1988	9.20E-02	Beyer 1990
Semivols					
4-Methylphenol	1.94	2.93E+00	Travis & Arms 1988	1.00E+00	default
Bis(2-ethylhexyl)phthalate	4.20	5.10E-03	USEPA 1994	1.20E+01	USEPA 1994
Butylbenzylphthalate	4.78	1.00E+00	default	1.00E+00	default
Carbazole	1.00	1.00E+00	default	1.15E+02	AQUIRE 1997
Dibenzofuran	4.17	1.51E-01	Travis & Arms 1988	1.00E+00	default
Di-n-butylphthalate	4.57	8.84E-02	Travis & Arms 1988	1.25E-01	USEPA 1994 (BEHP as surrogate)
Di-n-octylphthalate	9.20	1.60E-04	USEPA 1994	4.90E+03	USEPA 1994
Hexachlorobenzene	5.15	4.09E-02	Travis & Arms 1988	1.00E+00	default
Pentachlorophenol	4.50	3.40E-01	USEPA 1994	8.30E-02	USEPA 1994
Phenol	1.48	5.40E+00	Travis & Arms 1988	1.00E+00	default
Pesticides					
4,4'-DDD	5.99	1.34E-02	Travis & Arms 1988	1.00E-01	USEPA 1994 (DDT as surrogate)
4,4'-DDE	5.77	1.79E-02	Travis & Arms 1988	2.50E-02	Menzie et al. 1992
4,4'-DDT	5.90	1.00E-02	USEPA 1994	1.00E-01	USEPA 1994
Aldrin	5.52	1.00E-02	USEPA 1994	3.50E+00	USEPA 1994
Aroclor-1254	6.47	7.05E-03	Travis & Arms 1988	4.50E+00	USEPA 1994
Dieldrin	4.61	1.20E-01	USEPA 1994	4.70E-02	USEPA 1994
Endosulfan I	3.55	3.44E-01	Travis & Arms 1988	2.50E-01	Menzie et al. 1992
Endosulfan II	3.62	3.13E-01	Travis & Arms 1988	2.50E-01	Menzie et al. 1992 (endosulfan I as surrogate)
Endosulfan sulfate	3.66	2.97E-01	Travis & Arms 1988	2.50E-01	Menzie et al. 1992 (endosulfan I as surrogate)
Endrin ketone	5.06	2.20E-02	USEPA 1995	1.80E-01	USEPA 1994 (endrin as surrogate)
Heptachlor	5.44	4.90E-02	USEPA 1994	2.40E-01	USEPA 1994
Heptachlor epoxide	5.4	7.00E-02	USEPA 1994	1.30E-01	USEPA 1994
alpha-Chlordane	5.93	1.45E-02	Travis & Arms 1988	2.40E-01	USEPA 1994 (chlordane as surrogate)
delta-BHC	4.14	3.00E-01	Bell 1992	2.80E+02	AQUIRE 1997
gamma-BHC (Lindane)	3.61	4.00E-01	Bell 1992	4.03E+02	Sample et al. 1996
gamma-Chlordane	6.00	2.40E-02	USEPA 1994 (chlordane as surro	2.40E-01	USEPA 1994 (chlordane as surrogate)
Herbicides					
2,4,5-T	0.60	1.74E+01	Travis & Arms 1988	1.61E-06	
2,4-DB		no data		no data	default
Dicamba	0.48	2.04E+01	Travis & Arms 1988	1.21E-06	
Dichloroprop		1.00E+00	Default	1.00E+00	default
MCPP		1.00E+00	Default	1.00E+00	default

TABLE 3.6-3
ENVIRONMENTAL FATE AND TRANSPORT PROPERTIES
FOR CHEMICALS OF POTENTIAL CONCERN
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Soil to Plant Transfer Factors (STP)			Trophic Level 2 BAF (invertebrates)	
	logKow[1]	STP[2]	Source	BAF	Source
Nitroaromatics					
2,4-Dinitrotoluene	2.20	2.07E+00	Travis & Arms 1988	6.37E-05	
2,4,6-Trinitrotoluene	1.90	3.09E+00	Travis & Arms 1988	3.19E-05	
Tetryl	--	1.00E+00	Default	1.00E+00	default
Metals					
Arsenic	NA	4.00E-02	NRC 1992	5.00E-02	Beyer and Cromartie 1987
Cadmium	NA	5.50E-01	NRC 1992	2.15E-02	Ash and Lee 1980
Copper	NA	4.00E-01	NRC 1992	6.82E-01	MA et al. 1983
Lead	NA	5.80E-03	NRC 1992	2.10E+00	MA et al. 1983
Mercury	NA	9.00E-01	NRC 1992	2.30E+01	USEPA 1994
Potassium	NA	1.00E+00	NRC 1992	1.00E+00	default
Selenium	NA	6.20E+00	USEPA 1992	5.00E+00	Beyer & Cromartie, 1987
Zinc	NA	1.40E+00	NRC 1992	9.90E+00	Beyer & Cromartie, 1987

Notes:

(1) Logarithmic value of octonol-water partition coefficient. LogKow source: Montgomery, J.H. and L.M. Welkom, *Groundwater Chemicals Desk Reference*, 1989.

(2) Soil to plant uptake factor. For organic chemicals without reported STP values, the STP was estimated from the Kow as follows:

logSTP = 1.588 - 0.578 x logKow (Travis and Arms 1988)

(3) This table includes STP and BAF factor information available from Parsons ES-Tampa current database (8/99).

(4) BAF = Bioaccumulation factor.

(5) For chemicals without reported STP or BAF values, surrogate or default values were assigned based on best professional judgement.

TABLE 3.6-4
NOAEL TOXICITY REFERENCE VALUES - MAMMALS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF[1]	Study Duration CF[1]	Total CF[1]	TRV[2] (mg/kg/day)
Volatile Organics								
Acetone	rat	NOAEL, gavage, 90-day, liver and kidney damage	Sample et al. 1996	1.00E+02	1	10	10	1.00E+01
Benzene	mouse	LOAEL, oral gavage, days 6-12 gestation crit. lifestage, reproduction	Sample et al. 1996	2.64E+02	10	1	10	2.64E+01
Chloroform	rat	NOAEL, oral intubation, 13 wks., systematic	Sample et al. 1996	1.50E+02	1	10	10	1.50E+01
Methyl ethyl ketone	rat	NOAEL, water, 2 generations, reproduction	Sample et al. 1996	1.77E+03	10	1	10	1.77E+02
Methyl isobutyl ketone	rat	NOAEL, oral gavage, 13 wks, liver and kidney function	Sample et al. 1996	2.50E+02	1	10	10	2.50E+01
Methylene chloride	rat	NOAEL, water, 2 years, liver histology	Sample et al. 1996	5.85E+00	1	1	1	5.85E+00
Toluene	mouse	LOAEL, gavage, day 6-12 gestation crit. lifestage, reproduction	Sample et al. 1996	2.60E+02	10	1	10	2.60E+01
Total Xylenes	mouse	NOAEL, gavage, day 6-15 gestation crit. lifestage, reproduction	Sample et al. 1996	2.10E+00	1	1	1	2.10E+00
Semivolatile Organics								
2-Methylnaphthalene	mouse	LOAEL, diet, 81 wks., respitory (naphthalene used as surrogate)	ATSDR 1995	7.16E+01	10	1	10	7.16E+00
4-Methylphenol	mink	NOAEL, diet, 6 mos. crit. lifestage, reproduction (Methylphenol, 2- (o-cresol) as surrogate)	Sample et al. 1996	2.19E+02	1	1	1	2.19E+02
Acenaphthene	mouse	LOAEL, oral gavage, 13wk, hepatic effects	ATSDR 1995	1.75E+02	10	10	100	1.75E+00
Acenaphthylene	mouse	LOAEL, oral intubation, gestation days 7-16 (crit. lifestage), reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Anthracene	mouse	NOAEL, oral gavage, 13 wks., hepatic effects	ATSDR 1995	1.00E+03	1	10	10	1.00E+02
Benzo(a)anthracene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Benzo(a)pyrene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00

TABLE 3.6-4
NOAEL TOXICITY REFERENCE VALUES - MAMMALS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF[1]	Study Duration CF[1]	Total CF[1]	TRV[2] (mg/kg/day)
Benzo(b)fluoranthene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Benzo(ghi)perylene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1 00E+01	10	1	10	1.00E+00
Benzo(k)fluoranthene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
bis(2-ethylhexyl)phthalate	mouse	NOAEL, diet, 105 days crit. lifestage, reproduction	Sample et al. 1996	1.83E+01	1	1	1	1.83E+01
Chrysene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Dibenz(a,h)anthracene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Dibenzofuran	mammal	No data available					--	no data
Di-n-butylphthalate	mouse	NOAEL, diet, 105 days crit. lifestage, reproduction	Sample et al. 1996	5.50E+02	1	1	1	5.50E+02
Di-n-octylphthalate	mouse	NOAEL, diet, 105 days crit. lifestage, reproduction (BEHP as surrogate)	Sample et al. 1996	1.83E+01	1	1	1	1.83E+01
Fluoranthene	mouse	LOAEL, oral gavage, 13 wks., hepatic effects	ATSDR 1995	1.25E+02	10	10	100	1.25E+00
Fluorene	mouse	LOAEL, oral gavage, 13 wks., hepatic effects	ATSDR 1995	1.25E+02	10	10	100	1.25E+00
Indeno(1,2,3-cd)pyrene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Naphthalene	mouse	LOAEL, diet, 81 wks., respitory	ATSDR 1995	7.16E+01	10	1	10	7.16E+00
Pentachlorophenol	rat	NOAEL, diet, 75 days and through gestation and lactation crit. lifestage, reproduction	Sample et al. 1996	2.40E-01	1	1	1	2.40E-01
Phenanthrene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00

TABLE 3.6-4
NOAEL TOXICITY REFERENCE VALUES - MAMMALS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF[1]	Study Duration CF[1]	Total CF[1]	TRV[2] (mg/kg/day)
Pyrene	mouse	LOAEL, oral intubation, gestation days 7-16 crit. lifestage, reproduction (benzo(a)pyrene used as surrogate)	Sample et al. 1996	1.00E+01	10	1	10	1.00E+00
Pesticides/PCBs								
4,4'-DDD	rat	NOAEL, diet, 2 year crit. lifestage, reproduction (DDT used as surrogate)	Sample et al. 1996	8.00E-01	1	1	1	8.00E-01
4,4'-DDE	rat	NOAEL, diet, 2 year crit. lifestage, reproduction (DDT used as surrogate)	Sample et al. 1996	8.00E-01	1	1	1	8.00E-01
4,4'-DDT	rat	NOAEL, diet, 2 year crit. lifestage, reproduction	Sample et al. 1996	8.00E-01	1	1	1	8.00E-01
Aldrin	rat	NOAEL, diet, 3 generations, reproduction	Sample et al. 1996	2.00E-01	1	1	1	2.00E-01
Aroclor-1254	oldfield mouse	LOAEL, diet, 12 mos. crit. lifestage, reproduction	Sample et al. 1996	6.80E-01	10	1	10	6.80E-02
Dieldrin	rat	LOAEL, diet, 3 yr. crit. lifestage, reproduction.	Sample et al. 1996	2.00E-01	10	1	10	2.00E-02
Endosulfan	rat	NOAEL, oral intubation, 30 days, reproduction	Sample et al. 1996	1.50E+00	1	10	10	1.50E-01
Endrin	mouse	LOAEL, diet, 120 days crit. lifestage, reproduction	Sample et al. 1996	9.20E-01	10	1	10	9.20E-02
Heptachlor	mink	LOAEL, diet, 181 days crit. lifestage, reproduction	Sample et al. 1996	1.00E+00	10	1	10	1.00E-01
Heptachlor epoxide	mink	LOAEL, diet, 181 days crit. lifestage, reproduction (heptachlor as surrogate)	Sample et al. 1996	1.00E+00	10	1	10	1.00E-01
delta-BHC	rat	NOAEL, diet, 4 generations, reproduction (BHC-mixed isomers)	Sample et al. 1996	1.60E+00	1	1	1	1.60E+00
gamma-BHC (Lindane)	rat	NOAEL, diet, 3 generations, reproduction.	Sample et al. 1996	8.00E+00	1	1	1	8.00E+00
gamma-Chlordane	mouse	NOAEL, diet, 6 generations, reproduction	Sample et al. 1996	4.58E+00	1	1	1	4.58E+00
Metals								
Arsenic	mouse	LOAEL, water, 3 generations, reproduction	Sample et al. 1996	1.26E+00	10	1	10	1.26E-01
Cadmium	rat	NOAEL, gavage, 6 weeks mating and gestation crit. lifestage, reproduction	Sample et al. 1996	1.00E+00	1	1	1	1.00E+00
Copper	rat	NOAEL, diet, 13 wks., gastrointestinal effects	ATSDR 1990	1.40E+01	1	10	10	1.40E+00

TABLE 3.6-4
NOAEL TOXICITY REFERENCE VALUES - MAMMALS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF(1)	Study Duration CF(1)	Total CF(1)	TRV(2) (mg/kg/day)
Lead	rat	NOAEL, diet, 3 generations, reproduction	Sample et al. 1996	8.00E+00	1	1	1	8.00E+00
Mercury	mouse	NOAEL, diet, 20 mo., mortality, liver and kidney histology, reproduction	Sample et al. 1996	1.32E+01	1	1	1	1.32E+01
Selenium	rat	NOAEL, water, 1 yr througth 2 generations, reproduction	Sample et al. 1996	2.00E-01	1	1	1	2.00E-01
Zinc	rat	NOAEL, diet, day 1-16 of gestation crit. lifestage, reproduction	Sample et al. 1996	1.60E+02	1	1	1	1.60E+02

Notes:

(1) CF = conversion factor. Conversion factors - endpoint (non-NOAEL = 10) and study duration (non-chronic = 10)

(2) The toxicity reference value was derived by dividing the effect dose by the total conversion factor.

(3) This table includes TRV factor information available from Parsons ES-Tampa current database (8/99).

(4) V = Volatile (MW<200, H>1E-05); SV = Semi-Volatile; PAH = Polynuclear Aromatic Hydrocarbon; PES = Pesticide; PCB = Polychlorinated Biphenyl; ING = Inorganic

(5) Mammals: acute = <90days, subchronic = 90days - 1yr, chronic = >1yr. Birds: acute = <18days, subchronic = 18days - 10wks, chronic = >10wks. Source: Sample et al. 1996
If the study is during a critical life stage (gestation or development), the study may be considered a chronic exposure.

(6) The product of the appropriate uncertainty factors from each uncertainty category becomes the total uncertainty factor applied to develop the constituent-specific TRV.

TABLE 3.6-5
NOAEL TOXICITY REFERENCE VALUES - BIRDS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF1	Study Duration CF1	Total CF1	TRV2 (mg/kg/day)
Volatile Organic Compounds								
1,1,2,2-Tetrachloroethane		No data available						
Acetone	Japanese quail	NOAEL, 14-day old, diet, 5 days, survival	Hill and Camardese 1986	6.10E+03	1	10	10	6.10E+02
Methyl isobutyl ketone	red-winged blackbird	LD50, single gavage, survival	HSDB 1997	2.14E+01	10	10	100	2.14E-01
Total Xylenes	Japanese quail	NOAEL, 14-day old chicks, diet, 5 days, survival	Hill and Camardese 1986	3.06E+03	1	10	10	3.06E+02
Polynuclear Aromatic Hydrocarbons								
2-Methylnaphthalene	mallard	LOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	2.85E+02	10	1	10	2.85E+01
Acenaphthene	mallard	NOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	1.00E+03	1	1	1	1.00E+03
Acenaphthylene	mallard	NOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	1.00E+03	1	1	1	1.00E+03
Anthracene	mallard	NOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	1.00E+03	1	1	1	1.00E+03
Benzo(a)anthracene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Benzo(a)pyrene	chicken	Subchronic NOAEL, fertility and malformations	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Benzo(b)fluoranthene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Benzo(ghi)perylene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Benzo(k)fluoranthene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01

TABLE 3.6-5
NOAEL TOXICITY REFERENCE VALUES - BIRDS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF1	Study Duration CF1	Total CF1	TRV2 (mg/kg/day)
Chrysene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Dibenz(a,h)anthracene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Fluoranthene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Fluorene	mallard	LOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	2.85E+02	10	1	10	2.85E+01
Indeno(1,2,3-cd)pyrene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Naphthalene	mallard	LOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	2.85E+02	10	1	10	2.85E+01
Phenanthrene	mallard	LOAEL, diet, 7 months, physiological (mixed PAHs used as surrogate)	Eisler 1987	2.85E+02	10	1	10	2.85E+01
Pyrene	chicken	Subchronic NOAEL, Fertility and malformations (benzo(a)pyrene used as surrogate)	Rigdon and Neal 1963	4.00E+01	1	1	1	4.00E+01
Semi-volatile Organic Compounds								
4-Methylphenol	red-winged blackbird	LD50, single gavage, survival	Schafer et al. 1983.	2.06E+01	10	10	100	2.06E-01
Bis(2-ethylhexyl)phthalate	ringed dove	NOAEL, diet, 4 wks. crit. lifestage, reproduction	Sample et al. 1996	1.10E+00	1	1	1	1.10E+00
Dibenzofuran	red-winged blackbird	LC50, diet, 18 hours, survival	Schafer et al. 1983.	2.18E+01	10	10	100	2.18E-01
Di-n-butylphthalate	ringed dove	NOAEL, diet, 4 wks. crit. lifestage, reproduction	Sample et al. 1996	1.10E+00	1	10	10	1.10E-01

TABLE 3.6-5
NOAEL TOXICITY REFERENCE VALUES - BIRDS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF1	Study Duration CF1	Total CF1	TRV2 (mg/kg/day)
Di-n-octylphthalate	ringed dove	NOAEL, diet, 4 wks. crit. lifestage, reproduction [Bis(2-ethylhexyl)phthalate as surrogate]	Sample et al. 1996	1.10E+00	1	1	1	1.10E+00
Pentachlorophenol	Japanese quail	NOAEL, diet, 8 day, survival	Eisler 1989	3.49E+02	1	10	10	3.49E+01
Pesticides								
4,4'-DDD	Japanese quail	NOAEL, diet, 10 week, reproduction (DDT used as surrogate)	Sample et al. 1996	5.60E-01	1	10	10	5.60E-02
4,4'-DDE	Japanese quail	NOAEL, diet, 12 wks, reproduction, liver effects	Sample et al. 1996	5.60E-01	1	10	10	5.60E-02
4,4'-DDT	Japanese quail	NOAEL, diet, 10 week, reproduction	Sample et al. 1996	5.60E-01	1	10	10	5.60E-02
Aldrin	mallard	LOAEL, diet, 30 days, cumulative toxicity, mortality	Hudson et al. 1984	5.00E+00	10	1	10	5.00E-01
Aroclor-1254	chicken	NOAEL, egg production, hatchability, multi generation	Lillie et al. 1974	9.80E-01	1	1	1	9.80E-01
Dieldrin	barn owl	NOAEL, diet, 2 yr. crit. lifestage, reproduction.	Sample et al. 1996	7.70E-02	1	1	1	7.70E-02
Endosulfan I	gray partridge	NOAEL, diet, 4 wks crit. lifestage, reproduction (endosulfan as surrogate)	Sample et al. 1996	1.00E+01	1	10	10	1.00E+00
Endosulfan II	gray partridge	NOAEL, diet, 4 wks crit. lifestage, reproduction (endosulfan used as surrogate)	Sample et al. 1996	1.00E+01	1	1	1	1.00E+01
Endosulfan sulfate	gray partridge	NOAEL, diet, 4 wks crit. lifestage, reproduction (endosulfan as surrogate)	Sample et al. 1996	1.00E+01	1	10	10	1.00E+00
Endrin ketone	mallard	NOAEL, diet, >200 days, crit. lifestage, reproduction (endrin as surrogate)	Sample et al. 1996	3.00E-01	1	1	1	3.00E-01
Heptachlor	mallard	LD50, diet, 8days, mortality	AQUIRE 1997	4.80E+02	10	10	100	4.80E+00
Heptachlor epoxide	mallard	LD50, diet, 8days, mortality	AQUIRE 1997	4.80E+02	10	10	100	4.80E+00
alpha-Chlordane	red-winged blackbird	NOAEL, diet, 84 days, survival (total chlordane used as surrogate)	Sample et al. 1996	2.14E+00	1	1	1	2.14E+00
delta-BHC	Japanese quail	NOAEL, diet, 90 days critical lifestage, reproduction (BHC-mixed isomers used as surrogate)	Sample et al. 1996	5.60E-01	1	1	1	5.60E-01

TABLE 3.6-5
NOAEL TOXICITY REFERENCE VALUES - BIRDS
Decision Document - Mini Risk Assessment - Other Sites
Seneca Army Depot Activity

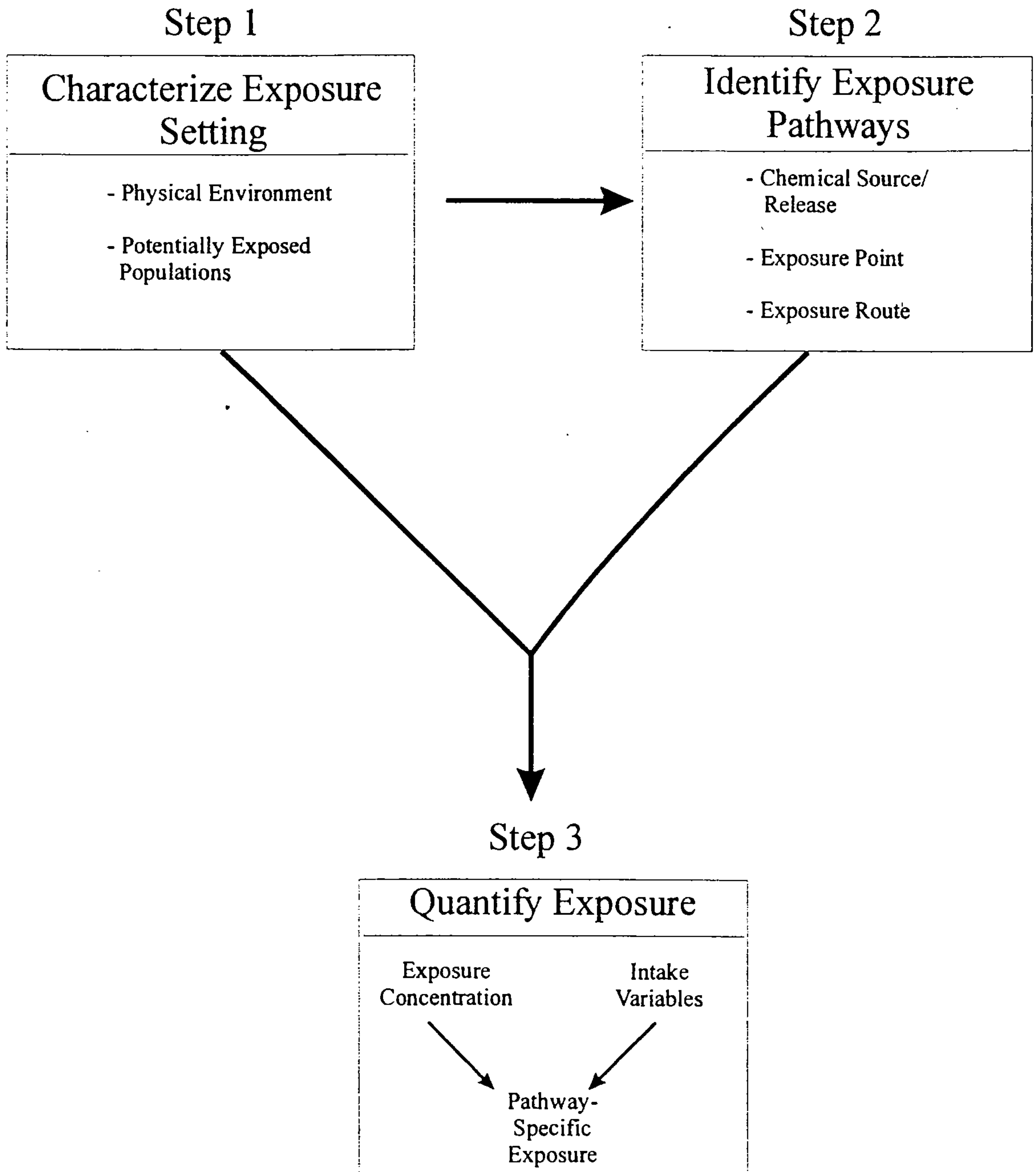
Constituent	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose (mg/kg/day)	Endpoint CF1	Study Duration CF1	Total CF1	TRV2 (mg/kg/day)
gamma-BHC (Lindane)	mallard	LOAEL, diet, 8 wks. crit. lifestage, reproduction.	Sample et al. 1996	2.00E+01	10	1	10	2.00E+00
gamma-Chlordane	red-winged blackbird	NOAEL, diet, 84 days, survival (total chlordane used as surrogate)	Sample et al. 1996	2.14E+00	1	1	1	2.14E+00
Metals								
Arsenic	brown-headed cowbird	NOAEL, diet, 7 mos, mortality	Sample et al. 1996	2.46E+00	1	1	1	2.46E+00
Cadmium	mallard	NOAEL, diet, 90 days, reproduction	Sample et al. 1996	1.45E+00	1	1	1	1.45E+00
Copper	chicken	NOAEL, 1-day old chicks, diet, 10 wks, growth, mortality	Sample et al. 1996	4.70E+01	1	1	1	4.70E+01
Lead	American Kestral	NOAEL, diet, 7 months reproduction	Sample et al. 1996	3.85E+00	1	1	1	3.85E+00
Mercury	Japanese quail	NOAEL, diet, reproduction	Sample et al. 1996	4.50E-01	1	1	1	4.50E-01
Selenium	mallard	NOAEL, diet, 100 days crit. lifestage, reproduction	Sample et al. 1996	4.00E-01	1	1	1	4.00E-01
Zinc	chicken	NOAEL, hens, diet, 44 wks. crit. lifestage, reproduction	Sample et al. 1996	1.45E+01	1	1	1	1.45E+01

1 CF = conversion factor.
2 The toxicity reference value was derived by dividing the effect dose by the total conversion factor.

TABLE 3.6-6
SUMMARY OF ECOLOGICAL HAZARD QUOTIENTS

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

	SEAD-9			Prison			SEAD-58			SEAD-64A			SEAD-64B			SEAD-64C			SEAD-64D			SEAD-66			SEAD-68			SEAD-70		
	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin	Mouse	Shrew	Robin
Volatile Organics																														
2-Butanone																														
Acetone				1.2E-01	3.9E-02	4.9E-03							3.3E-02	1.1E-02	1.4E-03													3.6E-02	1.1E-02	1.5E-03
Benzene										2.2E-04	1.1E-03	--																		
Chloroform				4.3E-04	1.9E-03	--																								
Methylene chloride							1.4E-02	3.5E-02	--																					
Methyl ethyl ketone				4.8E-04	2.3E-04	--							3.8E-04	1.8E-04	--				1.4E-04	6.5E-05	--									
Tetrachloroethene																									--	--	--			
Toluene				3.4E-03	1.7E-02	--				6.1E-04	3.2E-03	--													6.2E-03	4.9E-03	--			
Trichloroethene										--	--	--																		
Total Xylenes				4.1E-03	2.0E-02	9.2E-05																			4.6E-04	3.4E-04	3.8E-06			
Semivolatile Organics																														
2-Methylnaphthalene	2.2E-04	8.0E-04	1.2E-04	3.8E-04	1.4E-03	3.9E-04				1.2E-03	4.5E-03	1.3E-03							4.0E-04	1.5E-03	4.1E-04				1.7E-03	9.5E-04	6.5E-04			
4-Methylphenol				1.1E-03	1.8E-03	**3.5E+00**																								
Acenaphthene	4.8E-03	1.6E-02	1.9E-05	1.1E-02	3.7E-02	7.6E-05				9.1E-03	3.1E-02	6.3E-05													1.2E-03	6.2E-04	3.1E-06			
Acenaphthylene	3.8E-03	1.7E-02	4.5E-06							5.2E-02	2.3E-01	1.9E-04																		
Anthracene	5.5E-05	1.2E-04	2.7E-05	1.5E-04	3.2E-04	8.4E-05				2.3E-04	5.0E-04	1.3E-04													1.4E-05	4.6E-06	2.9E-06			
Benzo(a)anthracene	2.3E-02	1.0E-01	2.4E-03	2.3E-02	1.0E-01	3.6E-03				1.1E-01	4.7E-01	1.7E-02	7.4E-04	3.2E-03	1.2E-04				1.7E-03	7.3E-03	2.6E-04				1.2E-02	7.9E-03	6.8E-04			
Benzo(a)pyrene	5.9E-01	**2.6E+00**	1.3E-02	7.2E-01	**3.1E+00**	5.8E-02				**3.2E+00**	**1.4E+01**	2.6E-01	2.0E-02	8.8E-02	1.7E-03				4.6E-02	2.0E-01	3.7E-03				3.1E-01	2.1E-01	9.3E-03			
Benzo(b)fluoranthene				4.0E-02	2.0E-01	4.7E-03				3.8E-01	**1.9E+00**	4.5E-02	1.1E-03	5.5E-03	1.3E-04				6.3E-03	3.1E-02	7.5E-04				2.5E-02	1.9E-02	1.1E-03			
Benzo(ghi)perylene	1.4E-02	6.9E-02	9.5E-04	2.2E-02	1.1E-01	2.9E-03				1.2E-01	6.0E-01	1.6E-02	6.1E-04	3.0E-03	7.9E-05				2.1E-03	1.0E-02	2.7E-04				8.7E-03	6.5E-03	4.2E-04			
Benzo(k)fluoranthene				3.1E-02	1.5E-01	3.9E-03				1.8E-02	8.6E-02	2.2E-03	1.2E-03	5.7E-03	1.5E-04				3.5E-03	1.7E-02	4.5E-04				1.8E-02	1.3E-02	8.5E-04			
bis(2-Ethylhexyl)phthalate	6.7E-03	3.5E-02	4.3E-02	1.9E-01	**1.0E+00**	**1.1E+01**	1.8E-02	9.7E-02	**1.0E+00**	9.2E-01	**4.8E+00**	**5.1E+01**	6.8E-03	3.6E-02	3.8E-01	7.8E-02	4.1E-01	**4.3E+00**	7.8E-02	4.1E-01	**4.3E+00**				7.2E-03	5.8E-03	1.5E-01	3.9E-02	1.9E-01	**2.2E+00**
Butylbenzylphthalate																									--	--	--			
Carbazole	--	--	--	--	--	--				--	--	--													--	--	--			
Chrysene	3.1E-02	1.4E-01	2.6E-03	3.1E-02	1.4E-01	4.2E-03	4.6E-04	2.0E-03	6.3E-05	1.2E-01	5.4E-01	1.7E-02	1.0E-03	4.5E-03	1.4E-04				2.8E-03	1.2E-02	3.9E-04				1.7E-02	1.2E-02	8.8E-04			
Dibenz(a,h)anthracene	7.0E-03	2.9E-02	5.9E-04	7.3E-03	3.4E-02	1.0E-03				3.6E-02	1.7E-01	5.1E-03							9.7E-04	4.5E-03	1.4E-04				3.6E-03	2.6E-03	1.9E-04			
Dibenzofuran	--	--	2.7E-02	--	--	3.6E-01				--	--	2.6E-01													--	--	2.3E-02			
Di-n-butylphthalate	2.8E-06	8.9E-06	5.2E-02	3.1E-06	9.8E-06	8.0E-02				1.4E-05	4.6E-05	3.7E-01	6.0E-06	1.9E-05	1.5E-01	1.9E-06	6.2E-06	5.0E-02	3.8E-06	1.2E-05	9.9E-02							2.7E-06	8.1E-06	7.0E-02
Di-n-octylphthalate																			**2.2E+00**	**1.1E+01**	**1.2E+02**				3.5E-01	2.8E-01	**7.1E+00**			
Fluoranthene	1.9E-01	9.3E-01	7.0E-03	2.4E-01	**1.2E+00**	2.9E-02	2.0E-03	9.7E-03	2.4E-04	5.2E-01	**2.6E+00**	6.3E-02	2.6E-03	1.3E-02	3.2E-04				1.8E-02	8.9E-02	2.2E-03				7.6E-02	5.7E-02	3.4E-03	2.2E-03	1.0E-02	2.6E-04
Fluorene	4.0E-03	1.5E-02	3.9E-04	1.5E-02	5.4E-02	2.6E-03				1.6E-02	5.9E-02	2.9E-03													1.0E-03	5.9E-04	7.0E-05			
Indeno(1,2,3-cd)pyrene	2.8E-02	1.4E-01	1.3E-03	3.3E-02	1.7E-01	3.6E-03				1.7E-01	8.8E-01	1.9E-02							3.0E-03	1.5E-02	3.4E-04				1.3E-02	1.0E-02	5.5E-04			
Naphthalene	4.0E-04	9.9E-04	2.3E-04	1.7E-03	4.3E-03	1.6E-03				4.2E-03	1.1E-02	3.8E-03							3.9E-04	9.6E-04	3.4E-04				6.5E-04	2.5E-04	2.2E-04			
Pentachlorophenol																									3.4E-03	7.3E-04	3.4E-05			
Phenanthrene	3.4E-02	1.0E-01	4.5E-03	7.4E-02	2.2E-01	1.3E-02				7.7E-02	2.3E-01	1.4E-02	8.6E-04	2.6E-03	1.5E-04				2.9E-03	8.6E-03	5.1E-04				9.2E-03	4.2E-03	6.1E-04			
Phenol										--	--	--							--	--	--									
Pyrene	4.6E-02	1.6E-01	5.3E-03	5.2E-02	1.8E-01	7.9E-03	4.2E-04	1.5E-03	6.5E-05	1.0E-01	3.6E-01	1.6E-02	6.9E-04	2.4E-03	1.1E-04				3.1E-03	1.1E-02	4.7E-04				1.9E-02	1.0E-02	1.1E-03	5.0E-04	1.7E-03	7.7E-05
Pesticides/PCBs																														
4,4'-DDD	3.3E-04	1.4E-03	2.3E-02	5.8E-04	2.5E-03	5.6E-02				7.7E-05	3.3E-04	7.4E-03										1.2E-02	4.9E-02	8.0E-01						
4,4'-DDE	6.2E-04	1.9E-03	7.7E-02	5.4E-04	1.7E-03	7.4E-02				1.0E-04	3.2E-04	1.4E-02	2.9E-05	9.1E-05	4.0E-03							9.8E-02	3.1E-01	**1.2E+01**	2.0E-03	9.4E-04	1.0E-01			
4,4'-DDT	1.5E-03	6.4E-03	1.0E-01	5.5E-04	2.4E-03	5.4E-02				4.9E-04	2.1E-03	4.8E-02	5.3E-05	2.3E-04	5.2E-03							7.3E-01	**3.2E+00**	**5.1E+01**	1.8E-03	1.2E-03	6.4E-02			
Aldrin	4.6E-03	2.4E-02	9.6E-04																											
Aroclor-1254	**1.0E+00**	**5.3E+00**	3.3E-02																			5.8E-01	**3.0E+00**	1.9E-02						
delta-BHC	1.8E-02	9.3E-02	1.7E-02																											
Dieldrin	3.4E-03	6.6E-03	4.2E-03	7.9E-02	1.5E-01	1.1E-01				8.4E-03	1.6E-02	1.2E-02				5.3E-03	1.0E-02	7.5E-03												
Endosulfan I				--	--	5.1E-04	--	--	3.3E-04	--	--	8.5E-03										--	--	1.7E-03						
Endosulfan II																						--	--	8.1E-04						
Endosulfan sulfate										--	--	1.2E-03																		
Heptachlor																9.3E-04	3.9E-03	9.3E-05												
Heptachlor epoxide										4.9E-04	1.7E-03	5.5E-05	3.6E-04	1.3E-03	4.0E-05										7.0E-04	3.7E-04	2.9E-05			
alpha-Chlordane	--	--	3.2E-04	--	--	1.8E-04				--	--	4.8E-04										--	--	6.4E-04	--	--	4.0E-04			
gamma-BHC (Lindane)																						2.1E-01	**1.1E+00**	2.8E-01						
gamma-Chlordane	1.2E-05	5.6E-05	7.0E-05																						1.1E-04	7.8E-05	4.4E-04			
Nitroaromatics																														
2,4-Dinitrotoluene				**3.2E+00**	**1.1E+00**	--																								
2,4,6-Trinitrotoluene				1.8E-01	6.1E-02	--																								
Tetryl				--	--	--																								
Metals																														
Arsenic																									6.4E-01	3.9E-01	1.1E-01	**7.5E+00**	**2.8E+01**	**3.3E+00**
Cadmium				2.8E-02	4.4E-02	1.1E-01																								
Copper				**1.2E+01**	**5.5E+01**	**1.4E+00**																								
Lead	**2.5E+00**	**1.3E+01**	**1.8E+01**	**1.5E+01**	**7.9E+01**	**1.1E+02**				**1.1E+01**	**5.9E+01**	**8.3E+01**																		
Mercury	--	--	**1.8E+00**																											
Potassium				--	--	--																								
Selenium				**6.1E+00**	**2.6E+01**	**9.8E+00**										**6.4E+00**	**2.7E+01**	**1.0E+01**												
Zinc				**2.3E+00**	**1.2E+01**	**8.5E+01**																								
Herbicides																														
2,4-DB																									--	--	--			
2,4,5-T				2.3E-02	6.8E-03	--																			3.2E-02	1.5E-03	--			
Dicamba				9.7E-04	2.9E-04	--																								
Dichloroprop				--	--	--																								
MCPP				**1.7E+01**	**4.8E+01**	--																								



Source: US EPA 1989a

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DECISION DOCUMENT
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ENVIRONMENTAL ENGINEERING	763026-01001

FIGURE 3-1

EXPOSURE ASSESSMENT PROCESS

SCALE NA	May 2002

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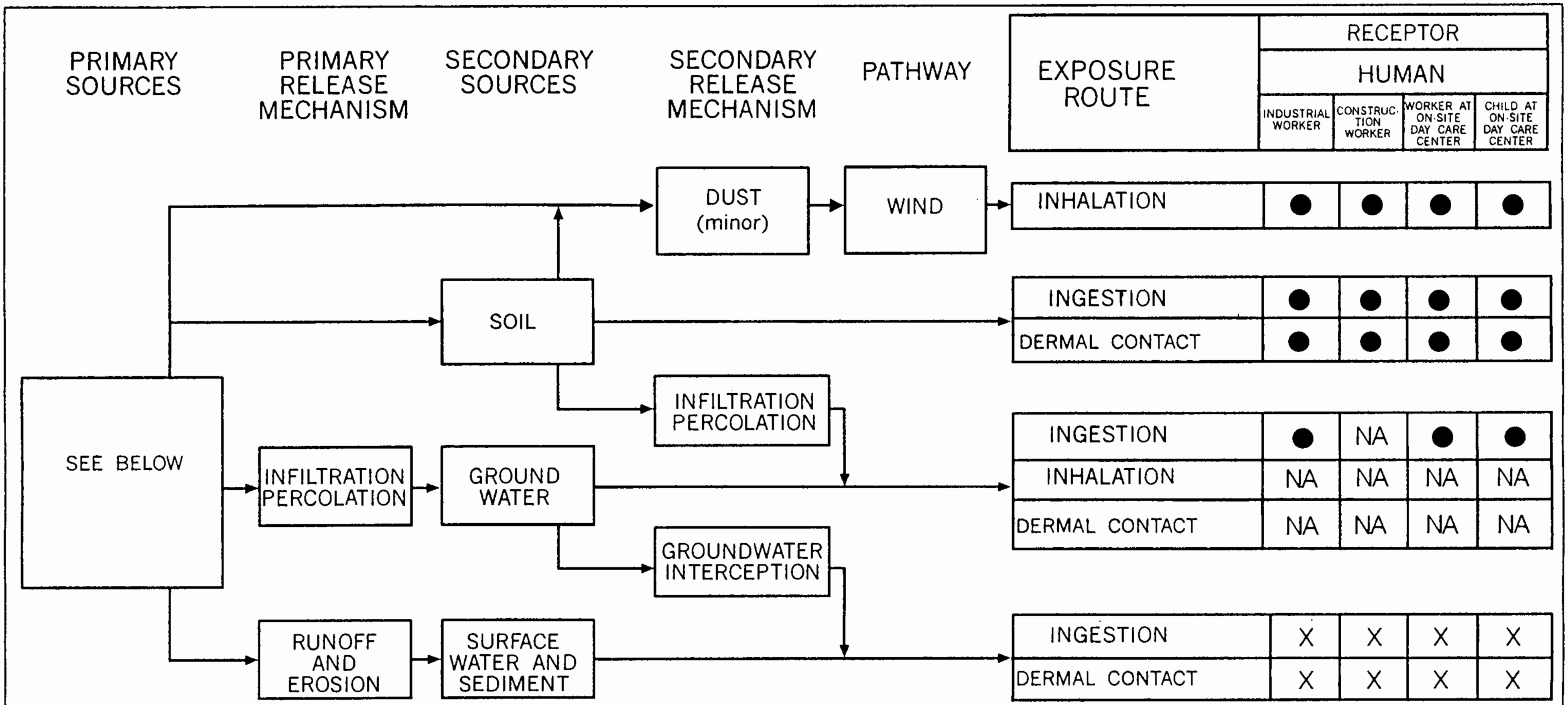

NOTE: EXPOSURE ROUTES APPLICABLE BASED ON PRESENCE OF MEDIA AT SITE AS SHOWN BELOW.

SEAD	PRIMARY SOURCE	SOIL	GW
9	OLD SCRAP WOOD	✓	NA
27	STEAM CLEANING WASTE TANK	✓	✓
28	UNDERGROUND WASTE OIL TANKS	✓	NA
23	UNDERGROUND WASTE OIL TANKS	✓	NA
34	UNDERGROUND WASTE OIL TANKS	✓	✓
66	PESTICIDE STORAGE FACILITY	✓	NA
68	PEST CONTROL SHOP	✓	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY NOT CONSIDERED

NA NOT APPLICABLE TO RECEPTOR

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FIGURE 3-2

EXPOSURE PATHWAY SUMMARY FOR PLANNED INDUSTRIAL DEVELOPMENT SCENARIO

SCALE NA | DATE MAY 2002

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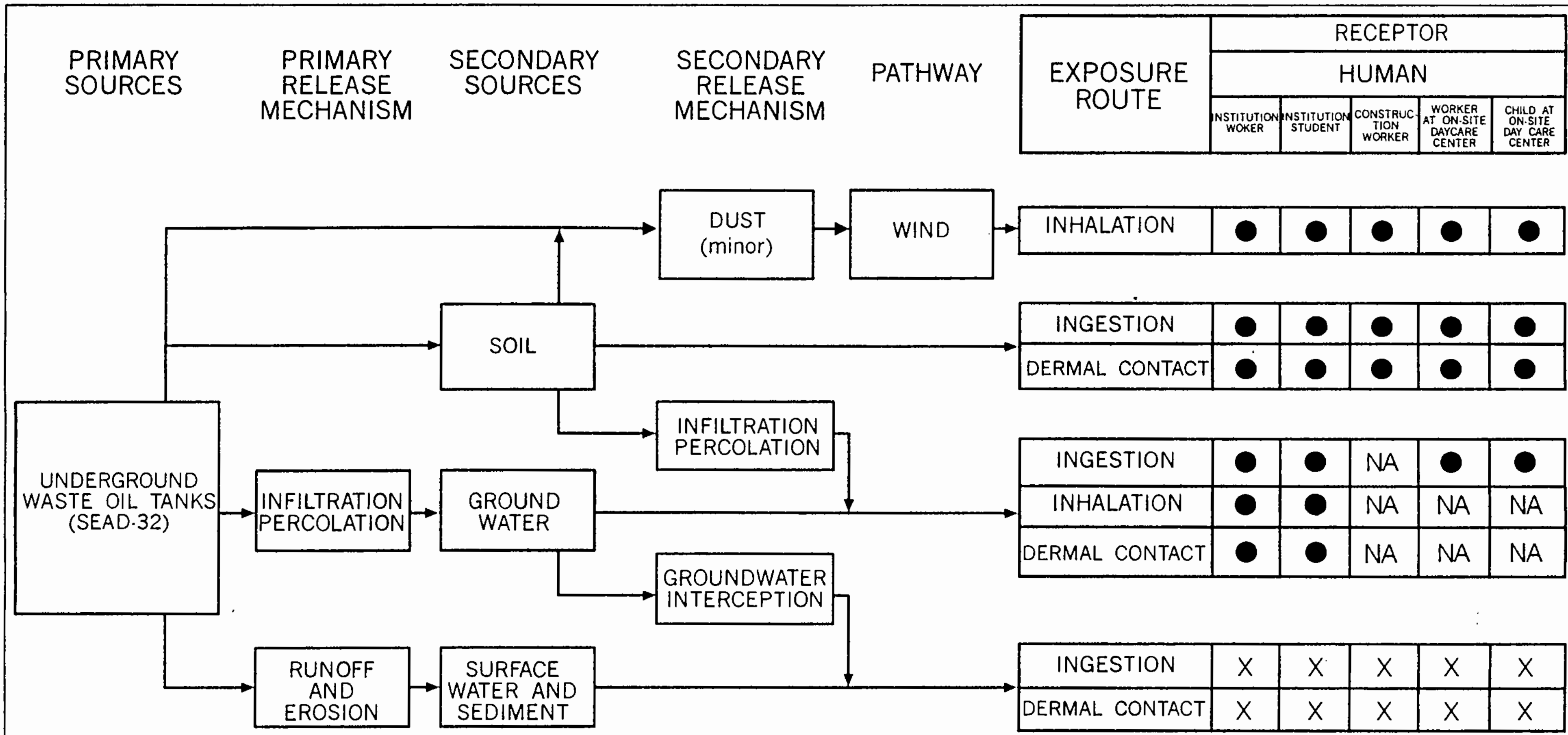

Exposure route	Institution Woker	Institution Student	Construction Worker	Worker at On-Site Daycare Center	Child at On-Site Day Care Center
Inhalation (dust/wind)	●	●	●	●	●
Ingestion (soil)	●	●	●	●	●
Dermal contact (soil)	●	●	●	●	●
Ingestion (groundwater)	●	●	NA	●	●
Inhalation (groundwater)	●	●	NA	NA	NA
Dermal contact (groundwater)	●	●	NA	NA	NA
Ingestion (surface water and sediment)	X	X	X	X	X
Dermal contact (surface water and sediment)	X	X	X	X	X

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY NOT CONSIDERED

NA NOT APPLICABLE RECEPTOR

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FIGURE 3-3
EXPOSURE PATHWAY SUMMARY FOR INSTITUTIONAL SCENARIO

SCALE NA | DATE MAY 2002

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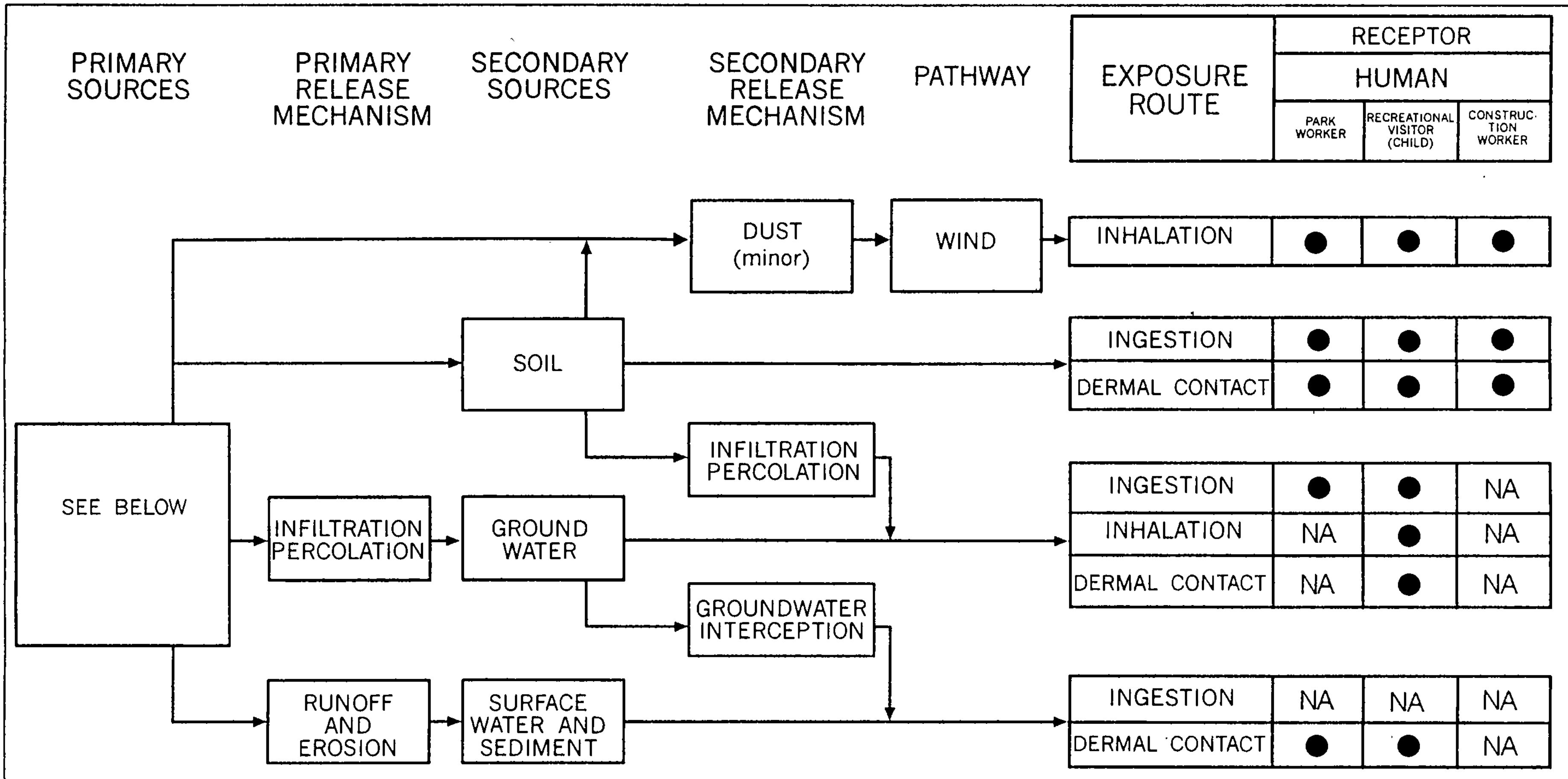

NOTE: EXPOSURE RATES APPLICABLE BASED ON PRESENCE OF MEDIA AT SITE AS SHOWN BELOW.

SEAD	PRIMARY SOURCE	SOIL	GW	SW	SED
58	DEBRIS	✓	✓	✓	✓
64B	DISPOSED GARBAGE	✓	✓	✓	✓
64D	DISPOSED GARBAGE	✓	✓	NA	NA
70	FILL	✓	✓	✓	✓

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK
X PATHWAY NOT CONSIDERED
NA NOT APPLICABLE TO RECEPTOR

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FIGURE 3-4
EXPOSURE PATHWAY SUMMARY FOR CONSERVATION AND RECREATION SCENARIO

SCALE NA | DATE MAY 2002

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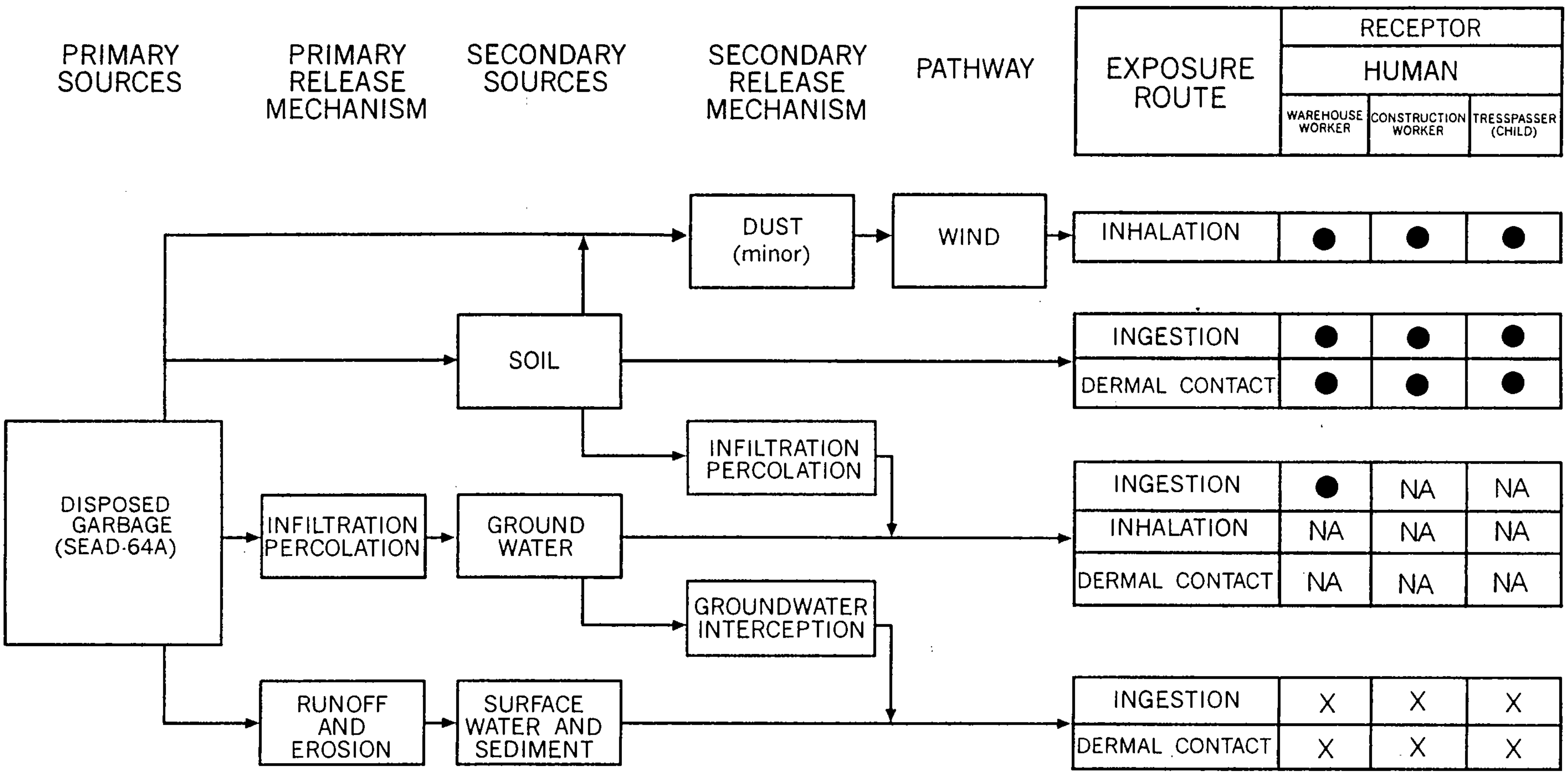

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY NOT CONSIDERED

NA NOT APPLICABLE RECEPTOR

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FIGURE 3-5

EXPOSURE PATHWAY SUMMARY FOR WAREHOUSE SCENARIO

SCALE NA | DATE MAY 2002

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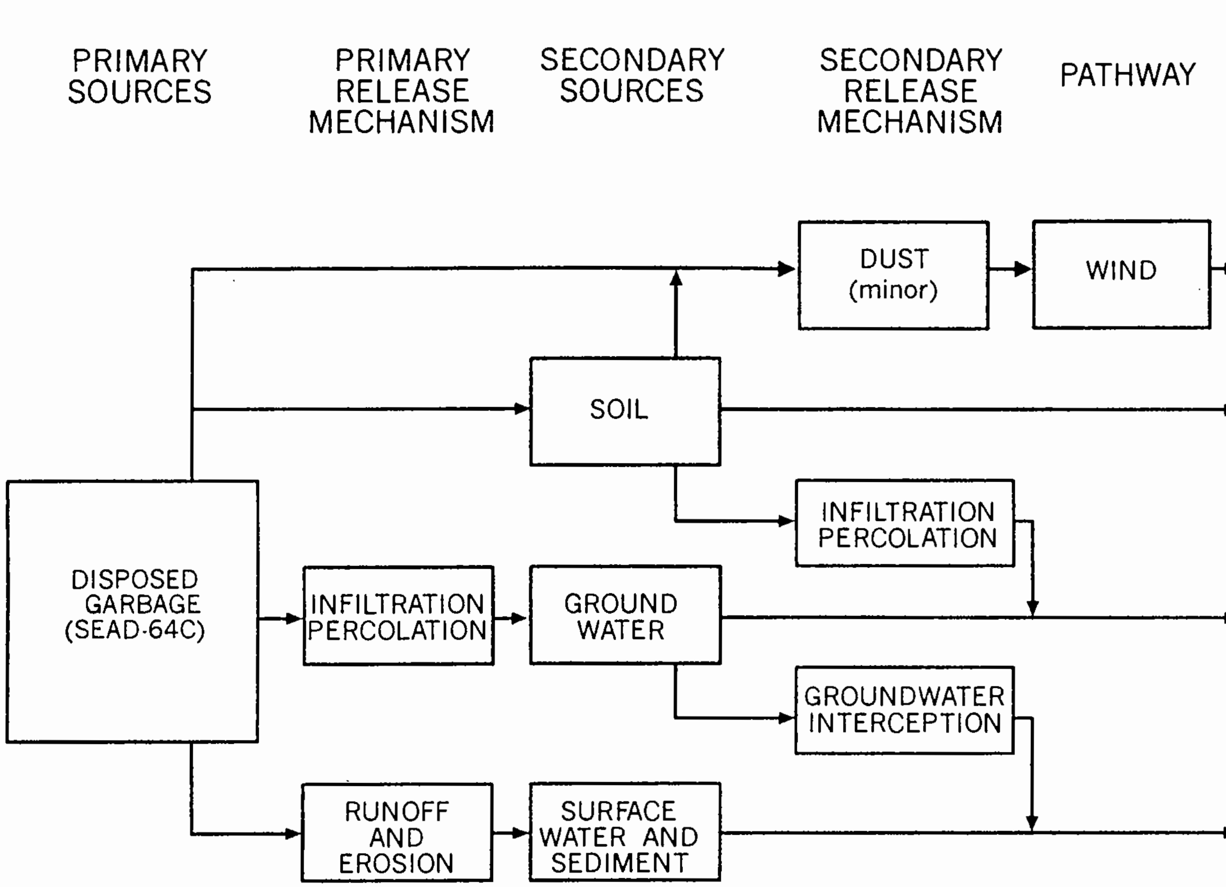

EXPOSURE ROUTE	RECEPTOR HUMAN: PRISON INMATE	PRISON WORKER	CONSTRUCTION WORKER	WORKER AT ON-SITE DAY CARE CENTER	CHILD AT ON-SITE DAY CARE CENTER
INHALATION	●	●	●	●	●
INGESTION	●	●	●	●	●
DERMAL CONTACT	●	●	●	●	●
INGESTION	●	●	NA	●	●
INHALATION	●	●	NA	NA	NA
DERMAL CONTACT	●	●	NA	NA	NA
INGESTION	X	X	X	X	X
DERMAL CONTACT	X	X	X	X	X

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

X PATHWAY NOT CONSIDERED

NA NOT APPLICABLE RECEPTOR

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DECISION DOCUMENT
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FIGURE 3-6

EXPOSURE PATHWAY SUMMARY FOR PRISON SCENARIO

SCALE NA | DATE MAY 2002

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Figure 3-7
IEUBK Model Results
Example Allowable Soil Pb Concentration for Day Care Scenario
Cumulative Probability of Blood Lead Concentration

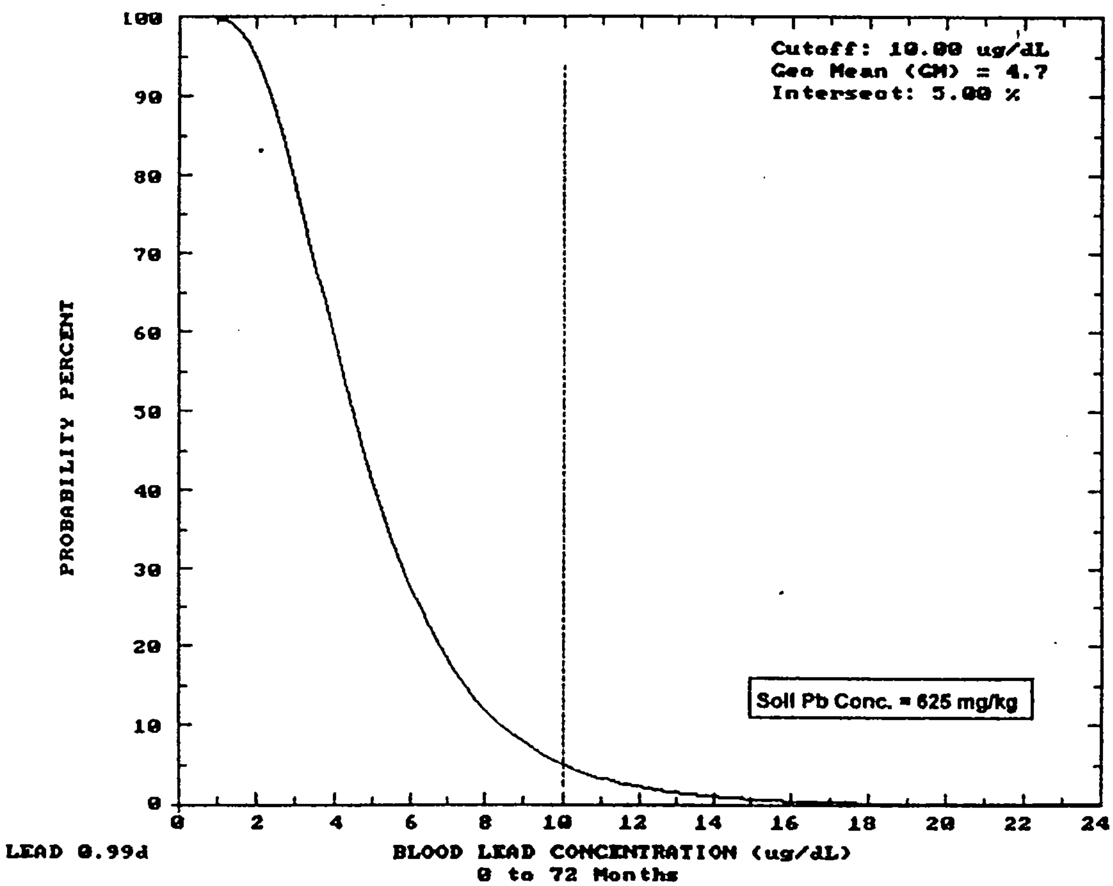

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Figure 3-8
IEUBK Model Results
Comparison of Example Day Care Scenario with EPA Residential Scenario Target Soil Levels

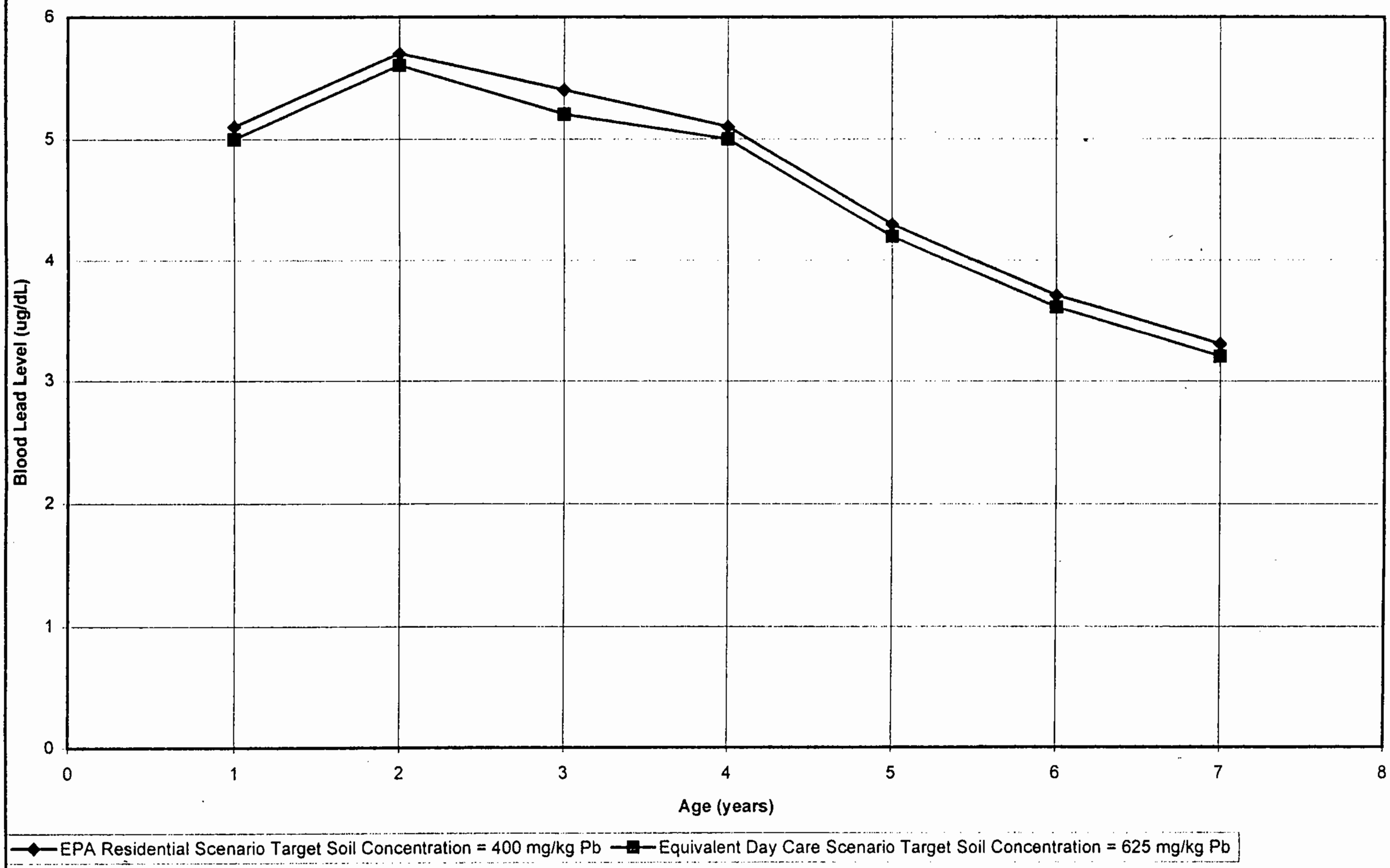

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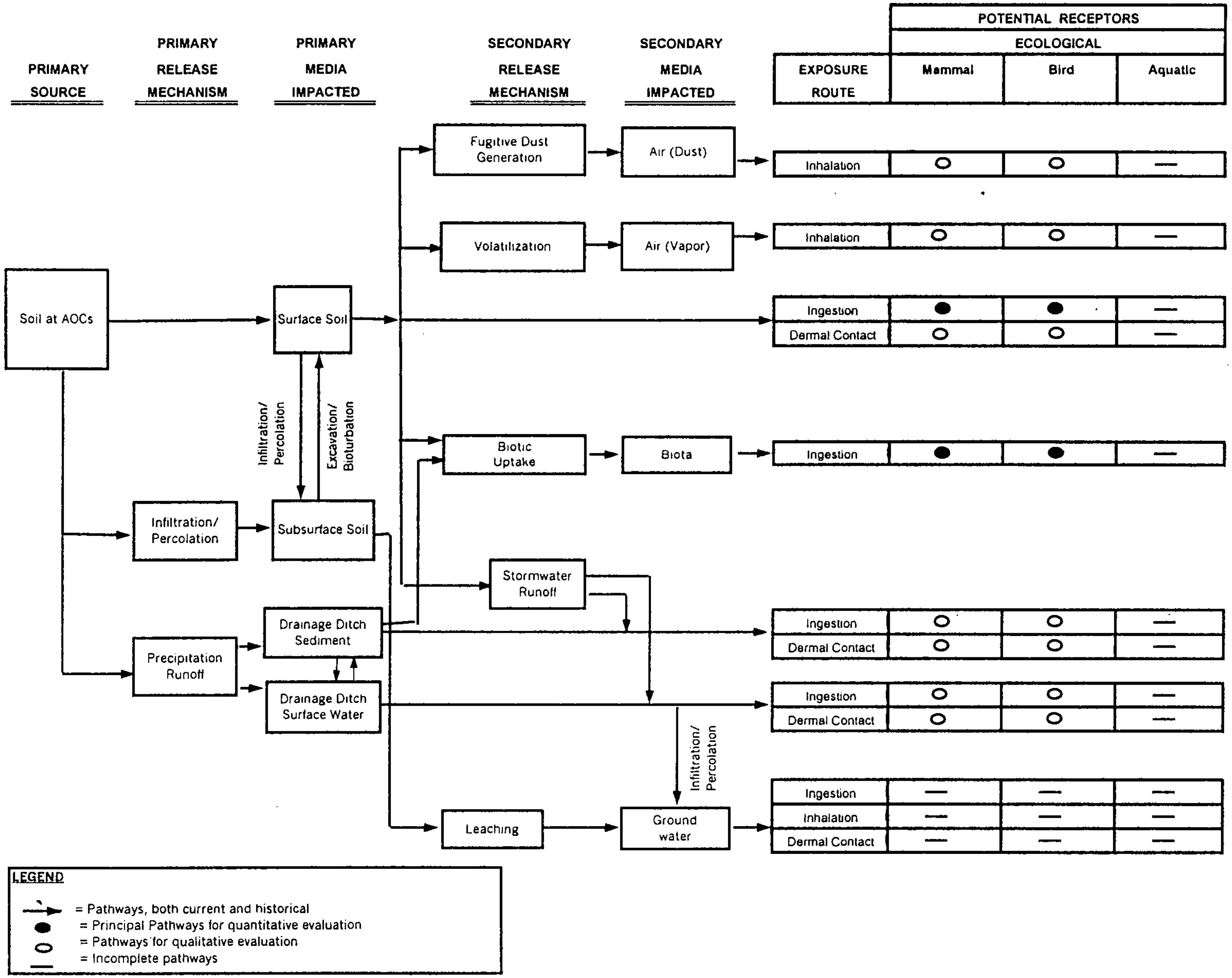
Figure 3-9 Ecological Conceptual Site Model
SENECA ARMY DEPOT ACTIVITY



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4.0 RECOMMENDATIONS

The following recommendations are made based on the results of the mini-risk assessments, detailed in the previous chapter, and the intended future land uses which have been developed by the Seneca Army Depot Local Redevelopment Authority (LRA). The guidance followed throughout this process is the EPA memorandum "Land Use in the CERCLA Remedy Selection Process" (EPA, 1995a) and the DoD memorandum titled "Responsibility for Additional Environmental Cleanup after Transfer of Real Property" (DoD, 1997).

The future land uses of the 21 SWMUs and one EBS site were developed by the Seneca Army Depot Local Redevelopment Authority (LRA) and are defined in the Reuse Plan and Implementation Strategy for Seneca Army Depot. This document was adopted and approved by the Seneca County Board of Supervisors on October 22, 1996. Under this plan and subsequent amendment, areas within the Depot were classified according to their most likely future use. These land uses described in the Reuse Plan and throughout this Decision Document are considered to be reasonably certain and have formed the basis for the mini risk assessment screening process. There is, however, always the possibility of an unexpected change in land use. According to EPA guidance outlined in "Land Use in the CERCLA Remedy Selection Process,"

> "*The baseline risk assessment generally needs only to consider the reasonably anticipated future land use; however, it may be valuable to evaluate risks associated with other land uses. The NCP (55 Fed. Reg. 8710) states that in the baseline risk assessment, more than one future land use assumption may be considered when decision makers wish to understand the implications of unexpected exposures. Especially where there is some uncertainty regarding the anticipated future land use, it may be useful to compare the potential risks associated with several land use scenarios to estimate the impact on human health and the environment should the land use unexpectedly change. The magnitude of such potential impacts may be an important consideration in determining whether and how institutional controls should be used to restrict future uses.*" (EPA, 1995a)

A residential scenario has been evaluated at 14 of the 22 sites to provide a comprehensive and conservative baseline for these sites even though residential development at these sites is unlikely. The recommendations made in Sections 4.1 through 4.20, however, were in no way dependent on the results of the residential risk analysis. A residential scenario was not evaluated for the eight Prison sites (SEAD-43, 56, 69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62) because the future Prison land use has been determined with certainty. Risk calculations for both an adult resident and a child resident at each site can be found in Appendix V. A summary of the results of the residential analysis is provided in Section 4.21.

The mini-risk assessment is a conservative, screening risk assessment tool. Due to the conservative nature of the mini-risk assessment, it is likely that a more traditional risk assessment would estimate even lower risks. The methods used to conduct the mini-risk assessment are the same as those used in prior baseline risk assessments at several of the other sites, with the exception that the maximum concentration of a component is used instead of the Upper 95th Confidence Limit (UCL) of the mean. The existing database is small at many of these sites. Using the maximum detected value will provide an added degree of conservatism. Biased sampling has been performed, and the data represent "worst case" conditions.

In addition to the evaluation of human health, the recommendations in the following sections consider the risk posed by the site to its ecological communities. Calculations in this mini-ecological risk assessment are conservatively based on the maximum concentrations of each chemical detected in each medium of potential concern to ecological receptors. Ecological receptors were determined based on prior studies at SEDA. Impacts from exposure to these receptors are determined using conservative assumptions to assure that a reasonable degree of protection is maintained.

The following sections present the recommendations for the 21 SWMUs and one EBS site and the justification and rationale for the respective recommendations. Recommendations are also summarized in **Table 4.0-1.**

4.1 SEAD-9 – Old Scrap Wood Site

4.1.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.1.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-1** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-9. The total cancer risk from all exposure routes at

SEAD-9 is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-9. No significant ecological risk was found at SEAD-9.

4.2 SEAD-27 – Building 360 – Steam Cleaning Waste Tank

4.2.1 Recommended Action

The Army recommends that a Land Use Restriction be placed on SEAD-27 to restrict the use of groundwater as a drinking water source. This recommendation is based on the intended future Planned Industrial Development land use of the site.

4.2.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-2** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-27. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Day Care Center Child (HI=3), but is less than one for the Industrial Worker (HI=0.7) and the Day Care Center Adult Worker (HI=0.7). The elevated hazard index for the Day Care Center Child receptors is due solely to ingestion of groundwater, with naphthalene and acetone being the most significant risk contributors.

Concentrations of acetone were detected in one well during the second, third, and fourth rounds of the four-month long, groundwater sampling program. Acetone concentrations were lowest during the fourth round. Naphthalene was detected in the second well though it was not detected until the fourth quarter of the sampling program. No additional samples have been collected to confirm the presence of naphthalene at the site. Neither of these two compounds has Class GA groundwater criteria, however, their hazard indices indicate that they contribute to risk due to ingestion of groundwater. Based on the current data, a restriction on groundwater use at this site is recommended.

No compounds of concern were detected in SEAD-27 soils; therefore, an ecological risk assessment was not applicable.

4.3 SEAD-28 – Building 360 – Underground Waste Oil Tanks

4.3.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.3.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is that no compounds of concern were detected in the one soil sample collected from SEAD-28.

4.4 SEAD-32 – Building 718 – Underground Waste Oil Tanks

4.4.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Institutional land use.

4.4.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-5** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-32. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. An ecological risk assessment was not applicable since no compounds of concern were detected in the soil samples collected from SEAD-32.

4.5 SEAD-33 – Building 121 – Underground Waste Oil Tank

4.5.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.5.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is that no compounds of concern were detected in the soil samples collected from SEAD-33.

4.6 SEAD-34 – Building 319 – Underground Waste Oil Tanks

4.6.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.6.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is that no compounds of concern were detected in the soil samples collected from SEAD-34.

4.7 SEAD-43 – Old Missile Propellant Test Laboratory, SEAD-56 – Building 606 – Herbicide and Pesticide Storage, SEAD-69 – Building 606 – Disposal Area

4.7.1 Recommended Action

The Army recommends that these SWMUs be designated as "No Further Action" sites for the intended future Prison land use. Alternative future land uses are not allowed for these sites based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SEADs 43, 56, and 69, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.7.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-11** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEADs-43, 56, 69. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.8 SEAD-44A – Quality Assurance Test Laboratory – Site A

4.8.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-44A, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.8.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-12** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-44A. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.9 SEAD-44B – Quality Assurance Test Laboratory – Site B

4.9.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-44B, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.9.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-13** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-44B. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.10 SEAD-52 – Ammunition Breakdown Area

4.10.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-52, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.10.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-14** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-52. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.11 SEAD-58 – Debris Area near Booster Station 2131

4.11.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Conservation and Recreation land use.

4.11.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-6** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-58. The total cancer risk from all exposure routes is within or below the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors. **Table 3.6-6** summarizes the calculated hazard quotients for ecological receptors at SEAD-58. No significant ecological risk was found at SEAD-58.

4.12 SEAD-62 – Nicotine Sulfate Disposal Area near Buildings 606 and 612

4.12.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-62, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.12.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-15** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-62. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.13 SEAD-64A – Garbage Disposal Area

4.13.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Warehouse land use.

4.13.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-10** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64A. The total cancer risk from all exposure routes is within or below the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-64A. No significant ecological risk was found at SEAD-64A.

4.14 SEAD-64B – Garbage Disposal Area

4.14.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future conservation/recreational land use.

4.14.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-7** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64B. The total cancer risk from all exposure routes is within or below the EPA target range for all three receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all three receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-64B. No significant ecological risk was found at SEAD-64B.

4.15 SEAD-64C – Garbage Disposal Area

4.15.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-64C, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.15.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-17** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64C. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-64C. No significant ecological risk was found at SEAD-64C.

4.16 SEAD-64D Garbage Disposal Area

4.16.1 Recommended Action

The Army recommends that a Land Use Restriction be placed on SEAD-64D to restrict the use of groundwater as a drinking water source. This recommendation is based on the intended future conservation/recreational land use of the site.

4.16.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-8** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64D. The total cancer risk from all exposure routes is within or below the EPA target range for all three receptors. The total non-cancer hazard index (HI) from all exposure routes is less than one for the Construction Worker, but equals or exceeds one for the Park Worker (HI=3) and the Recreational Child Visitor (HI=1). The elevated hazard index for both receptors is due solely to ingestion of groundwater, with iron and manganese being the significant risk contributors.

All five of the SEAD-64D groundwater samples exceeded the iron criteria for Class GA groundwater. Two of the five samples exceeded the manganese criteria for Class GA groundwater. Groundwater sampling was performed at SEAD-64D before low-flow sampling techniques were used at the Depot. As is seen from a review of the groundwater data obtained from this site, four of the five samples collected and analyzed exhibited turbidity levels greater than 100 NTU, and thus it is presumed that most of the elevated concentrations of both iron and manganese may be associated with the high turbidity of the samples. **Tables 4.16-1** and **4.16-2** illustrate the relationship between turbidity, metal concentrations in soil, and metal concentrations in groundwater. Groundwater concentrations of iron increase from 440 ug/L to 65800 ug/L as turbidity increases from 1.5 NTUs to greater than 200 NTUs, **Table 4.16-1**. The correlation between manganese concentrations in groundwater and turbidity is shown in **Table 4.16-2**. As shown, manganese groundwater concentrations increase from 223 ug/L to 8250 ug/L, as turbidity increases from 1.5 NTUs to more than 200 NTUs. However, as no additional groundwater samples have been collected and analyzed for iron and manganese content using low-flow sampling procedures, it is assumed that workers or visitors to the area could be exposed to and ingest elevated concentrations of iron and manganese if the groundwater were used as a source of drinking water in the future. Therefore, a restriction on groundwater use at this site is recommended.

Table 3.6-6 summarizes the calculated hazard quotients for all ecological receptors at SEAD-64D. No significant ecological risk was found at SEAD-64D.

4.17 SEAD-66 – Pesticide Storage near Buildings 5 and 6

4.17.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.17.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-3** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-66. The total cancer risk from all exposure routes is within or below the EPA target range for all four receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all four receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-66. No significant ecological risk was found at this site.

4.18 SEAD-68 – Building S-335 – Old Pest Control Shop

4.18.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Planned Industrial Development land use.

4.18.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-4** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-68. The total cancer risk from all exposure routes is within or below the EPA target range for all four receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all four receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at SEAD-68. No significant ecological risk was found at this site.

4.19 SEAD-70 – Fill Area Adjacent to Building T-2110

4.19.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future conservation/recreational land use.

4.19.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-9** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-70. The total cancer risk from all exposure routes is within or below the EPA target range for all three receptors. The total non-cancer hazard index (HI) from all exposure routes is less than one for the Park Worker and the Recreational Visitor, but exceeds one for the Construction Worker (HI=2). The elevated hazard index for the Construction Worker is due solely to ingestion of soil, with arsenic being the significant risk contributor.

While arsenic was detected in all 12 samples, only the maximum value, 88.5mg/Kg, exceeded the TAGM, 8.9 mg/Kg for arsenic. The maximum value used as the EPC for this assessment is 12-25 times all other measured concentrations. These results indicate that the actual average exposure to arsenic would be much lower. It is unlikely that the construction worker will be exposed to only soils in the corner of the site from which the maximum value was taken.

An analysis of the equivalence of the SEAD-70 and SEDA background data sets was conducted using the Wilcoxon Rank Sum Test (i.e., also known as the Mann Whitney U Test). The details of this evaluation are provided in Appendix W. The results of this analysis indicate that there is no statistically significant difference between the two sample means, and presumably, the sample data sets. Thus, the use of the maximum arsenic concentration found in soil at SEAD-70 to estimate the potential risk posed by the site probably overestimates the level of risk that is actually present. Therefore, a second computation of the potential risk that may be experienced by a future construction worker at SEAD-70 has been prepared that is based on the 95 upper confidence level value (i.e., 17.54 mg/Kg) for arsenic that is found at the site. This results in a revised hazard index for the construction worker of approximately 0.3.

Table 3.6-6 summarizes the calculated hazard quotients for all ecological receptors at SEAD-70. No significant ecological risk was found at this site.

4.20 SEAD-120B – Ovid Road Small Arms Range

4.20.1 Recommended Action

The Army recommends that this SWMU be designated as a "No Further Action" site for the intended future Prison land use. Alternative future land uses are not currently allowed for this site based on terms contained within the Quitclaim Deed that authorized the transfer of approximately 675 acres of land, including the area encompassed by SWMU-120B, from the US Government to the State of New York in September of 2000. As is stated in the Deed, parties representing the US and New York governments agreed that the transferred parcel would be used, operated, and maintained as a correctional facility by the State of New York, in perpetuity. Additionally, the transfer was subject to a reversionary clause that returns the property to the US Government in the event that any term or condition of the Deed is breached.

4.20.2 Justification and Rationale for Recommended Action

The justification and rationale for the recommended action is based upon the results of the risk assessment. **Table 3.5-16** summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-120B. The total cancer risk from all exposure routes is within or below the EPA target range for all five receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for all five receptors. **Table 3.6-6** summarizes the calculated hazard quotients for all ecological receptors at the combined "Prison Sites," which include SEADs 43, 44A, 44B, 52, 56, 62, 69, and 120B. No significant ecological risk was found at these sites.

4.21 Residential Land Use

As previously stated, a residential scenario has been evaluated at 14 SWMUs to provide a comprehensive and conservative baseline for these sites even though residential development at these sites is unlikely. The risk analyses recommendations made in Sections 4.1 through 4.20, are dependent on the actual projected land use for each site, and not. on the results of the residential risk analysis. A residential scenario was not evaluated for the eight Prison sites (SEAD-43, 56, 69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62) because the future Prison land use has been determined with certainty. Risk calculations for both an adult resident and a child resident at each site can be found in Appendix V. A summary of the results is provided below.

No compounds of potential concern were detected in the samples taken at each of the following four sites, therefore, it was not necessary to perform risk calculations.

- SEAD-28
- SEAD-32
- SEAD-33
- SEAD-34

For the following five sites, the total cancer risk from all exposure routes at each site is within or below the EPA target range for both adult and child residential receptors. Likewise, the total non-cancer hazard index from all exposure routes is less than one for both receptors.

- SEAD-9
- SEAD-58
- SEAD-64B
- SEAD-64C
- SEAD-68

For three of the following five sites, the total cancer risk from all exposure routes at each site is within or below the EPA target range for residential receptors. For the remaining two sites (SEAD-64A and SEAD-70) the total cancer risk exceeds the EPA target range for residential receptors. For all five of the following sites, the total non-cancer hazard index from one or more exposure routes is greater than one for child and/or adult receptors, depending on the site.

- SEAD-27
- SEAD-64A
- SEAD-64D
- SEAD-66
- SEAD-70

A more detailed discussion of the risks pertaining to the residential scenario at these five sites is provided below.

SEAD-27

Table V-3 summarizes the calculated cancer and non-cancer risks for all exposure routes considered at SEAD-27. The total cancer risk from all exposure routes is within or below the EPA target range for both receptors. The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Adult Resident (HI=2) and the Child Resident (HI=7). The elevated hazard index for the adult is due solely to ingestion of groundwater and the elevated hazard index for the child is due to ingestion of groundwater and dermal contact of groundwater. Naphthalene and acetone are the significant risk contributors.

Significant concentrations of acetone were detected in one well in the second and third rounds of the four-month long groundwater sampling program. The fourth round showed that the acetone concentrations had decreased, though they were still present. Naphthalene was detected in the second well, though it was not detected until the fourth quarter of the sampling program. No additional samples have been collected to confirm the presence of naphthalene at the site. Neither of these two compounds has Class GA groundwater criteria, however, their hazard indices indicate that they contribute to risk due to ingestion of groundwater and to dermal contact of groundwater. Based on the current data, should SEAD-27 be used as a residential area, it would be necessary to place a Land Use Restriction on groundwater use. This would restrict the use of groundwater as a drinking water source, preventing exposure to groundwater. This restriction results in the non-cancer Hazard Indices being less than 1 for both child and adult receptors.

SEAD-64A

Table V-3 summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64A. The total lifetime cancer risk from all exposure routes exceeds the EPA target range for residential receptors (cancer risk = 1E-04). The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Adult Resident (HI=1) and the Child Resident (HI=3). The elevated cancer risk is due solely to the ingestion of soil with a combination of PAHs being the significant risk contributors. The elevated hazard index for both receptors is due solely to ingestion of groundwater with manganese being the significant risk contributor.

Three of the five surface soil samples used in the residential risk analysis for SEAD-64A have significant exceedances of TAGMs for benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. These elevated levels have also contributed to a cancer risk that exceeds the EPA target range. Based on these findings, soil conditions would have to be addressed before residential use of SEAD-64A could occur.

Only one of the three SEAD-64A groundwater samples exceeded the manganese criteria for Class GA groundwater. Criteria for manganese are generally implemented for aesthetic purposes rather than as a measure of harm to human health. Manganese is a naturally occurring compound in soil. It is unlikely that there was a release of manganese at SEAD-64A due to its historical operations as a garbage disposal area. For these reasons, manganese is not a COC in SEAD-64A groundwater.

SEAD-64D

Table V-3 summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-64D. The total cancer risk from all exposure routes is within or below the EPA target range for both receptors. The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Adult Resident (HI=10) and the Child Resident (HI=31). The elevated hazard index for the adult is due solely to ingestion of groundwater and the elevated hazard index for the child is due to ingestion of groundwater and dermal contact of groundwater. Manganese, iron, and aluminum are the significant risk contributors.

All five of the SEAD-64D groundwater samples exceeded the iron criteria for Class GA groundwater. Two of the five samples exceeded the manganese criteria for Class GA groundwater. There are no groundwater criteria for aluminum. Four out of five of these samples had a turbidity of greater than 100 NTU (See **Tables 4.16-1** and **4.16-2**). The high levels of iron, manganese, and aluminum are most likely a direct result of the high turbidity of the samples. However, based on the current data, should SEAD-64D be used as a residential area, it would be necessary to place a Land Use Restriction on groundwater use. This would restrict the use of groundwater as a drinking water source, preventing exposure to groundwater.

SEAD-66

Table V-3 summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-66. The total cancer risk from all exposure routes is within or below the EPA target range for both receptors. The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Child Resident (HI=1). The elevated hazard index for this receptor is due solely to ingestion of soil with 4,4'-DDT being the significant risk contributor.

While 4,4'-DDT was detected in most samples (8 out of 9), only the maximum value exceeded the

TAGM for 4,4'-DDT. The maximum value used as the EPC for this assessment ranges from 300 to 10,000 times all other measured concentrations. These results indicate that the actual average exposure to 4,4'-DDT would be much lower. It is unlikely that the child will be exposed to only soils in the corner of the site from which the maximum value was taken. For these reasons, 4,4'-DDT is not considered a COC in soil at this site for this exposure scenario.

SEAD-70

Table V-3 summarizes the calculated cancer and non-cancer risks for all human receptors and exposure routes considered at SEAD-70. The total lifetime cancer risk from all exposure routes is not within the EPA target range for residential receptors (cancer risk = 3E-04). The total non-cancer hazard index (HI) from all exposure routes exceeds one for the Child Resident (HI=4). The elevated cancer risk is due solely to the ingestion of soil with arsenic being the significant risk contributor. The elevated hazard index for the child resident is also due solely to ingestion of soil with arsenic being the significant risk contributor.

While arsenic was detected in all 12 samples, only the maximum value exceeded the TAGM for arsenic. The maximum value used as the EPC for this assessment is 12-25 times all other measured concentrations. These results indicate that the actual average exposure to arsenic would be much lower. It is unlikely that the child will be exposed to only soils in the corner of the site from which the maximum value was taken. Also, the level of arsenic in soil at this site was only slightly higher than the highest concentration considered to be background. For these reasons, arsenic is not considered a COC in soil at this site for this exposure scenario.

Table 4.0-1
Recommended Actions for the 21 SWMUs and one EBS site

Site	Planned Land Use	Recommended Action for	
		Planned Land Use	**Residential Scenario**
9	Industrial Development	No Further Action	No Further Action
27	Industrial Development	Land Use Control	Land Use Control
28	Industrial Development	No Further Action	Not Evaluated, No COPCs
32	Institutional Land	No Further Action	Not Evaluated, No COPCs
33	Industrial Development	No Further Action	Not Evaluated, No COPCs
34	Industrial Development	No Further Action	Not Evaluated, No COPCs
43, 56, 69	Prison	No Further Action	Not Applicable
44A	Prison	No Further Action	Not Applicable
44B	Prison	No Further Action	Not Applicable
52	Prison	No Further Action	Not Applicable
58	Conservation/Recreational	No Further Action	No Further Action
62	Prison	No Further Action	Not Applicable
64A	Warehouse	No Further Action	Soil Treatment/Excavation
64B	Conservation/Recreational	No Further Action	No Further Action
64C	Prison	No Further Action	Not Applicable
64D	Conservation/Recreational	Land Use Control	Land Use Control
66	Industrial Development	No Further Action	No Further Action
68	Industrial Development	No Further Action	No Further Action
70	Conservation/Recreational	No Further Action	No Further Action
120B	Prison	No Further Action	Not Applicable

Table 4.16-1: Effect of turbidity of groundwater and concentration of iron in soil on concentration of iron in groundwater at SEAD-64D

Turbidity of Groundwater Sample, NTU	Soil Sample ID (1)	Soil Concentration, ug/Kg	Groundwater Sample Near Soil Samples	Groundwater Concentration, ug/L
1.5	SB64D-10-00	21000	MW64D-1	440
	SB64D-10-01	36200		
	SB64D-10-02	17000		
	Average	24700		
127	SB64D-8-00	32500	MW64D-3	538
	SB64D-8-01	28200		
	SB64D-8-02	28600		
	Average	29800		
141	SB64D-4-00	28300	MW64D-4	552
	SB64D-4-01	34800		
	SB64D-4-02	20500		
	Average	27900		
181	SB64D-6-00	24300	MW64D-2	1730
	SB64D-6-01	28200		
	SB64D-6-02	25300		
	Average	26000		
>200	SB64D-2-00	29800	MW64D-5	65800
	SB64D-2-01	36600		
	SB64D-2-02	24200		
	Average	30200		

1) Analytical results from the nearest soil boring were compared to each the result from the groundwater sample.

Table 4.16-2: Effect of turbidity of groundwater and concentration of manganese in soil on concentration of manganese in groundwater at SEAD-64D

Turbidity of Groundwater Sample, NTU	Soil Sample ID (1)	Soil Concentration, ug/Kg	Groundwater Sample Near Soil Samples (2)	Groundwater Concentration, ug/L
1.5	SB64D-10-00	684	MW64D-1	223
	SB64D-10-01	776		
	SB64D-10-02	352		
	Average	604		
127	SB64D-8-00	1040	MW64D-3	86.6
	SB64D-8-01	659		
	SB64D-8-02	748		
	Average	816		
141	SB64D-4-00	884	MW64D-4	106
	SB64D-4-01	859		
	SB64D-4-02	751		
	Average	831		
181	SB64D-6-00	627	MW64D-2	456
	SB64D-6-01	851		
	SB64D-6-02	645		
	Average	708		
>200	SB64D-2-00	688	MW64D-5	8250
	SB64D-2-01	1240		
	SB64D-2-02	476		
	Average	801		

1) Analytical results from the nearest soil boring were compared to each the result from the groundwater sample.

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APPENDIX A
SEAD-9: Old Scrap Wood Site

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TABLE A-1
SOIL ANALYSES RESULTS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND		MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES					
	MATRIX							SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION							SEAD-9	SEAD-9	SEAD-9	SEAD-9	SEAD-9
	DEPTH (FEET)							0-0.2	4-6	8-9	0-0.2	4-6
	SAMPLE DATE							05/24/94	05/24/94	05/24/94	05/24/94	05/24/94
	ES ID							SB9-1-00	SB9-1-03	SB9-1-05	SB9-2-00	SB9-2-03
	LAB ID							222207	222208	222209	222210	222211
	SDG NUMBER							44345	44345	44345	44345	44345
	UNITS											
VOLATILE ORGANICS												
Toluene	ug/Kg	1	22%	1500	0	2	9	11 U	1 J	12 U	11 U	1 J
Chlorobenzene	ug/Kg	2	11%	1700	0	1	9	11 U	12 U	12 U	11 U	2 J
Ethylbenzene	ug/Kg	1	11%	5500	0	1	9	11 U	1 J	12 U	11 U	11 U
Xylene (total)	ug/Kg	2	11%	1200	0	1	9	11 U	2 J	12 U	11 U	11 U
SEMIVOLATILE ORGANICS												
Naphthalene	ug/Kg	360	56%	13000	0	5	9	23 J	360 J	380 U	32 J	20 J
2-Methylnaphthalene	ug/Kg	140	33%	36400	0	3	9	27 J	140 J	380 U	470 U	33 J
Acenaphthylene	ug/Kg	40	44%	41000	0	4	9	28 J	40 J	380 U	29 J	350 U
Acenaphthene	ug/Kg	790	44%	50000*	0	4	9	90 J	790 J	380 U	130 J	350 U
Dibenzofuran	ug/Kg	360	44%	6200	0	4	9	39 J	360 J	380 U	39 J	350 U
Fluorene	ug/Kg	610	44%	50000*	0	4	9	67 J	610 J	380 U	85 J	350 U
Phenanthrene	ug/Kg	4300	67%	50000*	0	6	9	720	4300	380 U	1200	280 J
Anthracene	ug/Kg	1100	56%	50000*	0	5	9	210 J	1100	380 U	260 J	88 J
Carbazole	ug/Kg	860	44%	50000*	0	4	9	150 J	860	380 U	240 J	350 U
Di-n-butylphthalate	ug/Kg	70	56%	8100	0	5	9	55 J	70 J	380 U	470 U	350 U
Fluoranthene	ug/Kg	6200	78%	50000*	0	7	9	1700	6200	380 U	2500	540
Pyrene	ug/Kg	5100	78%	50000*	0	7	9	1400	5100	380 U	2400	570
Benzo(a)anthracene	ug/Kg	2600	56%	220	5	5	9	680	2600	380 U	1200	380
Chrysene	ug/Kg	2300	56%	400	5	5	9	720	2300	380 U	1200	440
bis(2-Ethylhexyl)phthalate	ug/Kg	240	67%	50000*	0	6	9	88 J	240 J	20 J	84 J	350 U
Benzo(b)fluoranthene(I)	ug/Kg	4700	125%	1100	4	5	4	1600 JN	4700 JN	380 U	2400 JN	590 JN
Benzo(a)pyrene	ug/Kg	2100	56%	61	5	5	9	670	2100	380 U	990	350 J
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	44%	3200	0	4	9	430	1100	380 U	570	350 U
Dibenz(a,h)anthracene	ug/Kg	670	44%	14	4	4	9	190 J	670 J	380 U	290 J	350 U
Benzo(g,h,i)perylene	ug/Kg	760	44%	50000*	0	4	9	310 J	760 J	380 U	460 J	350 U
PESTICIDES/PCBs												
delta-BHC	ug/Kg	0.94	11%	300	0	1	9	3.6 U	4.1 U	2 U	1.8 U	1.8 U
gamma-BHC (Lindane)	ug/Kg	1.3	11%	60	0	1	9	3.6 U	4.1 U	2 U	1.8 U	1.3 J
Heptachlor	ug/Kg	5.7	11%	100	0	1	9	3.6 U	4.1 U	2 U	1.8 U	5.7
Aldrin	ug/Kg	2.4	11%	41	0	1	9	2.4 J	4.1 U	2 U	1.8 U	1.8 U
Heptachlor epoxide	ug/Kg	1.1	11%	20	0	1	9	3.6 U	4.1 U	2 U	1.8 U	1.1 J
Dieldrin	ug/Kg	3	11%	44	0	1	9	7 U	8 U	3.8 U	3.5 U	3.5 U
4,4'-DDE	ug/Kg	55	67%	2100	0	6	9	55	13 J	3.8 U	25	25
4,4'-DDD	ug/Kg	16	67%	2900	0	6	9	14 J	8.1 J	3.8 U	16	14
4,4'-DDT	ug/Kg	73	67%	2100	0	6	9	73 J	33 J	3.8 U	37	45 J
alpha-Chlordane	ug/Kg	16	56%	540	0	5	9	8	4.7 J	2 U	1.8 U	16 J
gamma-Chlordane	ug/Kg	19	33%	540	0	3	9	3.6 U	4.1 U	2 U	1.7 J	19
Aroclor-1254	ug/Kg	140	11%	1000/10000(b)	0	1	9	140 J	80 U	38 U	35 U	35 U
METALS												
Aluminum	mg/Kg	15000	100%	19300	0	9	9	12700	12600	13600	8130	5230
Antimony	mg/Kg	0.71	56%	5.9	0	5	9	0.34 J	0.13 UJ	0.19 UJ	0.45 J	0.31 J
Arsenic	mg/Kg	8.5	100%	8.2	1	9	9	5.7	5.4	5.9	8.5	3.9
Barium	mg/Kg	101	100%	300	0	9	9	76.9	73.1	51.2	91.4	38.3

TABLE A-1
SOIL ANALYSES RESULTS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	MATRIX							SOIL	SOIL	SOIL	SOIL
	LOCATION							SEAD-9	SEAD-9	SEAD-9	SEAD-9
	DEPTH (FEET)							8-9	0-0.2	4-6	6-8
	SAMPLE DATE							05/24/94	05/24/94	05/24/94	05/24/94
	ES ID							SB9-2-05	SB9-3-00	SB9-3-03	SB9-3-04
	LAB ID		FREQUENCY		NUMBER	NUMBER	NUMBER	222212	222213	222214	222215
	SDG NUMBER		OF		ABOVE	OF	OF	44345	44345	44345	44345
COMPOUND	UNITS	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES				
VOLATILE ORGANICS											
Toluene	ug/Kg	1	22%	1500	0	2	9	12 U	12 U	12 U	12 U
Chlorobenzene	ug/Kg	2	11%	1700	0	1	9	12 U	12 U	12 U	12 U
Ethylbenzene	ug/Kg	1	11%	5500	0	1	9	12 U	12 U	12 U	12 U
Xylene (total)	ug/Kg	2	11%	1200	0	1	9	12 U	12 U	12 U	12 U
SEMIVOLATILE ORGANICS											
Naphthalene	ug/Kg	360	56%	13000	0	5	9	410 U	31 J	400 U	370 U
2-Methylnaphthalene	ug/Kg	140	33%	36400	0	3	9	410 U	390 U	400 U	370 U
Acenaphthylene	ug/Kg	40	44%	41000	0	4	9	410 U	24 J	400 U	370 U
Acenaphthene	ug/Kg	790	44%	50000*	0	4	9	410 U	87 J	400 U	370 U
Dibenzofuran	ug/Kg	360	44%	6200	0	4	9	410 U	36 J	400 U	370 U
Fluorene	ug/Kg	610	44%	50000*	0	4	9	410 U	87 J	400 U	370 U
Phenanthrene	ug/Kg	4300	67%	50000*	0	6	9	79 J	910	400 U	370 U
Anthracene	ug/Kg	1100	56%	50000*	0	5	9	410 U	220 J	400 U	370 U
Carbazole	ug/Kg	860	44%	50000*	0	4	9	410 U	160 J	400 U	370 U
Di-n-butylphthalate	ug/Kg	70	56%	8100	0	5	9	65 J	56 J	43 J	370 U
Fluoranthene	ug/Kg	6200	78%	50000*	0	7	9	97 J	1200	25 J	370 U
Pyrene	ug/Kg	5100	78%	50000*	0	7	9	160 J	1400	39 J	370 U
Benzo(a)anthracene	ug/Kg	2600	56%	220	5	5	9	410 U	670	400 U	370 U
Chrysene	ug/Kg	2300	56%	400	5	5	9	410 U	680	400 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	240	67%	50000*	0	6	9	410 U	95 J	400 U	60 J
Benzo(b)fluoranthene(l)	ug/Kg	4700	125%	1100	4	5	4	410 U	1600 JN	400 U	370 U
Benzo(a)pyrene	ug/Kg	2100	56%	61	5	5	9	410 U	750	400 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	44%	3200	0	4	9	410 U	420	400 U	370 U
Dibenz(a,h)anthracene	ug/Kg	670	44%	14	4	4	9	410 U	160 J	400 U	370 U
Benzo(g,h,i)perylene	ug/Kg	760	44%	50000*	0	4	9	410 U	230 J	400 U	370 U
PESTICIDES/PCBs											
delta-BHC	ug/Kg	0.94	11%	300	0	1	9	2.1 U	0.94 J	2 U	1.9 U
gamma-BHC (Lindane)	ug/Kg	1.3	11%	60	0	1	9	2.1 U	2 U	2 U	1.9 U
Heptachlor	ug/Kg	5.7	11%	100	0	1	9	2.1 U	2 U	2 U	1.9 U
Aldrin	ug/Kg	2.4	11%	41	0	1	9	2.1 U	2 U	2 U	1.9 U
Heptachlor epoxide	ug/Kg	1.1	11%	20	0	1	9	2.1 U	2 U	2 U	1.9 U
Dieldrin	ug/Kg	3	11%	44	0	1	9	4.1 U	3 J	4 U	3.7 U
4,4'-DDE	ug/Kg	55	67%	2100	0	6	9	4 J	23	4 U	3.7 U
4,4'-DDD	ug/Kg	16	67%	2900	0	6	9	2.6 J	4.2 J	4 U	3.7 U
4,4'-DDT	ug/Kg	73	67%	2100	0	6	9	4 J	27	4 U	3.7 U
alpha-Chlordane	ug/Kg	16	56%	540	0	5	9	1.2 J	1.9 J	2 U	1.9 U
gamma-Chlordane	ug/Kg	19	33%	540	0	3	9	1.4 J	2 U	2 U	1.9 U
Aroclor-1254	ug/Kg	140	11%	1000/10000(b)	0	1	9	41 U	39 U	40 U	37 U
METALS											
Aluminum	mg/Kg	15000	100%	19300	0	9	9	14600	14000	15000	13300
Antimony	mg/Kg	0.71	56%	5.9	0	5	9	0.27 J	0.71 J	0.21 UJ	0.13 UJ
Arsenic	mg/Kg	8.5	100%	8.2	1	9	9	6.9	5.4	5.3	4.6
Barium	mg/Kg	101	100%	300	0	9	9	64.9	88.3	101	70.8

TABLE A-1
SOIL ANALYSES RESULTS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	MATRIX											
	LOCATION							SOIL	SOIL	SOIL	SOIL	SOIL
	DEPTH (FEET)							SEAD-9	SEAD-9	SEAD-9	SEAD-9	SEAD-9
	SAMPLE DATE							0-0.2	4-6	8-9	0-0.2	4-6
	ES ID							05/24/94	05/24/94	05/24/94	05/24/94	05/24/94
	LAB ID		FREQUENCY		NUMBER	NUMBER	NUMBER	SB9-1-00	SB9-1-03	SB9-1-05	SB9-2-00	SB9-2-03
	SDG NUMBER		OF		ABOVE	OF	OF	222207	222208	222209	222210	222211
COMPOUND	UNITS	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	44345	44345	44345	44345	44345
Beryllium	mg/Kg	0.78	100%	1.1	0	9	9	0.61 J	0.6 J	0.62 J	0.46 J	0.34 J
Cadmium	mg/Kg	1.1	100%	2.3	0	9	9	0.97	0.69	0.44 J	1.1	0.61 J
Calcium	mg/Kg	217000	100%	121000	1	9	9	63000	40900	2790	120000	217000
Chromium	mg/Kg	22.8	100%	29.6	0	9	9	22.4	17.6	21.3	19.9	12.3
Cobalt	mg/Kg	12	100%	30	0	9	9	12	10.2	7.8 J	10.5	5.8 J
Copper	mg/Kg	33	100%	33	0	9	9	33	20.3	23.3	27.4	19.1
Iron	mg/Kg	28600	100%	36500	0	9	9	24200	22400	25400	16400	10200
Lead	mg/Kg	85.1	100%	24.8	4	9	9	50.3 J	21.7 J	10.4 J	85.1 J	43 J
Magnesium	mg/Kg	13000	100%	21500	0	9	9	9240	8310	4140	13000	10900
Manganese	mg/Kg	984	100%	1060	0	9	9	524	635	313	984	320
Mercury	mg/Kg	0.26	100%	0.1	1	9	9	0.05 J	0.08 J	0.26	0.1	0.07 J
Nickel	mg/Kg	41.6	100%	49	0	9	9	35.1	25.1	35.7	41.6	15.6
Potassium	mg/Kg	2140	100%	2380	0	9	9	2140 J	1430 J	1730 J	1790 J	1490 J
Selenium	mg/Kg	0.9	78%	2	0	7	9	0.58 J	0.23 J	0.9 J	0.25 U	0.31 U
Sodium	mg/Kg	185	89%	172	1	8	9	115 J	65 J	64.7 J	139 J	166 J
Vanadium	mg/Kg	26.8	100%	150	0	9	9	24.5	21.1	23.7	22.7	21.1
Zinc	mg/Kg	126	100%	110	1	9	9	126	75.7	82.7	102	59.7
OTHER ANALYSES												
Total Petroleum Hydrocarbons	mg/Kg	15900	89%		0	8	9	245	1170	30 U	580	15900
Total Solids	%W/W	93.9	1		0	9	9	93.9	83.1	85.8	93	93.4

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) The TAGM value for PCBs is 1000ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
c) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)fluranthene.

TABLE A-1
SOIL ANALYSES RESULTS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-9 8-9 05/24/94 SB9-2-05 222212 44345	SOIL SEAD-9 0-0.2 05/24/94 SB9-3-00 222213 44345	SOIL SEAD-9 4-6 05/24/94 SB9-3-03 222214 44345	SOIL SEAD-9 6-8 05/24/94 SB9-3-04 222215 44345
Beryllium	mg/Kg	0.78	100%	1.1	0	9	9	0.62 J	0.67 J	0.78 J	0.65
Cadmium	mg/Kg	1.1	100%	2.3	0	9	9	0.68 J	0.76 J	0.65 J	0.65
Calcium	mg/Kg	217000	100%	121000	1	9	9	17100	20600	4780	19800
Chromium	mg/Kg	22.8	100%	29.6	0	9	9	19.9	21	22.8	20.5
Cobalt	mg/Kg	12	100%	30	0	9	9	10.4	11.4	12	11.5
Copper	mg/Kg	33	100%	33	0	9	9	15.2	29.5	23.1	24.9
Iron	mg/Kg	28600	100%	36500	0	9	9	27700	25800	28600	26100
Lead	mg/Kg	85.1	100%	24.8	4	9	9	20.6 J	47.4 J	16.2 J	11.5 J
Magnesium	mg/Kg	13000	100%	21500	0	9	9	4840	9360	4700	6860
Manganese	mg/Kg	984	100%	1060	0	9	9	467	710	681	472
Mercury	mg/Kg	0.26	100%	0.1	1	9	9	0.07 J	0.06 J	0.09 J	0.08 J
Nickel	mg/Kg	41.6	100%	49	0	9	9	21.4	24	28.4	23
Potassium	mg/Kg	2140	100%	2380	0	9	9	1250 J	2070 J	1420 J	1300 J
Selenium	mg/Kg	0.9	78%	2	0	7	9	0.62 J	0.76 J	0.52 J	0.42 J
Sodium	mg/Kg	185	89%	172	1	8	9	185 J	29 U	48.2 J	65 J
Vanadium	mg/Kg	26.8	100%	150	0	9	9	21.8	26.8	25.5	21.7
Zinc	mg/Kg	126	100%	110	1	9	9	72	96.8	70.3	54.4
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/Kg	15900	89%		0	8	9	1520	145	47	33
Total Solids	%W/W	93.9	1		0	9	9	80.2	84.7	83.4	88.2

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) The TAGM value for PCBs is 1000ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
c) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)

TABLE A-2
GROUNDWATER ANALYSIS RESULTS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTIONS	NUMBER OF ANALYSES		
							MATRIX	WATER	WATER
							LOCATION	SEAD-9	SEAD-9
							SAMPLE DATE	03/30/94	07/19/94
							SAMPLE NUMBER	MW9-2	MW9-3
							LAB ID	216046	227439
							SDG NUMBER	43179	45332
METALS									
Aluminum	ug/L	5000	100%	50 (a)	NA	2	2	5000	1570 J
Arsenic	ug/L	1.6	50%	3 (b)	0	1	2	1.6 J	2 U
Barium	ug/L	105	100%	1000 (b)	0	2	2	102 J	105 J
Beryllium	ug/L	0.13	50%	4 (c)	0	1	2	0.13 J	0.1 U
Calcium	ug/L	192000	100%	NA	NA	2	2	192000	186000
Chromium	ug/L	8.4	100%	50 (b)	0	2	2	8.4 J	2.6 J
Cobalt	ug/L	5.6	100%	NA	NA	2	2	5.6 J	2.1 J
Copper	ug/L	5.4	100%	200 (b)	0	2	2	5.4 J	2.3 J
Iron	ug/L	9350	100%	300 (b)	2	2	2	9350	2950
Lead	ug/L	1.7	50%	25 (b)	0	1	2	1.7 J	0.89 U
Magnesium	ug/L	30900	100%	NA	NA	2	2	26000	30900
Manganese	ug/L	411	100%	50 (a)	1	2	2	411	222
Nickel	ug/L	13	100%	100 (b)	0	2	2	13 J	4.9 J
Potassium	ug/L	2700	100%	NA	NA	2	2	1700 J	2700 J
Silver	ug/L	1	50%	50 (b)	0	1	2	0.69 U	1 J
Sodium	ug/L	106000	100%	20000 (b)	2	2	2	26600	106000
Vanadium	ug/L	7	100%	NA	NA	2	2	7 J	2.6 J
Zinc	ug/L	29.1	100%	5000 (a)	0	2	2	29.1	13 J
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/L	3	100%	NA	NA	2	2	0.59	3
pH	Standard Units	7.7	100%	NA	NA	2	2	7.7	7.4
Conductivity	umhos/cm	1100	100%	NA	NA	2	2	550	1100
Temperature	°C	14.1	100%	NA	NA	2	2	3.9	14.1
Turbidity	NTU	309	100%	NA	NA	2	2	309	160

NOTES:
a) Secondary Drinking Water Regulations
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE A-3
INORGANICS ANALYSIS OF SOIL - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-9 Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	12128.89	No
Antimony	3.56	7.12	0.42	No
Arsenic	5.08	10.15	5.73	No
Barium	78.43	156.86	72.88	No
Beryllium	0.67	1.33	0.59	No
Cadmium	0.97	1.94	0.73	No
Calcium	45449.65	90899.30	56218.89	No
Chromium	20.32	40.64	19.74	No
Cobalt	11.39	22.79	10.18	No
Copper	20.99	41.97	23.98	No
Iron	24704.74	49409.47	22977.78	No
Lead	16.47	32.95	34.02	Yes
Magnesium	10290.18	20580.35	7927.78	No
Manganese	576.14	1152.28	567.33	No
Mercury	0.04	0.09	0.10	Yes
Nickel	30.39	60.79	27.77	No
Potassium	1487.25	2974.49	1624.44	No
Selenium	0.63	1.26	0.58	No
Sodium	99.42	198.85	105.99	No
Vanadium	21.41	42.82	23.21	No
Zinc	67.80	135.60	82.18	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE A-4
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-9 Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	3285	No
Arsenic	5.63	11.25	1.6	No
Barium	81.20	162.40	103.5	No
Beryllium	0.90	1.79	0.13	No
Calcium	115619.35	231238.71	189000	No
Chromium	8.67	17.35	5.5	No
Cobalt	6.84	13.68	3.85	No
Copper	5.39	10.79	3.85	No
Iron	4476.26	8952.53	6150	No
Lead	6.59	13.18	1.7	No
Magnesium	28567.74	57135.48	28450	No
Manganese	231.41	462.82	316.5	No
Nickel	10.57	21.14	8.95	No
Potassium	4065.59	8131.17	2200	No
Silver	0.83	1.66	1	No
Sodium	15020.67	30041.33	66300	Yes
Vanadium	8.23	16.47	4.8	No
Zinc	25.37	50.74	21.05	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE A-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-9
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Groundwater mg/L
Volatile Organics			
Chlorobenzene	2.00E-03		
Ethylbenzene	1.00E-03		
Toluene	1.00E-03		
Xylene (total)	2.00E-03		
Semivolatile Organics			
2-Methylnaphthalene	1.40E-01	2.70E-02	
Acenaphthene	7.90E-01	1.30E-01	
Acenaphthylene	4.00E-02	2.90E-02	
Anthracene	1.10E+00	2.60E-01	
Benzo(a)anthracene	2.60E+00	1.20E+00	
Benzo(a)pyrene	2.10E+00	9.90E-01	
Benzo(b)fluoranthene	4.70E+00		
Benzo(g,h,i)perylene	7.60E-01	4.60E-01	
bis(2-Ethylhexyl)phthalate	2.40E-01	9.50E-02	
Carbazole	8.60E-01	2.40E-01	
Chrysene	2.30E+00	1.20E+00	
Dibenz(a,h)anthracene	6.70E-01	2.90E-01	
Dibenzofuran	3.60E-01	3.90E-02	
Di-n-butylphthalate	7.00E-02	5.60E-02	
Fluoranthene	6.20E+00	2.50E+00	
Fluorene	6.10E-01	8.70E-02	
Indeno(1,2,3-cd)pyrene	1.10E+00	5.70E-01	
Naphthalene	3.60E-01	3.20E-02	
Phenanthrene	4.30E+00	1.20E+00	
Pyrene	5.10E+00	2.40E+00	
Pesticides/PCBs			
4.4'-DDD	1.60E-02	1.60E-02	
4.4'-DDE	5.50E-02	5.50E-02	
4.4'-DDT	7.30E-02	7.30E-02	
Aldrin	2.40E-03	2.40E-03	
alpha-Chlordane	1.60E-02	8.00E-03	
Aroclor-1254	1.40E-01	1.40E-01	
delta-BHC	9.40E-04	9.40E-04	
Dieldrin	3.00E-03	3.00E-03	
gamma-BHC (Lindane)	1.30E-03		
gamma-Chlordane	1.90E-02	1.70E-03	
Heptachlor	5.70E-03		
Heptachlor epoxide	1.10E-03		
Metals			
Lead	8.51E+01	8.51E+01	
Mercury	2.60E-01	1.00E-01	
Sodium			1.06E+02

TABLE A-6
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = CSsurf x PM10 x CF

Variables
CSsurf = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM10 = Average Measured PM10 Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = CStot x PM10 x CF

Variables:
CStot = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM10 = PM10 Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Toluene	ND	1.00E-03	ND	1.48E-10
Chlorobenzene	ND	2.00E-03	ND	2.96E-10
Ethylbenzene	ND	1.00E-03	ND	1.48E-10
Total Xylenes	ND	2.00E-03	ND	2.96E-10
Semivolatile Organics				
Naphthalene	3.20E-02	3.60E-01	5.44E-10	5.33E-08
2-Methylnaphthalene	2.70E-02	1.40E-01	4.59E-10	2.07E-08
Acenaphthylene	2.90E-02	4.00E-02	4.93E-10	5.92E-09
Acenaphthene	1.30E-01	7.90E-01	2.21E-09	1.17E-07
Dibenzofuran	3.90E-02	3.60E-01	6.63E-10	5.33E-08
Fluorene	8.70E-02	6.10E-01	1.48E-09	9.03E-08
Phenanthrene	1.20E+00	4.30E+00	2.04E-08	6.36E-07
Anthracene	2.60E-01	1.10E+00	4.42E-09	1.63E-07
Carbazole	2.40E-01	8.60E-01	4.08E-09	1.27E-07
Di-n-butylphthalate	5.60E-02	7.00E-02	9.52E-10	1.04E-08
Fluoranthene	2.50E+00	6.20E+00	4.25E-08	9.18E-07
Pyrene	2.40E+00	5.10E+00	4.08E-08	7.55E-07
Benzo(a)anthracene	1.20E+00	2.60E+00	2.04E-08	3.85E-07
Chrysene	1.20E+00	2.30E+00	2.04E-08	3.40E-07
bis(2-Ethylhexyl)phthalate	9.50E-02	2.40E-01	1.62E-09	3.55E-08
Benzo(b)fluoranthene	0.00E+00	4.70E+00	0.00E+00	6.96E-07
Benzo(a)pyrene	9.90E-01	2.10E+00	1.68E-08	3.11E-07
Indeno(1,2,3-cd)pyrene	5.70E-01	1.10E+00	9.69E-09	1.63E-07
Dibenz(a,h)anthracene	2.90E-01	6.70E-01	4.93E-09	9.92E-08
Benzo(g,h,i)perylene	4.60E-01	7.60E-01	7.82E-09	1.12E-07
Benzo(k)fluoranthene	1.10E-01	1.10E-01	1.87E-09	1.63E-08
Chrysene	1.50E-01	1.50E-01	2.55E-09	2.22E-08
Dibenz(a,h)anthracene	2.80E-02	2.80E-02	4.76E-10	4.14E-09
Fluoranthene	3.50E-01	3.50E-01	5.95E-09	5.18E-08
Indeno(1,2,3-cd)pyrene	6.40E-02	6.40E-02	1.09E-09	9.47E-09
Phenanthrene	3.30E-01	3.30E-01	5.61E-09	4.88E-08
Pyrene	3.80E-01	3.80E-01	6.46E-09	5.62E-08
bis(2-Ethylhexyl)phthalate	4.20E-02	4.20E-02	7.14E-10	6.22E-09
Pesticides				
delta-BHC	9.40E-04	9.40E-04	1.60E-11	1.39E-10
gamma-BHC (Lindane)	ND	1.30E-03	ND	1.92E-10
Heptachlor	ND	5.70E-03	ND	8.44E-10
Aldrin	2.40E-03	2.40E-03	4.08E-11	3.55E-10
Heptachlor epoxide	ND	1.10E-03	ND	1.63E-10
Dieldrin	3.00E-03	3.00E-03	5.10E-11	4.44E-10
4,4'-DDE	5.50E-02	5.50E-02	9.35E-10	8.14E-09
4,4'-DDD	1.60E-02	1.60E-02	2.72E-10	2.37E-09
4,4'-DDT	7.30E-02	7.30E-02	1.24E-09	1.08E-08
alpha-Chlordane	8.00E-03	1.60E-02	1.36E-10	2.37E-09
gamma-Chlordane	1.70E-03	1.90E-02	2.89E-11	2.81E-09
Aroclor-1254	1.40E-01	1.40E-01	2.38E-09	2.07E-08
Metals				
Lead	8.51E+01	8.51E+01	1.45E-06	1.26E-05
Mercury	1.00E-01	2.60E-01	1.70E-09	3.85E-08

ND = Compound was not detected.

TABLE A-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Industrial Worker Intake (mg/kg-day) (Nc)	Industrial Worker Intake (mg/kg-day) (Car)	Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk
Volatile Organics								
Toluene	1.14E-01	NA	ND	1.48E-10				
Chlorobenzene	5.70E-03	NA	ND	2.96E-10				
Ethylbenzene	2.86E-01	NA	ND	1.48E-10				
Total Xylenes	NA	NA	ND	2.96E-10				
Semivolatile Organics								
Naphthalene	8.60E-04	NA	5.44E-10	5.33E-08	5.11E-11		6E-08	
2-Methylnaphthalene	NA	NA	4.59E-10	2.07E-08				
Acenaphthylene	NA	NA	4.93E-10	5.92E-09				
Acenaphthene	NA	NA	2.21E-09	1.17E-07				
Dibenzofuran	NA	NA	6.63E-10	5.33E-08				
Fluorene	NA	NA	1.48E-09	9.03E-08				
Phenanthrene	NA	NA	2.04E-08	6.36E-07				
Anthracene	NA	NA	4.42E-09	1.63E-07				
Carbazole	NA	NA	4.08E-09	1.27E-07				
Di-n-butylphthalate	NA	NA	9.52E-10	1.04E-08				
Fluoranthene	NA	NA	4.25E-08	9.18E-07				
Pyrene	NA	NA	4.08E-08	7.55E-07				
Benzo(a)anthracene	NA	NA	2.04E-08	3.85E-07				
Chrysene	NA	NA	2.04E-08	3.40E-07				
bis(2-Ethylhexyl)phthalate	NA	NA	1.62E-09	3.55E-08				
Benzo(b)fluoranthene	NA	NA		6.96E-07				
Benzo(a)pyrene	NA	NA	1.68E-08	3.11E-07				
Indeno(1,2,3-cd)pyrene	NA	NA	9.69E-09	1.63E-07				
Dibenz(a,h)anthracene	NA	NA	4.93E-09	9.92E-08				
Benzo(ghi)perylene	NA	NA	7.82E-09	1.12E-07				
Pesticides								
delta-BHC	NA	NA	1.60E-11	1.39E-10				
gamma-BHC (Lindane)	NA	NA	ND	1.92E-10				
Heptachlor	NA	4.55E+00	ND	8.44E-10				
Aldrin	NA	1.72E+01	4.08E-11	3.55E-10		1.37E-12		2E-11
Heptachlor epoxide	NA	9.10E+00	ND	1.63E-10				
Dieldrin	NA	1.61E+01	5.10E-11	4.44E-10		1.71E-12		3E-11
4,4'-DDE	NA	NA	9.35E-10	8.14E-09				
4,4'-DDD	NA	NA	2.72E-10	2.37E-09				
4,4'-DDT	NA	3.40E-01	1.24E-09	1.08E-08		4.16E-11		1E-11
alpha-Chlordane	2.00E-04	3.50E-01	1.36E-10	2.37E-09	1.28E-11	4.56E-12	6E-08	2E-12
gamma-Chlordane	2.00E-04	3.50E-01	2.89E-11	2.81E-09	2.71E-12	9.70E-13	1E-08	3E-13
Aroclor-1254	NA	4.00E-01	2.38E-09	2.07E-08		7.98E-11		3E-11
Metals								
Lead	NA	NA	1.45E-06	1.26E-05				
Mercury	8.57E-05	NA	1.70E-09	3.85E-08	1.60E-10		2E-06	
Total Hazard Quotient and Cancer Risk:							**2E-06**	**1E-10**

Analyte	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Worker at On-Site Day Care Center Intake (mg/kg-day) (Car)	Worker at On-Site Day Care Center Hazard Quotient	Worker at On-Site Day Care Center Cancer Risk	Child at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Child at On-Site Day Care Center Intake (mg/kg-day) (Car)	Child at On-Site Day Care Center Hazard Quotient	Child at On-Site Day Care Center Cancer Risk
Volatile Organics												
Toluene	1.51E-11		1E-10									
Chlorobenzene	3.01E-11		5E-09									
Ethylbenzene	1.51E-11		5E-11									
Total Xylenes												
Semivolatile Organics												
Naphthalene	5.42E-09		6E-06		4.26E-11		5E-08		9.94E-11		1E-07	
2-Methylnaphthalene												
Acenaphthylene												
Acenaphthene												
Dibenzofuran												
Fluorene												
Phenanthrene												
Anthracene												
Carbazole												
Di-n-butylphthalate												
Fluoranthene												
Pyrene												
Benzo(a)anthracene												
Chrysene												
bis(2-Ethylhexyl)phthalate												
Benzo(b)fluoranthene												
Benzo(a)pyrene												
Indeno(1,2,3-cd)pyrene												
Dibenz(a,h)anthracene												
Benzo(ghi)perylene												
Pesticides												
delta-BHC												
gamma-BHC (Lindane)												
Heptachlor		1.23E-12		6E-12								
Aldrin		5.16E-13		9E-12		1.14E-12		2E-11		6.39E-13		1E-11
Heptachlor epoxide		2.37E-13		2E-12								
Dieldrin		6.45E-13		1E-11		1.43E-12		2E-11		7.98E-13		1E-11
4,4'-DDE												
4,4'-DDD												
4,4'-DDT		1.57E-11		5E-12		3.47E-11		1E-11		1.94E-11		7E-12
alpha-Chlordane	2.41E-10	3.44E-12	1E-06	1E-12	1.06E-11	3.80E-12	5E-08	1E-12	2.48E-11	2.13E-12	1E-07	7E-13
gamma-Chlordane	2.86E-10	4.09E-12	1E-06	1E-12	2.26E-12	8.08E-13	1E-08	3E-13	5.28E-12	4.52E-13	3E-08	2E-13
Aroclor-1254		3.01E-11		1E-11		6.65E-11		3E-11		3.73E-11		1E-11
Metals												
Lead												
Mercury	3.92E-09		5E-05		1.33E-10		2E-06		3.11E-10		4E-06	
Total Hazard Quotient and Cancer Risk:			**5E-05**	**5E-11**			**2E-06**	**8E-11**			**4E-06**	**5E-11**

Assumptions for Industrial Worker

CA = EPC Surface Only
BW = 70 kg
IR = 9.6 m3/day
EF = 250 days/year
ED = 25 years
AT (Nc) = 9,125 days
AT (Car) = 25,550 days

Assumptions for Construction Worker

CA = EPC Surface and Sub-Surface
BW = 70 kg
IR = 10.4 m3/day
EF = 250 days/year
ED = 1 year
AT (Nc) = 365 days
AT (Car) = 25,550 days

Assumptions for Worker at On-Site Day Care Center

CA = EPC Surface Only
BW = 70 kg
IR = 8 m3/day
EF = 250 days/year
ED = 25 years
AT (Nc) = 9,125 days
AT (Car) = 25,550 days

Assumptions for Child at On-Site Day Care Center

CA = EPC Surface Only
BW = 15 kg
IR = 4 m3/day
EF = 250 days/year
ED = 6 years
AT (Nc) = 2,190 days
AT (Car) = 25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE A-6 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE A-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Industrial Worker Intake (mg/kg-day)		Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at On-Site Day Care Center Intake (mg/kg-day)		Worker at On-Site Day Care Center Hazard Quotient	Worker at On-Site Day Care Center Cancer Risk	Child at On-Site Day Care Center Intake (mg/kg-day)		Child at On-Site Day Care Center Hazard Quotient	Child at On-Site Day Care Center Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics																				
Toluene	2.00E-01	NA		1.00E-03					4.70E-09		2E-08									
Chlorobenzene	2.00E-02	NA		2.00E-03					9.39E-09		5E-07									
Ethylbenzene	1.00E-01	NA		1.00E-03					4.70E-09		5E-08									
Total Xylenes	2.00E+00	NA		2.00E-03					9.39E-09		5E-09									
Semivolatile Organics																				
Naphthalene	2.00E-02	NA	3.20E-02	3.60E-01	3.13E-08		2E-06		1.69E-06		8E-05		3.13E-08		2E-06		2.92E-07		1E-05	
2-Methylnaphthalene	4.00E-02	NA	2.70E-02	1.40E-01	2.64E-08		7E-07		6.58E-07		2E-05		2.64E-08		7E-07		2.47E-07		6E-06	
Acenaphthylene	NA	NA	2.90E-02	4.00E-02																
Acenaphthene	6.00E-02	NA	1.30E-01	7.90E-01	1.27E-07		2E-06		3.71E-06		6E-05		1.27E-07		2E-06		1.19E-06		2E-05	
Dibenzofuran	NA	NA	3.90E-02	3.60E-01																
Fluorene	4.00E-02	NA	8.70E-02	6.10E-01	8.51E-08		2E-06		2.86E-06		7E-05		8.51E-08		2E-06		7.95E-07		2E-05	
Phenanthrene	NA	NA	1.20E+00	4.30E+00																
Anthracene	3.00E-01	NA	2.60E-01	1.10E+00	2.54E-07		8E-07		5.17E-06		2E-05		2.54E-07		8E-07		2.37E-06		8E-06	
Carbazole	NA	2.00E-02	2.40E-01	8.60E-01		8.39E-08		2E-09		5.77E-08		1E-09		8.39E-08		2E-09		1.88E-07		4E-09
Di-n-butylphthalate	1.00E-01	NA	5.60E-02	7.00E-02	5.48E-08		5E-07		3.29E-07		3E-06		5.48E-08		5E-07		5.11E-07		5E-06	
Fluoranthene	4.00E-02	NA	2.50E+00	6.20E+00	2.45E-06		6E-05		2.91E-05		7E-04		2.45E-06		6E-05		2.28E-05		6E-04	
Pyrene	3.00E-02	NA	2.40E+00	5.10E+00	2.35E-06		8E-05		2.40E-05		8E-04		2.35E-06		8E-05		2.19E-05		7E-04	
Benzo(a)anthracene	NA	7.30E-01	1.20E+00	2.60E+00		4.19E-07		3E-07		1.74E-07		1E-07		4.19E-07		3E-07		9.39E-07		7E-07
Chrysene	NA	7.30E-03	1.20E+00	2.30E+00		4.19E-07		3E-09		1.54E-07		1E-09		4.19E-07		3E-09		9.39E-07		7E-09
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	9.50E-02	2.40E-01	9.30E-08	3.32E-08	5E-06	5E-10	1.13E-06	1.61E-08	6E-05	2E-10	9.30E-08	3.32E-08	5E-06	5E-10	8.68E-07	7.44E-08	4E-05	1E-09
Benzo(b)fluoranthene	NA	7.30E-01		4.70E+00						3.15E-07		2E-07								
Benzo(a)pyrene	NA	7.30E+00	9.90E-01	2.10E+00		3.46E-07		3E-06		1.41E-07		1E-06		3.46E-07		3E-06		7.75E-07		6E-06
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	5.70E-01	1.10E+00		1.99E-07		1E-07		7.38E-08		5E-08		1.99E-07		1E-07		4.46E-07		3E-07
Dibenz(a,h)anthracene	NA	7.30E+00	2.90E-01	6.70E-01		1.01E-07		7E-07		4.50E-08		3E-07		1.01E-07		7E-07		2.27E-07		2E-06
Benzo(ghi)perylene	NA	NA	4.60E-01	7.60E-01																
Pesticides/PCBs																				
delta-BHC	NA	NA	9.40E-04	9.40E-04																
gamma-BHC (Lindane)	3.00E-04	1.30E+00		1.30E-03					6.11E-09	8.72E-11	2E-05	1E-10								
Heptachlor	5.00E-04	4.50E+00		5.70E-03					2.68E-08	3.82E-10	5E-05	2E-09								
Aldrin	3.00E-05	1.70E+01	2.40E-03	2.40E-03	2.35E-09	8.39E-10	8E-05	1E-08	1.13E-08	1.61E-10	4E-04	3E-09	2.35E-09	8.39E-10	8E-05	1E-08	2.19E-08	1.88E-09	7E-04	3E-08
Heptachlor epoxide	1.30E-05	9.10E+00		1.10E-03					5.17E-09	7.38E-11	4E-04	7E-10								
Dieldrin	5.00E-05	1.60E+01	3.00E-03	3.00E-03	2.94E-09	1.05E-09	6E-05	2E-08	1.41E-08	2.01E-10	3E-04	3E-09	2.94E-09	1.05E-09	6E-05	2E-08	2.74E-08	2.35E-09	5E-04	4E-08
4,4'-DDE	NA	3.40E-01	5.50E-02	5.50E-02		1.92E-08		7E-09		3.69E-09		1E-09		1.92E-08		7E-09		4.31E-08		1E-08
4,4'-DDD	NA	2.40E-01	1.60E-02	1.60E-02		5.59E-09		1E-09		1.07E-09		3E-10		5.59E-09		1E-09		1.25E-08		3E-09
4,4'-DDT	5.00E-04	3.40E-01	7.30E-02	7.30E-02	7.14E-08	2.55E-08	1E-04	9E-09	3.43E-07	4.90E-09	7E-04	2E-09	7.14E-08	2.55E-08	1E-04	9E-09	6.67E-07	5.71E-08	1E-03	2E-08
alpha-Chlordane	5.00E-04	3.50E-01	8.00E-03	1.60E-02	7.83E-09	2.80E-09	2E-05	1E-09	7.51E-08	1.07E-09	2E-04	4E-10	7.83E-09	2.80E-09	2E-05	1E-09	7.31E-08	6.26E-09	1E-04	2E-09
gamma-Chlordane	5.00E-04	3.50E-01	1.70E-03	1.90E-02	1.66E-09	5.94E-10	3E-06	2E-10	8.92E-08	1.27E-09	2E-04	4E-10	1.66E-09	5.94E-10	3E-06	2E-10	1.55E-08	1.33E-09	3E-05	5E-10
Aroclor-1254	2.00E-05	2.00E+00	1.40E-01	1.40E-01	1.37E-07	4.89E-08	7E-03	1E-07	6.58E-07	9.39E-09	3E-02	2E-08	1.37E-07	4.89E-08	7E-03	1E-07	1.28E-06	1.10E-07	6E-02	2E-07
Metals																				
Lead	NA	NA	8.51E+01	8.51E+01																
Mercury	3.00E-04	NA	1.00E-01	2.60E-01	9.78E-08		3E-04		1.22E-06		4E-03		9.78E-08		3E-04		9.13E-07		3E-03	
Total Hazard Quotient and Cancer Risk:							**8E-03**	**4E-06**			**4E-02**	**2E-06**			**8E-03**	**4E-06**			**7E-02**	**9E-06**

Assumptions for Industrial Worker		
CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Construction Worker		
CF =	1E-06	kg/mg
CS =	EPC Surface and Subsurfa	
BW =	70	kg
IR =	480	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Assumptions for Worker at On-Site Day Care Center		
CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Child at On-Site Day Care Center		
CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1

TABLE A-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Surface Soil	EPC from Total Soils	Industrial Worker				Construction Worker				Worker at On-Site Day Care Center				Child at On-Site Day Care Center			
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(mg/kg)	Absorbed Dose (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk
Volatile Organics																					
Toluene	2.00E-01	NA	NA	ND	1.00E-03																
Chlorobenzene	NA	NA	NA	ND	2.00E-03																
Ethylbenzene	NA	NA	NA	ND	1.00E-03																
Total Xylenes	1.80E+00	NA	NA	ND	2.00E-03																
Semivolatile Organics																					
Naphthalene	2.00E-02	NA	NA	3.20E-02	3.60E-01																
2-Methylnaphthalene	4.00E-02	NA	NA	2.70E-02	1.40E-01																
Acenaphthylene	NA	NA	NA	2.90E-02	4.00E-02																
Acenaphthene	6.00E-02	NA	NA	1.30E-01	7.90E-01																
Dibenzofuran	NA	NA	NA	3.90E-02	3.60E-01																
Fluorene	4.00E-02	NA	NA	8.70E-02	6.10E-01																
Phenanthrene	NA	NA	NA	1.20E+00	4.30E+00																
Anthracene	3.00E-01	NA	NA	2.60E-01	1.10E+00																
Carbazole	NA	2.00E-02	NA	2.40E-01	8.60E-01																
Di-n-butylphthalate	9.00E-02	NA	NA	5.60E-02	7.00E-02																
Fluoranthene	4.00E-02	NA	NA	2.50E+00	6.20E+00																
Pyrene	3.00E-02	NA	NA	2.40E+00	5.10E+00																
Benzo(a)anthracene	NA	7.30E-01	NA	1.20E+00	2.60E+00																
Chrysene	NA	7.30E-03	NA	1.20E+00	2.30E+00																
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	9.50E-02	2.40E-01																
Benzo(b)fluoranthene	NA	7.30E-01	NA		4.70E+00																
Benzo(a)pyrene	NA	1.46E+01	NA	9.90E-01	2.10E+00																
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	5.70E-01	1.10E+00																
Dibenz(a,h)anthracene	NA	7.30E+00	NA	2.90E-01	6.70E-01																
Benzo(ghi)perylene	NA	NA	NA	4.60E-01	7.60E-01																
Pesticides/PCBs																					
delta-BHC	NA	NA	NA	9.40E-04	9.40E-04																
gamma-BHC (Lindane)	3.00E-04	1.80E+00	NA	ND	1.30E-03																
Heptachlor	5.00E-04	4.50E+00	NA	ND	5.70E-03																
Aldrin	1.50E-05	3.40E+01	NA	2.40E-03	2.40E-03																
Heptachlor epoxide	1.30E-05	9.10E+00	NA	ND	1.10E-03																
Dieldrin	2.50E-05	3.20E+01	NA	3.00E-03	3.00E-03																
4,4'-DDE	NA	1.70E+00	NA	5.50E-02	5.50E-02																
4,4'-DDD	NA	1.20E+00	NA	1.60E-02	1.60E-02																
4,4'-DDT	1.00E-04	1.70E+00	NA	7.30E-02	7.30E-02																
alpha-Chlordane	5.00E-04	3.50E-01	NA	8.00E-03	1.60E-02																
gamma-Chlordane	5.00E-04	3.50E-01	NA	1.70E-03	1.90E-02																
Aroclor-1254	1.80E-05	2.22E+00	6.00E-02	1.40E-01	1.40E-01	4.77E-07	1.70E-07	3E-02	4E-07	4.77E-07	6.81E-09	3E-02	2E-08	4.77E-07	1.70E-07	3E-02	4E-07	8.40E-07	7.20E-08	5E-02	2E-07
Metals																					
Lead	NA	NA	NA	8.51E+01	8.51E+01																
Mercury	3.00E-06	NA	NA	1.00E-01	2.60E-01																
Total Hazard Quotient and Cancer Risk:								3E-02	4E-07			3E-02	2E-08			3E-02	4E-07			5E-02	2E-07

	Assumptions for Industrial Worker	Assumptions for Construction Worker	Assumptions for Worker at On-Site Day Care Center	Assumptions for Child at On-Site Day Care Center
CF =	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg
CS =	EPC Surface Only	EPC Surface and Subsurface	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	15 kg
SA =	5,800 cm2	5,800 cm2	5,800 cm2	2,190 cm2
AF =	1 mg/cm2	1 mg/cm2	1 mg/cm2	1 mg/cm2
EF =	250 days/year	250 days/year	250 days/year	250 days/year
ED =	25 years	1 years	25 years	6 years
AT (Nc) =	9,125 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1

TABLE A-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e.oral RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE A-11
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP1	BAF2	Deer Mouse Exposure (mg/kg/day) 3	Short-tailed Shrew Exposure (mg/kg/day) 3	American Robin Exposure (mg/kg/day)
Semivolatile Organics						
2-Methylnaphthalene	2.70E-02	1.63E-01	3.42E-01	1.59E-03	5.75E-03	3.52E-03
Acenaphthene	1.30E-01	2.10E-01	3.42E-01	8.32E-03	2.79E-02	1.86E-02
Acenaphthylene	2.90E-02	1.72E-01	1.00E+00	3.80E-03	1.70E-02	4.52E-03
Anthracene	2.60E-01	1.04E-01	5.10E-02	5.49E-03	1.19E-02	2.69E-02
Benzo(a)anthracene	1.20E+00	1.51E-02	1.25E-01	2.34E-02	1.02E-01	9.80E-02
Benzo(a)pyrene	9.90E-01	1.02E+00	4.50E+00	5.95E-01	2.58E+00	5.09E-01
Benzo(ghi)perylene	4.60E-01	3.05E-03	2.40E-01	1.41E-02	6.89E-02	3.79E-02
bis(2-Ethylhexyl)phthalate	9.50E-02	5.10E-03	1.20E+01	1.24E-01	6.49E-01	4.73E-02
Carbazole	2.40E-01	1.00E+00	1.15E+02	3.01E+00	1.57E+01	1.06E+00
Chrysene	1.20E+00	2.22E-02	1.75E-01	3.08E-02	1.36E-01	1.02E-01
Dibenz(a,h)anthracene	2.90E-01	8.16E-03	1.75E-01	7.01E-03	2.89E-02	2.36E-02
Dibenzofuran	3.90E-02	1.51E-01	1.00E+00	5.02E-03	2.29E-02	5.85E-03
Di-n-butylphthalate	5.60E-02	8.84E-02	1.25E-01	1.54E-03	4.88E-03	5.71E-03
Fluoranthene	2.50E+00	3.72E-02	7.92E-01	2.35E-01	1.16E+00	2.78E-01
Fluorene	8.70E-02	1.49E-01	3.42E-01	4.99E-03	1.85E-02	1.10E-02
Indeno(1,2,3-cd)pyrene	5.70E-01	1.37E-03	4.19E-01	2.84E-02	1.43E-01	5.03E-02
Naphthalene	3.20E-02	4.43E-01	3.42E-01	2.85E-03	7.10E-03	6.65E-03
Phenanthrene	1.20E+00	1.02E-01	1.22E-01	3.44E-02	1.03E-01	1.27E-01
Pyrene	2.40E+00	4.43E-02	9.20E-02	4.59E-02	1.61E-01	2.13E-01
Pesticides/PCBs						
4,4'-DDD	1.60E-02	1.34E-02	1.00E-01	2.66E-04	1.13E-03	1.28E-03
4,4'-DDE	5.50E-02	1.79E-02	2.50E-02	4.97E-04	1.55E-03	4.34E-03
4,4'-DDT	7.30E-02	1.00E-02	1.00E-01	1.19E-03	5.14E-03	5.79E-03
Aldrin	2.40E-03	1.00E-02	3.50E+00	9.20E-04	4.80E-03	4.78E-04
alpha-Chlordane	8.00E-03	1.45E-02	2.40E-01	2.55E-04	1.20E-03	6.84E-04
Aroclor-1254	1.40E-01	7.05E-03	4.50E+00	6.88E-02	3.60E-01	3.27E-02
delta-BHC	9.40E-04	3.00E-01	2.80E+02	2.85E-02	1.50E-01	9.43E-03
Dieldrin	3.00E-03	1.20E-01	4.70E-02	6.73E-05	1.32E-04	3.24E-04
gamma-Chlordane	1.70E-03	2.40E-02	2.40E-01	5.60E-05	2.56E-04	1.50E-04
Metals						
Lead	8.51E+01	5.80E-03	2.10E+00	1.97E+01	1.03E+02	6.92E+01
Mercury	1.00E-01	9.00E-01	2.30E+01	2.51E-01	1.31E+00	8.23E-01

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as
ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW
Where, ED = exposure dose
Cs = RME conc in soil (mg/kg)
CF = plant dry-to-wet-weight conversion factor
(0.2 for inorganics only, 1 for organics)
SP = soil-to-plant uptake factor
Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
BAF = bioaccumulation factor (unitless)
Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
SFF = Site foraging factor (1 for mouse and shrew; 0.583 for robin)
BW = body weight (0.02 kg for mouse, 0.015 kg for shrew, 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE A-12
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-9 - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Semivolatile Organics					
2-Methylnaphthalene	1.59E-03	5.75E-03	7.16E+00	2.2E-04	8.0E-04
Acenaphthene	8.32E-03	2.79E-02	1.75E+00	4.8E-03	1.6E-02
Acenaphthylene	3.80E-03	1.70E-02	1.00E+00	3.8E-03	1.7E-02
Anthracene	5.49E-03	1.19E-02	1.00E+02	5.5E-05	1.2E-04
Benzo(a)anthracene	2.34E-02	1.02E-01	1.00E+00	2.3E-02	1.0E-01
Benzo(a)pyrene	5.95E-01	2.58E+00	1.00E+00	5.9E-01	2.6E+00
Benzo(ghi)perylene	1.41E-02	6.89E-02	1.00E+00	1.4E-02	6.9E-02
bis(2-Ethylhexyl)phthalate	1.24E-01	6.49E-01	1.83E+01	6.7E-03	3.5E-02
Carbazole	3.01E+00	1.57E+01	none available	--	--
Chrysene	3.08E-02	1.36E-01	1.00E+00	3.1E-02	1.4E-01
Dibenz(a,h)anthracene	7.01E-03	2.89E-02	1.00E+00	7.0E-03	2.9E-02
Dibenzofuran	5.02E-03	2.29E-02	no data	--	--
Di-n-butylphthalate	1.54E-03	4.88E-03	5.50E+02	2.8E-06	8.9E-06
Fluoranthene	2.35E-01	1.16E+00	1.25E+00	1.9E-01	9.3E-01
Fluorene	4.99E-03	1.85E-02	1.25E+00	4.0E-03	1.5E-02
Indeno(1,2,3-cd)pyrene	2.84E-02	1.43E-01	1.00E+00	2.8E-02	1.4E-01
Naphthalene	2.85E-03	7.10E-03	7.16E+00	4.0E-04	9.9E-04
Phenanthrene	3.44E-02	1.03E-01	1.00E+00	3.4E-02	1.0E-01
Pyrene	4.59E-02	1.61E-01	1.00E+00	4.6E-02	1.6E-01
Pesticides/PCBs					
4,4'-DDD	2.66E-04	1.13E-03	8.00E-01	3.3E-04	1.4E-03
4,4'-DDE	4.97E-04	1.55E-03	8.00E-01	6.2E-04	1.9E-03
4,4'-DDT	1.19E-03	5.14E-03	8.00E-01	1.5E-03	6.4E-03
Aldrin	9.20E-04	4.80E-03	2.00E-01	4.6E-03	2.4E-02
alpha-Chlordane	2.55E-04	1.20E-03	none available	--	--
Aroclor-1254	6.88E-02	3.60E-01	6.80E-02	1.0E+00	5.3E+00
delta-BHC	2.85E-02	1.50E-01	1.60E+00	1.8E-02	9.3E-02
Dieldrin	6.73E-05	1.32E-04	2.00E-02	3.4E-03	6.6E-03
gamma-Chlordane	5.60E-05	2.56E-04	4.58E+00	1.2E-05	5.6E-05
Metals					
Lead	1.97E+01	1.03E+02	8.00E+00	2.5E+00	1.3E+01
Mercury	2.51E-01	1.31E+00	none available	--	--

(1) Receptor exposure from Table A-11.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE A-13
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-9 - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Semivolatile Organics			
2-Methylnaphthalene	3.52E-03	2.85E+01	1.2E-04
Acenaphthene	1.86E-02	1.00E+03	1.9E-05
Acenaphthylene	4.52E-03	1.00E+03	4.5E-06
Anthracene	2.69E-02	1.00E+03	2.7E-05
Benzo(a)anthracene	9.80E-02	4.00E+01	2.4E-03
Benzo(a)pyrene	5.09E-01	4.00E+01	1.3E-02
Benzo(ghi)perylene	3.79E-02	4.00E+01	9.5E-04
bis(2-Ethylhexyl)phthalat	4.73E-02	1.10E+00	4.3E-02
Carbazole	1.06E+00	none available	--
Chrysene	1.02E-01	4.00E+01	2.6E-03
Dibenz(a,h)anthracene	2.36E-02	4.00E+01	5.9E-04
Dibenzofuran	5.85E-03	2.18E-01	2.7E-02
Di-n-butylphthalate	5.71E-03	1.10E-01	5.2E-02
Fluoranthene	2.78E-01	4.00E+01	7.0E-03
Fluorene	1.10E-02	2.85E+01	3.9E-04
Indeno(1,2,3-cd)pyrene	5.03E-02	4.00E+01	1.3E-03
Naphthalene	6.65E-03	2.85E+01	2.3E-04
Phenanthrene	1.27E-01	2.85E+01	4.5E-03
Pyrene	2.13E-01	4.00E+01	5.3E-03
Pesticides/PCBs			
4,4'-DDD	1.28E-03	5.60E-02	2.3E-02
4,4'-DDE	4.34E-03	5.60E-02	7.7E-02
4,4'-DDT	5.79E-03	5.60E-02	1.0E-01
Aldrin	4.78E-04	5.00E-01	9.6E-04
alpha-Chlordane	6.84E-04	2.14E+00	3.2E-04
Aroclor-1254	3.27E-02	9.80E-01	3.3E-02
delta-BHC	9.43E-03	5.60E-01	1.7E-02
Dieldrin	3.24E-04	7.70E-02	4.2E-03
gamma-Chlordane	1.50E-04	2.14E+00	7.0E-05
Metals			
Lead	6.92E+01	3.85E+00	1.8E+01
Mercury	8.23E-01	4.50E-01	1.8E+00

(1) Receptor exposure from Table A-11.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX B

SEAD-27: Building 360 - Steam Cleaning Waste Tank

Table B-1: Soil Analysis Results
Table B-2: Groundwater Analysis Results
Table B-3: Inorganics Analysis of Soil
Table B-4: Inorganics Analysis of Groundwater
Table B-5: Exposure Point Concentrations for Chemicals of Potential Concern
Table B-6: Calculation of Intake and Risk from the Ingestion of Groundwater
Table B-7: Calculated Soil Receptor Exposure

TABLE B-1
SOIL ANALYSIS RESULTS - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-27	SEAD-27	SEAD-27	SEAD-27
							LOCATION ID	CS-1	CS-2	CS-2dup	CS-3
							MATRIX	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER				
							SAMP_DEPTH_TOP	1	1	1	0
							SAMP_DEPTH_BOT	3	3	3	1.5
							SAMP_DATE	1995	1995	1995	1995
							SAMPLE TYPE	SA	SA	DU	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value
METALS											
Chromium	MG/KG	28	100.00%	29.6	0	4	4	20.7	24.7	28	18.4
Lead	MG/KG	7.9	100.00%	24.8	0	4	4	7.9	7.8	7.3	5.7

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
TAGM for some metals in soil based on values in referenced document or site background.

TABLE B-2
GROUND WATER ANALYSIS RESULTS - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot

SEAD								SEAD-27	SEAD-27	SEAD-27	SEAD-27	SEAD-27	SEAD-27	SEAD-27
LOCATION ID								MW-1	MW-2	MW1-1	MW2-1	MW1-2	MW1-2dup	MW2-2
MATRIX								GRND WTR	GRND WTR	GRND WTR	GRND WTR	GRND WTR	GRND WTR	GRND WTR
SAMPLE NUMBER														
SAMP_DEPTH_TOP														
SAMP_DEPTH_BOT														
SAMP_DATE								Feb-95	Feb-95	Mar-95	Mar-95	Apr-95	Apr-95	Apr-95
SAMPLE TYPE								SA	SA	SA	SA	SA	DU	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS														
1,1-Dichloroethane	UG/L	38.3	100.00%	5	3	3	3							
1,1,2,2-Tetrachloroethane	UG/L	7.6	100.00%	5	1	1	1							
Acetone	UG/L	2000	100.00%	NA	0	4	4			2000		1700	1700	
Total Xylenes	UG/L	11	100.00%	5	1	1	1							
SEMIVOLATILE ORGANICS														
Methylnaphthalene	UG/L	110	100.00%	NA	0	1	1							
Naphthalene	UG/L	950	100.00%	NA	0	1	1							
METALS														
Chromium	UG/L	41.2	100.00%	50	0	3	3	20	41.2					13.3
Lead	UG/L	9.3	100.00%	25	0	2	2	5.4	9.3					

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available

TABLE B-2
GROUND WATER ANALYSIS RESULTS - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot

SEAD								SEAD-27	SEAD-27	SEAD-27
LOCATION ID								MW1-3	MW2-3	MW1-3dup
MATRIX								RND WTR	GRND WTR	GRND WTR
SAMPLE NUMBER										
SAMP_DEPTH_TOP										
SAMP_DEPTH_BOT										
SAMP_DATE								May-95	May-95	May-95
SAMPLE TYPE								SA	SA	DU
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS										
1,1-Dichloroethane	UG/L	38.3	100.00%	5	3	3	3	7	38.3	7.6
1,1,2,2-Tetrachloroethane	UG/L	7.6	100.00%	5	1	1	1			7.6
Acetone	UG/L	2000	100.00%	NA	0	4	4	110		150
Total Xylenes	UG/L	11	100.00%	5	1	1	1			11
SEMIVOLATILE ORGANICS										
Methylnaphthalene	UG/L	110	100.00%	NA	0	1	1		110	
Naphthalene	UG/L	950	100.00%	NA	0	1	1		950	
METALS										
Chromium	UG/L	41.2	100.00%	50	0	3	3			
Lead	UG/L	9.3	100.00%	25	0	2	2			

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available

TABLE B-3
INORGANICS ANALYSIS OF SOIL - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-27 Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Chromium	20.32	40.64	22.95	No
Lead	16.47	32.95	7.18	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE B-4
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-27 Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Chromium	8.67	17.35	24.83	Yes
Lead	6.59	13.18	7.35	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE B-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-27
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Groundwater mg/L
Volatile Organics	
1,1-Dichloroethane	3.83E-02
1,1,2,2-Tetrachloroethane	7.60E-03
Acetone	2.00E+00
Total Xylenes	1.10E-02
Semivolatile Organics	
Methylnaphthalene	1.10E-01
Naphthalene	9.50E-01
Metals	
Chromium	4.12E-02

TABLE B-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Industrial Worker Intake (mg/kg-day) (Nc)	Industrial Worker Intake (mg/kg-day) (Car)	Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Worker at On-Site Day Care Center Intake (mg/kg-day) (Car)	Worker at On-Site Day Care Center Hazard Quotient	Worker at On-Site Day Care Center Cancer Risk	Child at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Child at On-Site Day Care Center Intake (mg/kg-day) (Car)	Child at On-Site Day Care Center Hazard Quotient	Child at On-Site Day Care Center Cancer Risk
Volatile Organics																			
1,1-Dichloroethane	1.00E-01	NA	3.83E-02	3.75E-04		4E-03		**Ingestion of Groundwater**				3.75E-04		4E-03		1.75E-03		2E-02	
1,1,2,2-Tetrachloroethane	NA	2.00E-01	7.60E-03		2.66E-05		5E-06	**Not Applicable**					2.66E-05		5E-06		2.97E-05		6E-06
Acetone	1.00E-01	NA	2.00E+00	1.96E-02		2E-01		**for Construction Worker**				1.96E-02		2E-01		9.13E-02		9E-01	
Total Xylenes	2.00E+00	NA	1.10E-02	1.08E-04		5E-05						1.08E-04		5E-05		5.02E-04		3E-04	
Semivolatile Organics																			
Methylnaphthalene	4.00E-02	NA	1.10E-01	1.08E-03		3E-02						1.08E-03		3E-02		5.02E-03		1E-01	
Naphthalene	2.00E-02	NA	9.50E-01	9.30E-03		5E-01						9.30E-03		5E-01		4.34E-02		2E+00	
Metals																			
Chromium*	1.50E+00	NA	4.12E-02	4.03E-04		3E-04						4.03E-04		3E-04		1.88E-03		1E-03	
Total Hazard Quotient and Cancer Risk:						**7E-01**	**5E-06**							**7E-01**	**5E-06**			**3E+00**	**6E-06**

Assumptions for Industrial Worker

BW =	70	kg
IR =	1	liters/day
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Worker at On-Site Day Care Center

BW =	70	kg
IR =	1	liters/day
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Child at On-Site Day Care Center

BW =	15	kg
IR =	1	liters/day
EF =	250	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available
*Oral Rfd for Chromium III was used in this assessment.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1

TABLE B-7
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

There are no chemicals of potential concern in SEAD-27 soils, therefore, an ecological risk assessment was not performed.

APPENDIX C

SEAD-28: Building 360 - Underground Waste Oil Tanks (2)

Table C-1: Soil Analysis Results
Table C-2: Exposure Point Concentrations for Chemicals of Potential Concern

TABLE C-1
SOIL ANALYSIS RESULTS - SEAD-28
Decsision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD	SEAD-28
LOCATION ID	355-1
MATRIX	SOIL
SAMPLE NUMBER	SA0416
SAMP_DEPTH_TOP	
SAMP_DEPTH_BOT	
SAMP_DATE	12/22/94
SAMPLE TYPE	SA

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)
SEMIVOLATILE ORGANICS								
Acenaphthene	UG/KG	0	0.00%	50000	0	0	1	370 U
Anthracene	UG/KG	0	0.00%	50000	0	0	1	370 U
Benzo(a)anthracene	UG/KG	0	0.00%	224	0	0	1	370 U
Benzo(a)pyrene	UG/KG	0	0.00%	61	0	0	1	370 U
Benzo(b)fluoranthene	UG/KG	0	0.00%	1100	0	0	1	370 U
Benzo(ghi)perylene	UG/KG	0	0.00%	50000	0	0	1	370 U
Benzo(k)fluoranthene	UG/KG	0	0.00%	1100	0	0	1	370 U
Chrysene	UG/KG	0	0.00%	400	0	0	1	370 U
Dibenzo(a,h)anthracene	UG/KG	0	0.00%	14	0	0	1	370 U
Fluoranthene	UG/KG	0	0.00%	50000	0	0	1	370 U
Fluorene	UG/KG	0	0.00%	50000	0	0	1	370 U
Indeno(1,2,3-cd)pyrene	UG/KG	0	0.00%	3200	0	0	1	370 U
Phenanthrene	UG/KG	0	0.00%	50000	0	0	1	370 U
Pyrene	UG/KG	0	0.00%	50000	0	0	1	370 U

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)

TABLE C-2
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-28
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

There are no chemicals of potential concern for SEAD-28 soils.

APPENDIX D

SEAD-32: Building 718 - Underground Waste Oil Tanks (2)

Table D-1: Soil Analysis Results

Table D-2: Groundwater Analysis Results

Table D-3: Exposure Point Concentrations for Chemicals of Potential Concern

Table D-4: Ambient Air Exposure Point Concentrations

Table D-5: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air

Table D-6: Calculation of Intake and Risk from the Ingestion of Soil

Table D-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil

TABLE D-1
SOIL ANALYSIS RESULTS - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SEAD: SEAD-32 LOCATION ID: MATRIX: SOIL SAMPLE NUMBER: SB32-1 SAMP_DEPTH_TOP: 2 SAMP_DEPTH_BOT: 4 SAMPLE DATE: 01/10/94 SAMPLE TYPE: Value (Q)	SEAD: SEAD-32 LOCATION ID: MATRIX: SOIL SAMPLE NUMBER: SB32-2 SAMP_DEPTH_TOP: 2 SAMP_DEPTH_BOT: 4 SAMPLE DATE: 01/10/94 SAMPLE TYPE: Value (Q)
VOLATILE ORGANICS									
1,1,1-Trichloroethane	ug/Kg	0	0%	800	0	0	2	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/Kg	0	0%	600	0	0	2	12 U	11 U
1,1,2-Trichloroethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
1,1-Dichloroethane	ug/Kg	0	0%	200	0	0	2	12 U	11 U
1,1-Dichloroethene	ug/Kg	0	0%	400	0	0	2	12 U	11 U
1,2-Dichloroethane	ug/Kg	0	0%	100	0	0	2	12 U	11 U
1,2-Dichloroethene (total)	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
1,2-Dichloropropane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
2-Butanone	ug/Kg	0	0%	300	0	0	2	12 U	11 U
2-Hexanone	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
4-Methyl-2-Pentanone	ug/Kg	0	0%	1000	0	0	2	12 U	11 U
Acetone	ug/Kg	0	0%	200	0	0	2	12 U	11 U
Benzene	ug/Kg	0	0%	60	0	0	2	12 U	11 U
Bromodichloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Bromoform	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Bromomethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Carbon Disulfide	ug/Kg	0	0%	2700	0	0	2	12 U	11 U
Carbon Tetrachloride	ug/Kg	0	0%	600	0	0	2	12 U	11 U
Chlorobenzene	ug/Kg	0	0%	1700	0	0	2	12 U	11 U
Chloroethane	ug/Kg	0	0%	1900	0	0	2	12 U	11 U
Chloroform	ug/Kg	0	0%	300	0	0	2	12 U	11 U
Chloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
cis-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Dibromochloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Ethylbenzene	ug/Kg	0	0%	5500	0	0	2	12 U	11 U
Methylene Chloride	ug/Kg	1	50%	100	0	1	2	12 U	1 J
Styrene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Tetrachloroethene	ug/Kg	0	0%	1400	0	0	2	12 U	11 U
Toluene	ug/Kg	0	0%	1500	0	0	2	12 U	11 U
trans-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Trichloroethene	ug/Kg	0	0%	700	0	0	2	12 U	11 U
Vinyl Chloride	ug/Kg	0	0%	200	0	0	2	12 U	11 U
Xylene (total)	ug/Kg	0	0%	1200	0	0	2	12 U	11 U
OTHER ANALYSES									
Total Solids	%W/W	83.2	100%	NA	0	2	2	83.2	82
Total Petroleum Hydrocarbons	mg/Kg	90	100%	NA	0	2	2	90	81

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) NA = Not Available
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
Samples collected during the Limited Sampling Program and reported in the SWMU Classification Report, September 1994.

TABLE D-2
GROUNDWATER ANALYSIS RESULTS - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								MATRIX	WATER	WATER	WATER
								LOCATION	SEAD-32	SEAD-32	SEAD-32
								SAMPLE DATE	02/05/94	02/05/94	02/05/94
								ES ID	MW32-1	MW32-2	MW32-3
								LAB ID	210485	210487	210488
								SDG NUMBER			
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS											
1,1,1-Trichloroethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,1,2-Trichloroethane	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
1,1-Dichloroethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,1-Dichloroethene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,2-Dichloroethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,2-Dichloroethene (total)	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
1,2-Dichloropropane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
2-Butanone	ug/L	0	0%	50	0	0	3		10 U	10 U	10 U
2-Hexanone	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
4-Methyl-2-Pentanone	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Acetone	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Benzene	ug/L	0	0%	0.7	0	0	3		10 U	10 U	10 U
Bromodichloromethane	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Bromoform	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Bromomethane	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Carbon Disulfide	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Carbon Tetrachloride	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Chlorobenzene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Chloroethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Chloroform	ug/L	0	0%	7	0	0	3		10 U	10 U	10 U
Chloromethane	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
cis-1,3-Dichloropropene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Dibromochloromethane	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Ethylbenzene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Methylene Chloride	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Styrene	ug/L	0	0%	NA	0	0	3		10 U	10 U	10 U
Tetrachloroethene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Toluene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
trans-1,3-Dichloropropene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Trichloroethene	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
Vinyl Chloride	ug/L	0	0%	2	0	0	3		10 U	10 U	10 U
Xylene (total)	ug/L	0	0%	5	0	0	3		10 U	10 U	10 U
OTHER ANALYSES											
Total Petroleum Hydrocarbons	mg/L	0.69	67%	NA	0	2	3		0.69	0.39 U	0.53

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available
c) U = The compound was not detected above this concentration.

TABLE D-3
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-32
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/L
Volatile Organics		
Methylene Chloride	1.00E-03	

TABLE D-4
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$	Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$
Variables: CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg) PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³ CF = Conversion Factor = 1E-9 kg/ug	Variables: CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg) PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³ CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Methylene chloride	ND	1.00E-03	ND	1.48E-10

ND = Compound was not detected.

TABLE D-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Institution Worker Intake (mg/kg-day) (Nc)	Institution Worker Intake (mg/kg-day) (Car)	Institution Worker Hazard Quotient	Institution Worker Cancer Risk	Institution Student Intake (mg/kg-day) (Nc)	Institution Student Intake (mg/kg-day) (Car)	Institution Student Hazard Quotient	Institution Student Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Worker at On-Site Day Care Center Intake (mg/kg-day) (Car)	Worker at On-Site Day Care Center Hazard Quotient	Worker at On-Site Day Care Center Cancer Risk	Child at On-Site Day Care Center Intake (mg/kg-day) (Nc)	Child at On-Site Day Care Center Intake (mg/kg-day) (Car)	Child at On-Site Day Care Center Hazard Quotient	Child at On-Site Day Care Center Cancer Risk
Volatile Organics																								
Methylene chloride	8.57E-01	1.65E-03	ND	1.48E-10									1.51E-12	2.15E-14	2E-12	4E-17								
Total Hazard Quotient and Cancer Risk:															**2E-12**	**4E-17**								

	Assumptions for Institution Worker	Assumptions for Institution Student	Assumptions for Construction Worker	Assumptions for Worker at On-Site Day Care Center	Assumptions for Child at On-Site Day Care Center
CA =	EPC Surface Only	EPC Surface Only	EPC Surface and Sub-Surface	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	70 kg	15 kg
IR =	8 m3/day	16 m3/day	10.4 m3/day	8 m3/day	4 m3/day
EF =	25 days/year	36.5 days/year	25 days/year	25 days/year	25 days/year
ED =	25 years	2 years	1 year	25 years	6 years
AT (Nc) =	9,125 days	710 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE D-4 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Institutional Land provided in Table 3.3-2

TABLE D-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Institution Worker				Institution Student				Construction Worker				Worker at On-Site Day Care Center				Child at On-Site Day Care Center			
					Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics																								
Methylene chloride	6.00E-02	7.50E-03	NA	1.00E-03									4.70E-10	6.71E-12	8E-09	5E-14								
Total Hazard Quotient and Cancer Risk:															**8E-09**	**5E-14**								

	Assumptions for Institution Worker	Assumptions for Institution Student	Assumptions for Construction Worker	Assumptions for Worker at On-Site Day Care Center	Assumptions for Child at On-Site Day Care Center
CF =	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg
CS =	EPC Surface Only	EPC Surface Only	EPC Surface and Subsurfa	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	70 kg	15 kg
IR =	100 mg soil/day	200 mg soil/day	480 mg soil/day	100 mg soil/day	200 mg soil/day
FI =	1 unitless	1 unitless	1 unitless	1 unitless	1 unitless
EF =	25 days/year	36.5 days/year	25 days/year	25 days/year	25 days/year
ED =	25 years	2 years	1 year	25 years	6 years
AT (Nc) =	9,125 days	710 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Institutional Land provided in Table 3.3-2

TABLE D-7
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-32
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Since these compounds were not found, risks from this pathway were not quantified.

APPENDIX E
SEAD-33: Building 121 - Underground Waste Oil Tank

Table E-1: Soil Analysis Results
Table E-2: Exposure Point Concentrations for Chemicals of Potential Concern

TABLE E-1
SOIL ANALYSIS RESULTS - SEAD-33
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-33	SEAD-33	SEAD-33
							LOCATION ID			
							MATRIX	SOIL	SOIL	SOIL
							SAMPLE NUMBER	SB33-1.1	SB33-1.2	SB33-2.1
							SAMP_DEPTH_TOP	2-4	2-4	4-6
							SAMP_DEPTH_BOT	2-4	2-4	4-6
							SAMPLE DATE	12/16/93	12/16/93	12/15/93
							SAMPLE TYPE		SB33-1.1DUP	
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS										
1,1,1-Trichloroethane	ug/Kg	0	0%	800	0	0	3	11 U	11 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	0	0%	600	0	0	3	11 U	11 U	12 U
1,1,2-Trichloroethane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
1,1-Dichloroethane	ug/Kg	0	0%	200	0	0	3	11 U	11 U	12 U
1,1-Dichloroethene	ug/Kg	0	0%	400	0	0	3	11 U	11 U	12 U
1,2-Dichloroethane	ug/Kg	0	0%	100	0	0	3	11 U	11 U	12 U
1,2-Dichloroethene (total)	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
1,2-Dichloropropane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
2-Butanone	ug/Kg	0	0%	300	0	0	3	11 U	11 U	12 U
2-Hexanone	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
4-Methyl-2-Pentanone	ug/Kg	0	0%	1000	0	0	3	11 U	11 U	12 U
Acetone	ug/Kg	0	0%	200	0	0	3	11 U	11 U	12 U
Benzene	ug/Kg	0	0%	60	0	0	3	11 U	11 U	12 U
Bromodichloromethane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Bromoform	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Bromomethane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Carbon Disulfide	ug/Kg	0	0%	2700	0	0	3	11 U	11 U	12 U
Carbon Tetrachloride	ug/Kg	0	0%	600	0	0	3	11 U	11 U	12 U
Chlorobenzene	ug/Kg	0	0%	1700	0	0	3	11 U	11 U	12 U
Chloroethane	ug/Kg	0	0%	1900	0	0	3	11 U	11 U	12 U
Chloroform	ug/Kg	0	0%	300	0	0	3	11 U	11 U	12 U
Chloromethane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
cis-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Dibromochloromethane	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Ethylbenzene	ug/Kg	0	0%	5500	0	0	3	11 U	11 U	12 U
Methylene Chloride	ug/Kg	0	0%	100	0	0	3	11 U	11 U	12 U
Styrene	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U
Tetrachloroethene	ug/Kg	0	0%	1400	0	0	3	11 U	11 U	12 U
Toluene	ug/Kg	0	0%	1500	0	0	3	11 U	11 U	12 U
trans-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	3	11 U	11 U	12 U

See Last Page for Notes

TABLE E-1
SOIL ANALYSIS RESULTS - SEAD-33
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-33	SEAD-33	SEAD-33
							LOCATION ID			
							MATRIX	SOIL	SOIL	SOIL
							SAMPLE NUMBER	SB33-1.1	SB33-1.2	SB33-2.1
							SAMP_DEPTH_TOP	2-4	2-4	4-6
							SAMP_DEPTH_BOT	2-4	2-4	4-6
							SAMPLE DATE	12/16/93	12/16/93	12/15/93
							SAMPLE TYPE		SB33-1.1DUP	
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
Trichloroethene	ug/Kg	0	0%	700	0	0	3	11 U	11 U	12 U
Vinyl Chloride	ug/Kg	0	0%	200	0	0	3	11 U	11 U	12 U
Xylene (total)	ug/Kg	0	0%	1200	0	0	3	11 U	11 U	12 U
OTHER ANALYSES										
Total Solids	%W/W	91.6	100%	NA	0	2	2	86.2		91.6
Total Petroleum Hydrocarbons	mg/Kg	470	100%	NA	0	2	2	78		470

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) NA = Not Available
c) U = The compound was not detected at or above this concentration.

See Last Page for Notes

TABLE E-2
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-33
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

There are no Chemicals of Potential Concern for SEAD-33 soils.

APPENDIX F

SEAD-34: Building 319 - Underground Waste Oil Tanks (2)

Table F-1: Soil Analysis Results

Table F-2: Groundwater Analysis Results

Table F-3: Exposure Point Concentrations for Chemicals of Potential Concern

TABLE F-1
SOIL ANALYSIS RESULTS - SEAD-34
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)
							SEAD	SEAD-34	SEAD-34
							LOCATION ID		
							MATRIX	SOIL	SOIL
							SAMPLE NUMBER	SB34-1.1	SB34-2.1
							SAMP_DEPTH_TOP	6	5
							SAMP_DEPTH_BOT	7	6
							SAMPLE DATE	12/15/93	12/14/93
							SAMPLE TYPE		
VOLATILE ORGANICS									
1,1,1-Trichloroethane	ug/Kg	0	0%	800	0	0	2	12 U	11 U
1,1,2,2-Tetrachloroethane	ug/Kg	0	0%	600	0	0	2	12 U	11 U
1,1,2-Trichloroethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
1,1-Dichloroethane	ug/Kg	0	0%	200	0	0	2	12 U	11 U
1,1-Dichloroethene	ug/Kg	0	0%	400	0	0	2	12 U	11 U
1,2-Dichloroethane	ug/Kg	0	0%	100	0	0	2	12 U	11 U
1,2-Dichloroethene (total)	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
1,2-Dichloropropane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
2-Butanone	ug/Kg	0	0%	300	0	0	2	12 U	11 U
2-Hexanone	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
4-Methyl-2-Pentanone	ug/Kg	0	0%	1000	0	0	2	12 U	11 U
Acetone	ug/Kg	0	0%	200	0	0	2	24 U	24 U
Benzene	ug/Kg	0	0%	60	0	0	2	12 U	11 U
Bromodichloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Bromoform	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Bromomethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Carbon Disulfide	ug/Kg	0	0%	2700	0	0	2	12 U	11 U
Carbon Tetrachloride	ug/Kg	0	0%	600	0	0	2	12 U	11 U
Chlorobenzene	ug/Kg	0	0%	1700	0	0	2	12 U	11 U
Chloroethane	ug/Kg	0	0%	1900	0	0	2	12 U	11 U
Chloroform	ug/Kg	0	0%	300	0	0	2	12 U	11 U
Chloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
cis-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Dibromochloromethane	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Ethylbenzene	ug/Kg	0	0%	5500	0	0	2	12 U	11 U
Methylene Chloride	ug/Kg	0	0%	100	0	0	2	12 U	11 U
Styrene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Tetrachloroethene	ug/Kg	0	0%	1400	0	0	2	12 U	11 U
Toluene	ug/Kg	0	0%	1500	0	0	2	12 U	11 U
trans-1,3-Dichloropropene	ug/Kg	0	0%	NA	0	0	2	12 U	11 U
Trichloroethene	ug/Kg	0	0%	700	0	0	2	12 U	11 U
Vinyl Chloride	ug/Kg	0	0%	200	0	0	2	12 U	11 U
Xylene (total)	ug/Kg	0	0%	1200	0	0	2	12 U	11 U

See Last Page for Notes:

TABLE F-1
SOIL ANALYSIS RESULTS - SEAD-34
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-34	SEAD-34
							LOCATION ID		
							MATRIX	SOIL	SOIL
							SAMPLE NUMBER	SB34-1.1	SB34-2.1
							SAMP_DEPTH_TOP	6	5
							SAMP_DEPTH_BOT	7	6
							SAMPLE DATE	12/15/93	12/14/93
							SAMPLE TYPE		
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)
OTHER ANALYSES									
Total Solids	%W/W	84.8	100%	NA	0	2	2	82.4	84.8
Total Petroleum Hydrocarbons	mg/Kg	93	100%	NA	0	2	2	81	93

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) NA = Not Available
c) U = The compound was not detected at or above this concentration.

TABLE F-2
GROUNDWATER ANALYSIS RESULTS - SEAD-34
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	MATRIX: WATER LOCATION: SEAD-34 SAMPLE DATE: 02/06/94 SAMPLE NUMBER: MW34-1 LAB ID: 210710 Value (Q)	MATRIX: WATER LOCATION: SEAD-34 SAMPLE DATE: 02/06/94 SAMPLE NUMBER: MW34-2 LAB ID: 210711 Value (Q)
VOLATILE ORGANICS									
1,1,1-Trichloroethane	ug/L	0	0%	5	0	0	2	10 U	10 U
1,1,2,2-Tetrachloroethane	ug/L	0	0%	5	0	0	2	10 U	10 U
1,1,2-Trichloroethane	ug/L	0	0%	NA	0	0	2	10 U	10 U
1,1-Dichloroethane	ug/L	0	0%	5	0	0	2	10 U	10 U
1,1-Dichloroethene	ug/L	0	0%	5	0	0	2	10 U	10 U
1,2-Dichloroethane	ug/L	0	0%	5	0	0	2	10 U	10 U
1,2-Dichloroethene (total)	ug/L	0	0%	5	0	0	2	10 U	10 U
1,2-Dichloropropane	ug/L	0	0%	5	0	0	2	10 U	10 U
2-Butanone	ug/L	0	0%	50	0	0	2	10 U	10 U
2-Hexanone	ug/L	0	0%	NA	0	0	2	10 U	10 U
4-Methyl-2-Pentanone	ug/L	0	0%	NA	0	0	2	10 U	10 U
Acetone	ug/L	0	0%	NA	0	0	2	10 U	10 U
Benzene	ug/L	0	0%	1	0	0	2	10 U	10 U
Bromodichloromethane	ug/L	0	0%	NA	0	0	2	10 U	10 U
Bromoform	ug/L	0	0%	NA	0	0	2	10 U	10 U
Bromomethane	ug/L	0	0%	NA	0	0	2	10 U	10 U
Carbon Disulfide	ug/L	0	0%	NA	0	0	2	10 U	10 U
Carbon Tetrachloride	ug/L	0	0%	5	0	0	2	10 U	10 U
Chlorobenzene	ug/L	0	0%	5	0	0	2	10 U	10 U
Chloroethane	ug/L	0	0%	5	0	0	2	10 U	10 U
Chloroform	ug/L	0	0%	7	0	0	2	10 U	10 U
Chloromethane	ug/L	0	0%	5	0	0	2	10 U	10 U
cis-1,3-Dichloropropene	ug/L	0	0%	5	0	0	2	10 U	10 U
Dibromochloromethane	ug/L	0	0%	NA	0	0	2	10 U	10 U
Ethylbenzene	ug/L	0	0%	5	0	0	2	10 U	10 U
Methylene Chloride	ug/L	0	0%	5	0	0	2	10 U	10 U
Styrene	ug/L	0	0%	NA	0	0	2	10 U	10 U
Tetrachloroethene	ug/L	0	0%	5	0	0	2	10 U	10 U
Toluene	ug/L	0	0%	5	0	0	2	10 U	10 U
trans-1,3-Dichloropropene	ug/L	0	0%	5	0	0	2	10 U	10 U
Trichloroethene	ug/L	0	0%	5	0	0	2	10 U	10 U
Vinyl Chloride	ug/L	0	0%	2	0	0	2	10 U	10 U
Xylene (total)	ug/L	0	0%	5	0	0	2	10 U	10 U
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/L	0	0%	NA	0	0	2	0.39 U	0.39 U

NOTES:
a) NY State Class GA Groundwater Regulations
b) NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE F-3
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-34
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

There are no Chemicals of Potential Concern for SEAD-34 soils or ground water.

APPENDIX G

SEAD-43: Old Missile Propellant Test Laboratory
SEAD-56: Building 606 – Herbicide and Pesticide Storage
SEAD-69: Building 606 – Disposal Area

Table G-1:	Soil Analysis Results
Table G-2:	Groundwater Analysis Results
Table G-3:	Surface Water Analysis Results
Table G-4:	Sediment Analysis Results
Table G-5:	Inorganics Statistical Analysis - Soil
Table G-6:	Inorganics Statistical Analysis - Groundwater
Table G-7:	Exposure Point Concentrations for Chemicals of Potential Concern
Table G-8:	Ambient Air Exposure Point Concentrations
Table G-9:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table G-10:	Calculation of Intake and Risk from the Ingestion of Soil
Table G-11:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table G-12:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table G-13:	Calculation of Air Concentration in Shower from Volatilization of Groundwater
Table G-14:	Calculation of Intake and Risk from Dermal Contact to Groundwater (while Showering)
Table G-15:	Calculation of Intake and Risk from Inhalation of Groundwater (while Showering)
Table G-16:	Shallow Soil Analysis Results – Prison SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B
Table G-17:	Calculated Soil Receptor Exposure – Prison Sites
Table G-18:	Calculation of Soil Hazard Quotients – Prison Sites - Mammals
Table G-19:	Calculation of Soil Hazard Quotients – Prison Sites - Bird

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-43 0-0.2 06/10/94 SB43-1-00 223889 Value (Q)	SOIL SEAD-43 4-5 06/10/94 SB43-1-03 223891 Value (Q)	SOIL SEAD-43 14-16 06/10/94 SB43-1-08 223892 Value (Q)	SOIL SEAD-43 0-0.2 06/10/94 SB43-2-00 223682 Value (Q)	SOIL SEAD-43 4-6 06/10/94 SB43-2-03 223684 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	13 U	11 U	11 UR	12 U	11 U
Acetone	ug/Kg	16	23%	200	0	6	26	13 U	11 U	11 UR	12 U	11 U
Chloroform	ug/Kg	11	23%	300	0	6	26	13 U	11 U	11 UR	12 U	11 U
Toluene	ug/Kg	27	32%	1500	0	9	28	13 U	11 U	11 UR	12 U	11 U
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	13 U	11 U	11 UR	12 U	11 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	12 J	5.6 U	5.3 U	6.4 U	5.5 U
Dicamba	ug/Kg	11	3%		0	1	30	11 J	5.6 U	5.3 U	6.4 U	5.5 U
Dichloroprop	ug/Kg	72	3%		0	1	30	72 J	56 U	53 U	64 U	55 U
MCPP	ug/Kg	7700	10%		0	3	30	7300 J	5600 U	5300 U	6400 U	5500 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	410 U	370 U	350 U	420 U	360 U
Naphthalene	ug/Kg	200	7%	13000	0	2	30	410 U	370 U	350 U	420 U	360 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	410 U	370 U	350 U	420 U	360 U
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	410 U	370 U	350 U	420 U	360 U
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	410 U	370 U	350 U	420 U	360 U
Fluorene	ug/Kg	610	7%	50000	0	2	30	410 U	370 U	350 U	420 U	360 U
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	410 U	370 U	350 U	27 J	360 U
Anthracene	ug/Kg	1300	10%	50000	0	3	30	410 U	370 U	350 U	420 U	360 U
Carbazole	ug/Kg	620	10%	50000	0	3	30	410 U	370 U	350 U	420 U	360 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	410 U	370 U	350 U	420 U	360 U
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	410 U	370 U	350 U	42 J	360 U
Pyrene	ug/Kg	4700	13%	50000	0	4	30	410 U	370 U	350 U	45 J	360 U
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	410 U	370 U	350 U	22 J	360 U
Chrysene	ug/Kg	2400	13%	400	2	4	30	410 U	370 U	350 U	25 J	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	510 J	370 U	70 J	53 J	50 J
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	410 U	370 U	350 U	420 U	360 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	410 U	370 U	350 U	420 U	360 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	410 U	370 U	350 U	420 U	360 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	410 U	370 U	350 U	420 U	360 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	410 U	370 U	350 U	420 U	360 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	410 U	370 U	350 U	420 U	360 U
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	2.1 U	1.9 U	1.8 U	2.2 U	1.8 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	2.1 U	1.9 U	1.8 U	2.2 U	1.8 U
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	20800	8620	16200	14700 J	11600 J
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	0.23 UJ	0.19 UJ	0.21 UJ	0.32 UJ	0.24 J
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	6.1	3.9	6.2	6.1	5.4

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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								SOIL	SOIL	SOIL	SOIL	SOIL
								SEAD-43	SEAD-43	SEAD-43	SEAD-43	SEAD-43
								0-0.2	4-5	14-16	0-0.2	4-6
								06/10/94	06/10/94	06/10/94	06/10/94	06/10/94
			FREQUENCY		NUMBER	NUMBER	NUMBER	SB43-1-00	SB43-1-03	SB43-1-08	SB43-2-00	SB43-2-03
			OF		ABOVE	OF	OF	223889	223891	223892	223682	223684
COMPOUND	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	145	46	54.8	104 J	72.1 J
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.86 J	0.41 J	0.73 J	0.69 J	0.52 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.96	0.91	0.98	0.68 J	0.71 J
Calcium	mg/Kg	141000	100%	121000	1	30	30	8980	67800	48900	11800 J	69200 J
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	26.2	13.3	25.7	21.2 J	18.5 J
Cobalt	mg/Kg	20.9	100%	30	0	30	30	10.9	7.2 J	13.1	9.3 J	10.2 J
Copper	mg/Kg	28.1	100%	33	0	30	30	21.8	24.5	24.7	21 J	22.6 J
Iron	mg/Kg	40300	100%	36500	1	30	30	26800	17200	30900	26800 J	23000 J
Lead	mg/Kg	30.2	100%	24 8	2	30	30	19.2	7.6	6.8	19.8	8.2
Magnesium	mg/Kg	47500	100%	21500	3	30	30	5440	17600	11500	6080 J	18500 J
Manganese	mg/Kg	782	87%	1060	0	26	30	782	387	510	546 J	416 J
Mercury	mg/Kg	0.08	80%	0.1	0	24	30	0.07 J	0.01 J	0.02 J	0.06 JR	0.03 J
Nickel	mg/Kg	57.2	100%	49	2	30	30	28.1	22.6	41.5	26.7 J	31.6 J
Potassium	mg/Kg	3560	100%	2380	5	30	30	3560 J	2000 J	2670 J	2060	2160
Selenium	mg/Kg	1.8	63%	2	0	19	30	1.1	0.39 U	0.54 J	1.3	0.43 U
Sodium	mg/Kg	151	87%	172	0	26	30	17.8 U	88.3 J	136 J	24.8 U	101 J
Vanadium	mg/Kg	41.8	100%	150	0	30	30	36.7	17.6	23.8	27 J	18.8 J
Zinc	mg/Kg	338	100%	110	10	30	30	98.6	116	122	91.1 J	94.7 J
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.58 U	0.56 U	0.48 U	0.58 U	0.48 U
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							0 94 J	0.26	0.04 U	0.01 U	0.03
TotalSolids	%W/W							80.7	89.6	94	78.6	91.6

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-43 10-12 06/10/94 SB43-2-06 223685 Value (Q)	SOIL SEAD-43 0-0.2 06/09/94 SB43-3-00 223686 Value (Q)	SOIL SEAD-43 2-4 06/09/94 SB43-3-02 223687 Value (Q)	SOIL SEAD-43 4-5.5 06/09/94 SB43-3-03 223688 Value (Q)	SOIL SEAD-43 1.0-1.5 02/17/94 SB43-4.01 211724 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	11 UR	11 U	13 U	11 U	11 U
Acetone	ug/Kg	16	23%	200	0	6	26	16 UR	11 U	13 U	11 U	15 U
Chloroform	ug/Kg	11	23%	300	0	6	26	11 UR	11 U	13 U	11 U	3 J
Toluene	ug/Kg	27	32%	1500	0	9	28	11 UR	11 U	13 U	11 U	3 J
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	11 UR	11 U	13 U	11 U	4 J
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	5.4 U	5.5 U	6 U	5.5 U	5.9 U
Dicamba	ug/Kg	11	3%		0	1	30	5.4 U	5.5 U	6 U	5.5 U	5.9 U
Dichloroprop	ug/Kg	72	3%		0	1	30	54 U	55 U	60 U	55 U	59 U
MCPP	ug/Kg	7700	10%		0	3	30	5400 U	7100	7700	5500 U	5900 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	350 U	360 U	390 U	360 U	520 U
Naphthalene	ug/Kg	200	7%	13000	0	2	30	350 U	360 U	390 U	360 U	140 J
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	350 U	360 U	390 U	360 U	46 J
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	350 U	360 U	390 U	360 U	300 J
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	350 U	360 U	390 U	360 U	170 J
Fluorene	ug/Kg	610	7%	50000	0	2	30	350 U	360 U	390 U	360 U	320 J
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	350 U	140 J	390 U	360 U	2600
Anthracene	ug/Kg	1300	10%	50000	0	3	30	350 U	35 J	390 U	360 U	700
Carbazole	ug/Kg	620	10%	50000	0	3	30	350 U	20 J	390 U	360 U	350 J
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	350 U	360 U	390 U	360 U	48 J
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	350 U	240 J	390 U	360 U	3200
Pyrene	ug/Kg	4700	13%	50000	0	4	30	350 U	230 J	390 U	360 U	2700
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	350 U	110 J	390 U	360 U	1200
Chrysene	ug/Kg	2400	13%	400	2	4	30	350 U	120 J	390 U	360 U	1200
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	29 J	530	36 J	2100	2700
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	350 U	100 J	390 U	360 U	1000
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	350 U	86 J	390 U	360 U	960
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	350 U	96 J	390 U	360 U	1200
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	350 U	75 J	390 U	360 U	660
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	350 U	33 J	390 U	360 U	300 J
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	350 U	88 J	390 U	360 U	730
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	1.8 U	1.2 J	2 U	1.9 U	2 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	1.8 U	1.8 U	2 U	1.9 U	2.4 J
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	12800 J	10900 J	27000 J	10600 J	13300 J
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	0.23 UJ	0.24 J	0.26 J	0.25 UJ	4.6 J
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	5.5	5.3	4.3	4	6 J

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-43 10-12 06/10/94 SB43-2-06 223685 Value (Q)	SOIL SEAD-43 0-0.2 06/09/94 SB43-3-00 223686 Value (Q)	SOIL SEAD-43 2-4 06/09/94 SB43-3-02 223687 Value (Q)	SOIL SEAD-43 4-5.5 06/09/94 SB43-3-03 223688 Value (Q)	SOIL SEAD-43 1.0-1.5 02/17/94 SB43-4.01 211724 Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	70.9 J	60.3 J	175 J	62.2 J	92.1 J
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.58 J	0.44 J	1.2	0.48 J	0.58 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.64 J	0.58 J	0.7 J	0.58 J	0.41 U
Calcium	mg/Kg	141000	100%	121000	1	30	30	77400 J	41900 J	7280 J	62400 J	60500 J
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	20.5 J	15.7 J	30.7 J	16.8 J	23.1
Cobalt	mg/Kg	20.9	100%	30	0	30	30	10.8 J	8.2 J	6.7 J	8.5 J	8.7 J
Copper	mg/Kg	28.1	100%	33	0	30	30	20.3 J	23.6 J	23.8 J	22.5 J	23.8
Iron	mg/Kg	40300	100%	36500	1	30	30	24900 J	19200 J	28100 J	20700 J	23900 J
Lead	mg/Kg	30.2	100%	24.8	2	30	30	8.8	19.1	12.7	9	15.9
Magnesium	mg/Kg	47500	100%	21500	3	30	30	12700 J	20000 J	5210 J	13400 J	18800 J
Manganese	mg/Kg	782	87%	1060	0	26	30	493 J	593 J	182 J	453 J	530 R
Mercury	mg/Kg	0.08	80%	0.1	0	24	30	0.03 J	0.08 JR	0.05 JR	0.04 JR	0.04 J
Nickel	mg/Kg	57.2	100%	49	2	30	30	33.3 J	20.6 J	27 J	29.1 J	27
Potassium	mg/Kg	3560	100%	2380	5	30	30	2630	2550	3130	2070	1940
Selenium	mg/Kg	1.8	63%	2	0	19	30	0.47 U	0.48 J	1.1	0.52 U	0.17 UJ
Sodium	mg/Kg	151	87%	172	0	26	30	151 J	27.5 J	72.5 J	96.5 J	128 J
Vanadium	mg/Kg	41.8	100%	150	0	30	30	20.1 J	21.1 J	41.8 J	18.3 J	24.6
Zinc	mg/Kg	338	100%	110	10	30	30	59.9 J	121 J	94 J	89.8 J	71.7 J
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.34 U	0.45 U	0.49 U	0.37 U	0.56 U
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							0.01 U	0.08	0.64	0.12	1.63
TotalSolids	%W/W							94.4	92	83.8	90.6	84.8

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-43 2-4 02/17/94 SB43-4.02 211725 Value (Q)	SOIL SEAD-43 10-10.5 02/18/94 SB43-4.07 211726 Value (Q)	SOIL SEAD-56 0-0.2 05/23/94 SB56-1-00 222124 Value (Q)	SOIL SEAD-56 4-6 05/23/94 SB56-1-03 222125 Value (Q)	SOIL SEAD-56 12-13 05/23/94 SB56-1-07 222126 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	12 U	11 UJ	11 U	11 U	4 J
Acetone	ug/Kg	16	23%	200	0	6	26	12 U	20 UJ	11 U	19 U	16 UJ
Chloroform	ug/Kg	11	23%	300	0	6	26	4 J	11 UJ	11 U	11 U	11 UJ
Toluene	ug/Kg	27	32%	1500	0	9	28	12 U	11 J	11 U	11 U	2 J
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	12 U	12 J	11 U	11 U	11 UJ
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	6.1 U	5.4 U	6.5 U	5.6 U	5.3 U
Dicamba	ug/Kg	11	3%		0	1	30	6.1 U	5.4 U	6.5 U	5.6 U	5.3 U
Dichloroprop	ug/Kg	72	3%		0	1	30	61 U	54 U	65 U	56 U	53 U
MCPP	ug/Kg	7700	10%		0	3	30	6100 U	5400 U	6500 U	5600 U	5300 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	1100 U	350 U	430 U	370 U	350 U
Naphthalene	ug/Kg	200	7%	13000	0	2	30	200 J	350 U	430 U	370 U	350 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	88 J	350 U	430 U	370 U	350 U
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	570 J	350 U	430 U	370 U	350 U
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	310 J	350 U	430 U	370 U	350 U
Fluorene	ug/Kg	610	7%	50000	0	2	30	610 J	350 U	430 U	370 U	350 U
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	5200 J	350 U	430 U	370 U	350 U
Anthracene	ug/Kg	1300	10%	50000	0	3	30	1300 J	350 U	430 U	370 U	350 U
Carbazole	ug/Kg	620	10%	50000	0	3	30	620 J	350 U	430 U	370 U	350 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	1100 U	350 U	430 U	370 U	350 U
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	6300 J	350 U	430 U	370 U	350 U
Pyrene	ug/Kg	4700	13%	50000	0	4	30	4700 J	350 U	430 U	370 U	350 U
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	2400 J	350 U	430 U	370 U	350 U
Chrysene	ug/Kg	2400	13%	400	2	4	30	2400 J	350 U	430 U	370 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	700 J	1300	280 J	89 J	350 U
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	1600 J	350 U	430 U	370 U	350 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	2000 J	350 U	430 U	370 U	350 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	2000 J	350 U	430 U	370 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	1200 J	350 U	430 U	370 U	350 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	520 J	350 U	430 U	370 U	350 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	1300 J	350 U	430 U	370 U	350 U
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	2.1 U	1.8 U	2.2 U	1.9 U	1.8 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	2.1 U	1.8 U	2.2 U	1.9 U	1.8 U
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	15500 J	15200 J	4620	11700	13200
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	7.2 J	3.3 J	0.21 UJ	0.19 UJ	0.19 UJ
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	6.5 J	4 J	3.5	6	3.5

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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								SOIL	SOIL	SOIL	SOIL	SOIL
								SEAD-43	SEAD-43	SEAD-56	SEAD-56	SEAD-56
								2-4	10-10.5	0-0.2	4-6	12-13
								02/17/94	02/18/94	05/23/94	05/23/94	05/23/94
			FREQUENCY		NUMBER	NUMBER	NUMBER	SB43-4.02	SB43-4.07	SB56-1-00	SB56-1-03	SB56-1-07
			OF		ABOVE	OF	OF	211725	211726	222124	222125	222126
COMPOUND	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	123 J	49.9 J	26 J	70.7	49.7
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.74 J	0.72	0.22 J	0.59 J	0.6 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.51 U	0.26 U	1.5	0.76 J	0.7 J
Calcium	mg/Kg	141000	100%	121000	1	30	30	15900 J	21500 J	62200	51500	31200
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	23.9	25.7	7.1	18.6	22.8
Cobalt	mg/Kg	20.9	100%	30	0	30	30	13.4	15.7	3.8 J	10.7	13.6
Copper	mg/Kg	28.1	100%	33	0	30	30	26	28.1	18.8	24.5	25.6
Iron	mg/Kg	40300	100%	36500	1	30	30	30700 J	31000 J	10900	26300	29000
Lead	mg/Kg	30.2	100%	24.8	2	30	30	13.6	15.6	30.2	11.1	17.1
Magnesium	mg/Kg	47500	100%	21500	3	30	30	7270 J	8540 J	29500	11700	8440
Manganese	mg/Kg	782	87%	1060	0	26	30	1100 R	479 R	529	575	404
Mercury	mg/Kg	0.08	80%	0.1	0	24	30	0.06 J	0.02 J	0.02 J	0.02 J	0.01 U
Nickel	mg/Kg	57.2	100%	49	2	30	30	43.8	53.4	10.9	32.5	41.5
Potassium	mg/Kg	3560	100%	2380	5	30	30	1740	1580	1020 J	1180	1430
Selenium	mg/Kg	1.8	63%	2	0	19	30	0.17 J	1.8 J	0.35 U	0.51 J	1
Sodium	mg/Kg	151	87%	172	0	26	30	82.5 J	98.5 J	94.6 J	100 J	94.6 J
Vanadium	mg/Kg	41.8	100%	150	0	30	30	28.2	21.3	10.2 J	18	17.9
Zinc	mg/Kg	338	100%	110	10	30	30	84.4 J	126 J	295	84.6	83.6
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.54 U	0.51 U	0.61 U	0.42 U	0.53 U
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							1.25	0.13	0.58	0.18	0.04
TotalSolids	%W/W							82.1	92.8	77.4	90.4	94.1

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-56 0-0.2 05/23/94 SB56-2-00 222127 Value (Q)	SOIL SEAD-56 4-6 05/23/94 SB56-2-03 222128 Value (Q)	SOIL SEAD-56 8-10 05/23/94 SB56-2-05 222129 Value (Q)	SOIL SEAD-56 0-0.2 05/18/94 SB56-3-00 221480 Value (Q)	SOIL SEAD-56 6-8 05/18/94 SB56-3-04 221481 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	11 U	12 U	11 U	12 U	11 U
Acetone	ug/Kg	16	23%	200	0	6	26	11 U	5 J	5 J	12 U	11 U
Chloroform	ug/Kg	11	23%	300	0	6	26	11 U	12 U	11 U	12 U	11 U
Toluene	ug/Kg	27	32%	1500	0	9	28	11 U	12 U	11 U	12 U	11 U
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	11 U	12 U	11 U	12 U	11 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	5.9 U	5.8 U	5.6 U	6.1 U	6.1 U
Dicamba	ug/Kg	11	3%		0	1	30	5.9 U	5.8 U	5.6 U	6.1 U	6.1 U
Dichloroprop	ug/Kg	72	3%		0	1	30	59 U	58 U	56 U	61 U	61 U
MCPP	ug/Kg	7700	10%		0	3	30	5900 U	5800 U	5600 U	6100 U	6100 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	380 U	380 U	370 U	400 U	400 U
Naphthalene	ug/Kg	200	7%	13000	0	2	30	380 U	380 U	370 U	400 U	400 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	380 U	380 U	370 U	400 U	400 U
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	380 U	380 U	370 U	400 U	400 U
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	380 U	380 U	370 U	400 U	400 U
Fluorene	ug/Kg	610	7%	50000	0	2	30	380 U	380 U	370 U	400 U	400 U
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	380 U	380 U	370 U	400 U	400 U
Anthracene	ug/Kg	1300	10%	50000	0	3	30	380 U	380 U	370 U	400 U	400 U
Carbazole	ug/Kg	620	10%	50000	0	3	30	380 U	380 U	370 U	400 U	400 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	380 U	380 U	370 U	400 U	400 U
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	380 U	380 U	370 U	400 U	400 U
Pyrene	ug/Kg	4700	13%	50000	0	4	30	380 U	380 U	370 U	400 U	400 U
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	380 U	380 U	370 U	400 U	400 U
Chrysene	ug/Kg	2400	13%	400	2	4	30	380 U	380 U	370 U	400 U	400 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	81 J	40 J	32 J	1300	400 U
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	380 U	380 U	370 U	400 U	400 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	380 U	380 U	370 U	400 U	400 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	380 U	380 U	370 U	400 U	400 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	380 U	380 U	370 U	400 U	400 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	380 U	380 U	370 U	400 U	400 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	380 U	380 U	370 U	400 U	400 U
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	2 U	2 U	1.9 U	2.1 U	2 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	2 U	2 U	1.9 U	2.1 U	2 U
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	4850	12700	11700	2900	10200
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	0.19 UJ	0.15 UJ	0.21 UJ	0.17 UJ	0.21 UJ
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	3.3	5.7	4	4.5	3.9

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
Decision Document - Mini Risk Assessment
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-56 0-0.2 05/23/94 SB56-2-00 222127 Value (Q)	SOIL SEAD-56 4-6 05/23/94 SB56-2-03 222128 Value (Q)	SOIL SEAD-56 8-10 05/23/94 SB56-2-05 222129 Value (Q)	SOIL SEAD-56 0-0.2 05/18/94 SB56-3-00 221480 Value (Q)	SOIL SEAD-56 6-8 05/18/94 SB56-3-04 221481 Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	33 J	70.1	49	14.4 J	53.4
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.22 J	0.62 J	0.58 J	0.17 J	0.5 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.51 J	0.63 J	0.58 J	0.55 J	0.67 J
Calcium	mg/Kg	141000	100%	121000	1	30	30	66400	8840	39800	111000	77700
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	7	20.8	19.9	5.4	17.3
Cobalt	mg/Kg	20.9	100%	30	0	30	30	4.5 J	12.1	12.5	2.8 J	8.3 J
Copper	mg/Kg	28.1	100%	33	0	30	30	17.3	23.1	23.2	11.4	19.7
Iron	mg/Kg	40300	100%	36500	1	30	30	11500	29200	25500	8520	21200
Lead	mg/Kg	30.2	100%	24.8	2	30	30	12.8	14.8 J	12.1 J	19.3	10.2
Magnesium	mg/Kg	47500	100%	21500	3	30	30	26400	7550	13200	17800	18900
Manganese	mg/Kg	782	87%	1060	0	26	30	533	421	373	502	394
Mercury	mg/Kg	0.08	80%	0 1	0	24	30	0.03 J	0.06	0.06 J	0.01 J	0.02 J
Nickel	mg/Kg	57.2	100%	49	2	30	30	10.3	28.6	33.4	6.8	28.6
Potassium	mg/Kg	3560	100%	2380	5	30	30	1030	1250 J	1440 J	730 J	1630
Selenium	mg/Kg	1.8	63%	2	0	19	30	0.55 J	0.6 J	0.52 J	0.29 U	0.36 U
Sodium	mg/Kg	151	87%	172	0	26	30	52 J	50.3 J	88.4 J	86.1 J	88 J
Vanadium	mg/Kg	41.8	100%	150	0	30	30	10.6	21.4	17.6	6.4 J	16.7
Zinc	mg/Kg	338	100%	110	10	30	30	75.4	89	98	139	89.1
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.55 U	0.55 U	0.48 U	0.54 U	1.7
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							1 02	0.08	0.2	0.02	0.67
TotalSolids	%W/W							86.4	86.5	90.3	82	83.4

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
Decision Document - Mini Risk Assessment
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-56 14-16 05/18/94 SB56-3-08 221482 Value (Q)	SOIL SEAD-69 0-0.2 05/17/94 SB69-1-00 221354 Value (Q)	SOIL SEAD-69 8-10 05/17/94 SB69-1-05 221483 Value (Q)	SOIL SEAD-69 10-12 05/17/94 SB69-1-06 221484 Value (Q)	SOIL SEAD-69 0-0.2 02/19/94 SB69-2.01 211964 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	3 J	15 U	11 U	3 J	24 U
Acetone	ug/Kg	16	23%	200	0	6	26	11 U	15 U	11 U	11 UJ	24 U
Chloroform	ug/Kg	11	23%	300	0	6	26	11 U	15 U	11 U	11 UJ	24 U
Toluene	ug/Kg	27	32%	1500	0	9	28	2 J	15 U	11 U	3 J	24 U
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	11 U	15 U	11 U	2 J	24 U
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	5.4 U	7.4 U	5.7 U	5.4 U	9.4 U
Dicamba	ug/Kg	11	3%		0	1	30	5.4 U	7.4 U	5.7 U	5.4 U	9.4 U
Dichloroprop	ug/Kg	72	3%		0	1	30	54 U	74 U	57 U	54 U	94 U
MCPP	ug/Kg	7700	10%		0	3	30	5400 U	7400 U	5700 U	5400 U	9400 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	350 U	490 U	370 U	360 U	580 J
Naphthalene	ug/Kg	200	7%	13000	0	2	30	350 U	490 U	370 U	360 U	620 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	350 U	490 U	370 U	360 U	620 U
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	350 U	490 U	370 U	360 U	620 U
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	350 U	490 U	370 U	360 U	620 U
Fluorene	ug/Kg	610	7%	50000	0	2	30	350 U	490 U	370 U	360 U	620 U
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	350 U	490 U	370 U	360 U	620 U
Anthracene	ug/Kg	1300	10%	50000	0	3	30	350 U	490 U	370 U	360 U	620 U
Carbazole	ug/Kg	620	10%	50000	0	3	30	350 U	490 U	370 U	360 U	620 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	350 U	490 U	370 U	360 U	620 U
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	350 U	490 U	370 U	360 U	620 U
Pyrene	ug/Kg	4700	13%	50000	0	4	30	350 U	490 U	370 U	360 U	620 U
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	350 U	490 U	370 U	360 U	620 U
Chrysene	ug/Kg	2400	13%	400	2	4	30	350 U	490 U	370 U	360 U	620 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	350 U	490 U	370 U	360 U	690
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	350 U	490 U	370 U	360 U	620 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	350 U	490 U	370 U	360 U	620 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	350 U	490 U	370 U	360 U	620 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	350 U	490 U	370 U	360 U	620 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	350 U	490 U	370 U	360 U	620 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	350 U	490 U	370 U	360 U	620 U
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	1.8 U	2.5 U	1.9 U	1.8 U	3.3 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	1.8 U	2.5 U	1.9 U	1.8 U	3.3 U
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	9590	13900	13700	8550	16000 J
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	0.17 UJ	0.26 UJ	0.15 UJ	0.13 UJ	6 UJ
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	3.6	5.8	4.8	3.1	5.4 J

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-56 14-16 05/18/94 SB56-3-08 221482 Value (Q)	SOIL SEAD-69 0-0.2 05/17/94 SB69-1-00 221354 Value (Q)	SOIL SEAD-69 8-10 05/17/94 SB69-1-05 221483 Value (Q)	SOIL SEAD-69 10-12 05/17/94 SB69-1-06 221484 Value (Q)	SOIL SEAD-69 0-0.2 02/19/94 SB69-2.01 211964 Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	43.1	132	52.7	50.9	133 J
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.46 J	0.75 J	0.63 J	0.46 J	0.9 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.63 J	0.83 J	0.87	0.64 J	0.58 U
Calcium	mg/Kg	141000	100%	121000	1	30	30	50500	8360	26800	112000	7760 J
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	16.7	19.9	22.6	14.1	22.6
Cobalt	mg/Kg	20.9	100%	30	0	30	30	9.6	9.2 J	14.8	8.1	8.9 J
Copper	mg/Kg	28.1	100%	33	0	30	30	17.1	20.5	23.6	16.3	22.9
Iron	mg/Kg	40300	100%	36500	1	30	30	21600	24600	29300	17800	27100 J
Lead	mg/Kg	30.2	100%	24.8	2	30	30	9.8	23.9	15.6	9.1	21.1
Magnesium	mg/Kg	47500	100%	21500	3	30	30	14700	4290	10500	47500	4940 J
Manganese	mg/Kg	782	87%	1060	0	26	30	386	540	373	423	576 R
Mercury	mg/Kg	0.08	80%	0.1	0	24	30	0.01 U	0.06 J	0.02 J	0.01 J	0.08 J
Nickel	mg/Kg	57.2	100%	49	2	30	30	29.7	22.5	44.8	24.1	28.1
Potassium	mg/Kg	3560	100%	2380	5	30	30	1230	2140	1770	1300	1930
Selenium	mg/Kg	1.8	63%	2	0	19	30	0.28 U	1.4	0.28 J	0.22 U	0.54 J
Sodium	mg/Kg	151	87%	172	0	26	30	117 J	41 U	90.2 J	111 J	54.9 U
Vanadium	mg/Kg	41.8	100%	150	0	30	30	14	25	19.4	13	28.3
Zinc	mg/Kg	338	100%	110	10	30	30	81.9	94.2	162	67.5	338 J
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.45 U	0.5 U	0.52 U	0.43 U	0.94 U
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							0.15	9.7	0.29	0.18	0.02 U
TotalSolids	%W/W							93	67.9	89.4	92.1	52.5

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-69 6-8 05/16/94 SB69-2-04 221356 Value (Q)	SOIL SEAD-69 12-14 05/16/94 SB69-2-07 221357 Value (Q)	SOIL SEAD-69 0-0.2 02/18/94 SB69-3.01 211967 Value (Q)	SOIL SEAD-69 6-8 02/18/94 SB69-3.04 212007 Value (Q)	SOIL SEAD-69 10-12 02/18/94 SB69-3.06 211970 Value (Q)
VOLATILE ORGANICS												
MethyleneChloride	ug/Kg	11	26%	100	0	7	27	11 U	4 J	19 U	11 U	11 UR
Acetone	ug/Kg	16	23%	200	0	6	26	11 U	11 UR	19 U	11 U	11 UR
Chloroform	ug/Kg	11	23%	300	0	6	26	11 U	11 UR	19 U	11 U	11 UR
Toluene	ug/Kg	27	32%	1500	0	9	28	11 U	27 J	19 U	11 U	4 J
Xylene(total)	ug/Kg	12	27%	1200	0	7	26	11 U	11 UR	19 U	11 U	11 UR
HERBICIDES												
2,4,5-T	ug/Kg	12	3%	1900	0	1	30	5.4 U	5.3 U	9.8 U	5.5 U	5.4 U
Dicamba	ug/Kg	11	3%		0	1	30	5.4 U	5.3 U	9.8 U	5.5 U	5.4 U
Dichloroprop	ug/Kg	72	3%		0	1	30	54 U	53 U	98 U	55 U	54 U
MCPP	ug/Kg	7700	10%		0	3	30	5400 U	5300 U	9800 U	5500 U	5400 U
SEMIVOLATILE ORGANICS												
4-Methylphenol	ug/Kg	580	3%	900	0	1	30	350 U	350 U	650 U	360 U	350 U
Naphthalene	ug/Kg	200	7%	13000	0	2	30	350 U	350 U	650 U	360 U	350 U
2-Methylnaphthalene	ug/Kg	88	7%	36400	0	2	30	350 U	350 U	650 U	360 U	350 U
Acenaphthene	ug/Kg	570	7%	50000	0	2	30	350 U	350 U	650 U	360 U	350 U
Dibenzofuran	ug/Kg	310	7%	6200	0	2	30	350 U	350 U	650 U	360 U	350 U
Fluorene	ug/Kg	610	7%	50000	0	2	30	350 U	350 U	650 U	360 U	350 U
Phenanthrene	ug/Kg	5200	13%	50000	0	4	30	350 U	350 U	650 U	360 U	350 U
Anthracene	ug/Kg	1300	10%	50000	0	3	30	350 U	350 U	650 U	360 U	350 U
Carbazole	ug/Kg	620	10%	50000	0	3	30	350 U	350 U	650 U	360 U	350 U
Di-n-butylphthalate	ug/Kg	62	10%	8100	0	3	30	350 U	350 U	62 J	25 J	350 U
Fluoranthene	ug/Kg	6300	13%	50000	0	4	30	350 U	350 U	650 U	360 U	350 U
Pyrene	ug/Kg	4700	13%	50000	0	4	30	350 U	350 U	650 U	360 U	350 U
Benzo(a)anthracene	ug/Kg	2400	13%	224	2	4	30	350 U	350 U	650 U	360 U	350 U
Chrysene	ug/Kg	2400	13%	400	2	4	30	350 U	350 U	650 U	360 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	2700	70%	50000	0	21	30	350 U	350 U	580 J	140 J	340 J
Benzo(b)fluoranthene	ug/Kg	1600	10%	1100	1	3	30	350 U	350 U	650 U	360 U	350 U
Benzo(k)fluoranthene	ug/Kg	2000	10%	1100	1	3	30	350 U	350 U	650 U	360 U	350 U
Benzo(a)pyrene	ug/Kg	2000	10%	61	3	3	30	350 U	350 U	650 U	360 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1200	10%	3200	0	3	30	350 U	350 U	650 U	360 U	350 U
Dibenz(a,h)anthracene	ug/Kg	520	10%	14	3	3	30	350 U	350 U	650 U	360 U	350 U
Benzo(g,h,i)perylene	ug/Kg	1300	10%	50000	0	3	30	350 U	350 U	650 U	360 U	350 U
PESTICIDES/PCBs												
Endosulfan I	ug/Kg	1.2	3%	900.00	0	1	30	1.8 U	1.8 U	3.3 U	1.9 U	1.8 U
alpha-Chlordane	ug/Kg	2.4	3%	540.00	0	1	30	1.8 U	1.8 U	3.3 U	1.9 U	1.8 U
METALS												
Aluminum	mg/Kg	27000	100%	19300	2	30	30	14100	17500	14900	11500	10900
Antimony	mg/Kg	7.2	30%	5.9	1	9	30	0.16 UJ	0.12 J	0.37 UJ	0.23 J	0.32 J
Arsenic	mg/Kg	7.1	100%	8.2	0	30	30	5.1	7.1	4.7	5.1	6.5

TABLE G-1
SOIL ANALYSIS RESULTS - SEADS-43,56,69
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COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-69 6-8 05/16/94 SB69-2-04 221356 Value (Q)	SOIL SEAD-69 12-14 05/16/94 SB69-2-07 221357 Value (Q)	SOIL SEAD-69 0-0.2 02/18/94 SB69-3.01 211967 Value (Q)	SOIL SEAD-69 6-8 02/18/94 SB69-3.04 212007 Value (Q)	SOIL SEAD-69 10-12 02/18/94 SB69-3.06 211970 Value (Q)
Barium	mg/Kg	175	100%	300	0	30	30	42.7	82.1	118	80.4	80.2
Beryllium	mg/Kg	1.2	100%	1.1	1	30	30	0.66 J	0.78	0.67 J	0.55 J	0.49 J
Cadmium	mg/Kg	1.5	87%	2.3	0	26	30	0.83	1.1	0.31 J	0.28 J	0.23 J
Calcium	mg/Kg	141000	100%	121000	1	30	30	28900	22000	7510 J	**141000** J	58900 J
Chromium	mg/Kg	30.7	100%	29.6	2	30	30	24.1	**30.2**	21.5	17.9	18.4
Cobalt	mg/Kg	20.9	100%	30	0	30	30	17.8	20.9	8.2 J	10.5	10.8
Copper	mg/Kg	28.1	100%	33	0	30	30	27.8	25	20.6	21.1	23
Iron	mg/Kg	40300	100%	36500	1	30	30	31400	**40300**	24900	22300	24200
Lead	mg/Kg	30.2	100%	24.8	2	30	30	9.7	13.6	**25.1**	6.1	5.9
Magnesium	mg/Kg	47500	100%	21500	3	30	30	10200	9880	4730	10900	10900
Manganese	mg/Kg	782	87%	1060	0	26	30	488	539	368	403	484
Mercury	mg/Kg	0.08	80%	0.1	0	24	30	0.02 J	0.02 J	0.06 J	0.03 J	0.02 J
Nickel	mg/Kg	57.2	100%	49	2	30	30	47.2	**57.2**	26.6 J	30.2 J	30 J
Potassium	mg/Kg	3560	100%	2380	5	30	30	1350	1600	1940 J	2350 J	1490 J
Selenium	mg/Kg	1.8	63%	2	0	19	30	0.28 U	0.36 J	1.2 J	0.51 J	0.66 J
Sodium	mg/Kg	151	87%	172	0	26	30	85.8 J	113 J	85.5 J	139 J	122 J
Vanadium	mg/Kg	41.8	100%	150	0	30	30	20	24.5	27.6	18.4	15.7
Zinc	mg/Kg	338	100%	110	10	30	30	**182**	97.2	**273**	82.6	64.3
Cyanide	mg/Kg	1.7	3%	0.35	0	1	30	0.48 U	0.5 U	0.92 U	0.54 U	0.47 U
OTHERANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg							0.58	0.19	0.02 U	0.04	0.03
TotalSolids	%W/W							93.6	95.4	51.2	91	92.8

NOTES:

a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) *= As per proposed TAGM, total VOCs <10ppm, total SVOs <500ppm, and individual SVOs <50ppm.
c) NA = Not Available.
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE G-2
GROUNDWATER ANALYSIS RESULTS - SEAD-43, 56, AND 69
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-43 07/19/94 MW43-1 227445 45332 Value (Q)	WATER SEAD-43 07/19/94 MW43-2 227448 45332 Value (Q)	WATER SEAD-43 03/28/94 MW43-3 215554 43179 Value (Q)	WATER SEAD-43 03/28/94 MW43-4 215557 43179 Value (Q)
HERBICIDES											
2,4,5-TP (Silvex)	ug/L	0.44	25%	0.26 (b)	1	1	4	0.11 U	0.11 U	0.44 J	0.11 U
METALS											
Aluminum	ug/L	2870	100%	50 (a)	4	4	4	2610 J	169 J	2870	1010
Antimony	ug/L	1.5	25%	3 (b)	0	1	4	1.3 U	1.5 J	1 U	1 U
Arsenic	ug/L	1.5	25%	10 (c)	0	1	4	2 U	2 U	1.5 J	1.5 U
Barium	ug/L	113	100%	1000 (b)	0	4	4	77.1 J	43.4 J	113 J	97.2 J
Calcium	ug/L	138000	100%	NA	0	4	4	102000	112000	138000	123000
Chromium	ug/L	5.3	75%	50 (b)	0	3	4	3.5 J	0.4 U	5.3 J	2 J
Cobalt	ug/L	4.2	75%	NA	0	3	4	2.2 J	0.5 U	3.3 J	4.2 J
Copper	ug/L	4	75%	200 (b)	0	3	4	3.3 J	0.5 U	4 J	1.9 J
Iron	ug/L	7170	100%	300 (b)	4	4	4	4010 J	1000	7170	1930
Lead	ug/L	2.4	25%	25 (b)	0	1	4	0.9 U	0.9 U	2.4 J	0.8 U
Magnesium	ug/L	46800	100%	NA	0	4	4	27500	46800	42700	36800
Manganese	ug/L	297	100%	50 (a)	4	4	4	120	139	183	297
Mercury	ug/L	0.04	25%	0.7 (b)	0	1	4	0.04 J	0.04 U	0.03 U	0.03 U
Nickel	ug/L	9.4	75%	100 (b)	0	3	4	7.7 J	0.7 U	9.2 J	9.4 J
Potassium	ug/L	3280	100%	NA	0	4	4	2420 J	3010 J	3280 J	3250 J
Silver	ug/L	0.7	25%	50 (b)	0	1	4	0.7 J	0.5 U	0.7 U	0.7 U
Sodium	ug/L	13400	100%	20000 (b)	0	4	4	4600 J	8100	7410	13400
Thallium	ug/L	2.2	25%	2 (c)	1	1	4	2.2 J	1.9 U	1.6 U	1.6 U
Vanadium	ug/L	5.2	75%	NA	0	3	4	4.4 J	0.5 U	5.2 J	2.3 J
Zinc	ug/L	22.5	100%	5000 (a)	0	4	4	11 J	2.3 J	22.5 J	11.8 J
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen	mg/L	0.06	75%		0	3	4	0.06	0.01 U	0.03 J	0.02
pH	Standard Units	7.7	100%		0	4	4	7.1	7.1	7.7	7.1
Conductivity	umhos/cm	610	100%		0	4	4	460	610	600	535
Temperature	°C	13.7	100%		0	4	4	13.7	13.1	8	6.1
Turbidity	NTU	431	100%		0	4	4	148	16.6	431	0.2

NOTES:
a) Secondary Drinking Water Regulation
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE G-3
SURFACE WATER ANALYSIS RESULTS - SEAD-43, 56, 69
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-43 4/16/94 SW43-1-1 217864 43549 SW43-1 SA Value (Q)	WATER SEAD-43 4/16/94 SW43-2-1 217865 43549 SW43-2 SA Value (Q)	WATER SEAD-43 4/15/94 SW43-3-1 217769 43549 SW43-3 SA Value (Q)	WATER SEAD-43 4/15/94 SW43-3-20 217772 43549 SW43-3 DU Value (Q)	WATER SEAD-43 4/16/94 SW43-4-1 217866 43549 SW43-4 SA Value (Q)	WATER SEAD-43 4/15/94 SW43-5-1 217770 43549 SW43-5 SA Value (Q)
VOLATILE ORGANICS													
Acetone	ug/L	5	17%		0	1	6	10 U	5 J	10 U	10 U	10 U	10 U
SEMIVOLATILE ORGANICS													
4-Methylphenol	ug/L	1	17%		0	1	6	36 U	1 J	12 U	12 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	150	17%	0.6	1	1	6	150	12 U	12 U	12 U	10 U	11 U
METALS													
Aluminum	ug/L	1190	100%	100	4	6	6	400	1190	72.2 J	71.4 J	335	111 J
Barium	ug/L	55.2	100%		0	6	6	23 6 J	27.9 J	55.2 J	47.6 J	32.7 J	40.4 J
Beryllium	ug/L	0.1	17%	1100	0	1	6	0.1 J	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Cadmium	ug/L	0.34	33%	3.85	0	2	6	0.14 J	0.1 U	0.1 U	0.1 U	0.34 J	0.1 U
Calcium	ug/L	92900	100%		0	6	6	49900	43200	92900	92800	52300	79400
Chromium	ug/L	3.3	83%	140	0	5	6	0.82 J	1.6 J	0.4 UJ	3.3 J	0.51 J	0.47 J
Copper	ug/L	2.5	100%	17.36	0	6	6	1.9 J	2.5 J	1.6 J	1.1 J	2.3 J	1.3 J
Iron	ug/L	1750	100%	300	3	6	6	397	1750	177	163	503	150
Lead	ug/L	1.4	17%	8.7	0	1	6	0.8 U	0.8 U	0.8 U	0.8 U	1.4 J	0.8 U
Magnesium	ug/L	15900	100%		0	6	6	9210	7820	15900	15900	9420	14600
Manganese	ug/L	94.6	100%		0	6	6	13.9 J	94.6	91.5 J	48.9 J	39.1	12.2 J
Mercury	ug/L	0.06	100%	0.77	0	6	6	0.04 J	0.06 J	0.06 J	0.04 J	0.04 J	0.05 J
Nickel	ug/L	277	100%	100.16	1	6	6	1.6 J	2.8 J	0.71 J	1.6 J	277	1.4 J
Potassium	ug/L	2660	100%		0	6	6	1000 J	2290 J	1520 J	1500 J	2660 J	1810 J
Sodium	ug/L	5180	100%		0	6	6	2450 J	892 J	4440 J	4550 J	3240 J	5180
Vanadium	ug/L	2.1	33%	14	0	2	6	0 89 J	2.1 J	0.7 U	0.7 U	0.69 U	0.7 U
Zinc	ug/L	1040	100%	159.6	1	6	6	5.3 J	12.1 J	3.8 J	3.9 J	1040	14.2 J
		0	0%		0	0	6						
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/L	353.2						0.01	0.02	1.42	1.17	0.02	0.04
pH	SU							9.2	8.8	7.3		7.6	7.9
Conductivity	umhos/cm							215	165	333		255	432
Temperature	°C							11	10	21		16	21
Turbidity	NTU							9.8	31.2	1.9		9.7	2.3

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) NYSDEC guidance value

TABLE G-4
SEDIMENT ANALYSIS RESULTS - SEAD-43, 56, AND 69
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	SEDIMENT SEAD-43 0-0.2 04/16/94 SD43-1 217861 43543 Value (Q)	SEDIMENT SEAD-43 0-0.2 04/16/94 SD43-2 217862 43543 Value (Q)	SEDIMENT SEAD-43 0.4 04/15/94 SD43-3 217764 43543 Value (Q)	SEDIMENT SEAD-43 0-0.2 04/16/94 SD43-4 217863 43543 Value (Q)	SEDIMENT SEAD-43 0.6 04/15/94 SD43-5 217766 43543 Value (Q)
VOLATILE ORGANICS												
Acetone	ug/Kg	220	14%		0	1	5	82 U	20 U	220	32 U	65 U
2-Butanone	ug/Kg	49	29%		0	2	5	19	17 U	49	14 U	16 U
HERBICIDES												
2,4-DB	ug/Kg	110	14%		0	1	5	84 U	110	110 U	72 U	81 U
2,4,5-T	ug/Kg	23	57%		0	4	5	18	18	23 J	7.2 U	11
MCPP	ug/Kg	17000	29%		0	2	5	16000	17000	11000 U	7200 U	8100 U
NITROAROMATICS												
HMX	ug/Kg	110	29%		0	2	5	130 U	110 J	130 U	72 J	130 U
METALS												
Aluminum	mg/Kg	19600	71%		0	5	5	19600	16800	17600	13000	15400
Antimony	mg/Kg	0.37	167%	2	0	5	5	0.26 UJ	0.29 UJ	0.37 J	0.19 UJ	0.27 UJ
Arsenic	mg/Kg	9	71%	6	2	5	5	9	6.5	4.6	5.3	4.1
Barium	mg/Kg	158	71%		0	5	5	158	127	133	85.1	97.8
Beryllium	mg/Kg	0.99	71%		0	5	5	0.99 J	0.85 J	0.78 J	0.61 J	0.69 J
Cadmium	mg/Kg	0.63	71%	0.6	1	5	5	0.63 J	0.46 J	0.58 J	0.33 J	0.37 J
Calcium	mg/Kg	68900	71%		0	5	5	7220	7170	8230	68900	9030
Chromium	mg/Kg	27.4	71%	26	1	5	5	27.4	23.1	23	19.5	21
Cobalt	mg/Kg	19.7	71%		0	5	5	19.7	10.9 J	10.6 J	9.6	7.6 J
Copper	mg/Kg	30.1	71%	16	5	5	5	30.1	20.3	24.1	20.4	18.5
Iron	mg/Kg	37100	71%	20000	5	5	5	37100	28900	23800	25300	22100
Lead	mg/Kg	28.7	71%	31	0	5	5	28.7	23.2	22.2	9.8	16.7
Magnesium	mg/Kg	10500	71%		0	5	5	6870	5390	4880	10500	5180
Manganese	mg/Kg	1480	71%	460	3	5	5	1480	501	433	615	198
Mercury	mg/Kg	0.07	71%	0.15	0	5	5	0.06 J	0.04 J	0.06 J	0.03 J	0.07 J
Nickel	mg/Kg	44.3	71%	16	5	5	5	44.3	27.4	26.8	29.7	24.8
Potassium	mg/Kg	2440	71%		0	5	5	2140	2080	2320	2160	2440
Selenium	mg/Kg	1	14%		0	1	5	0.44 U	0.49 U	1 J	0.32 U	0.45 U
Sodium	mg/Kg	50	14%		0	1	5	41.3 U	45.5 U	45.3 U	50 J	42.2 U
Thallium	mg/Kg	0.75	43%		0	3	5	0.42 U	0.73 J	0.68 J	0.3 U	0.75 J
Vanadium	mg/Kg	37.4	71%		0	5	5	37.4	32.4	32.1	20.6	27.1
Zinc	mg/Kg	178	71%	120	3	5	5	122	124	105	64.3	178
		0	0%									
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	0.15	80%					0.1	0.03	0.15 J	0.06	0.02 U
Total Solids	%							59.5	62.2	48.6	69.5	62.1

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criterion is exceeded.
c) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE G-5
INORGANICS STATISTICAL ANALYSIS - SOIL
(WILCOXON RANKED SUM TEST)
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Number of site samples	Number of background samples	Total samples	Mean m	Stddev n	Stddev m	Min. n	Min. m	Max. n	Max. m	Mean Rank	Mean Rank	Wilcoxon Rank Sum	Wilcoxon Rank Sum			Reject Null
Metals	n	m	N (m+n)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	n	m	n	m	Zrs	Z(1-alpha)	Hypothesis?
Aluminum	58	54	112	13757.22	3639.85	4402.3	2900	5560	27000	21200	54.35	58.81	3175.5	3175.74	-0.7251	1.645	No
Antimony	58	54	112	2.81	1.94	2.17	0.07	0.08	10.8	6.8	41.39	72.73	3927.5	3927.42	-5.1051	1.645	No
Arsenic	58	52	110	5.54	1.82	2.78	2.7	2.7	13.1	21.5	54.05	57.12	2970	2970.24	-0.5031	1.645	No
Barium	58	54	112	79.85	42.4	26.73	2.7	33.9	202	159	59.42	53.36	2881.5	2881.44	0.987	1.645	No
Beryllium	58	54	112	0.68	0.17	0.25	0.17	0.34	1.2	1.4	52.41	60.9	3288.5	3288.6	-1.3836	1.645	No
Cadmium	58	54	112	0.53	0.31	0.74	0.04	0.01	1.5	2.9	63.58	48.9	2640.5	2640.6	2.3908	1.645	Yes
Calcium	58	54	112	46539.26	30573.25	50814.36	3385	1370	141000	293000	55.55	57.52	3106	3106.08	-0.3203	1.645	No
Chromium	58	54	112	20.93	4.92	6.43	5.4	10.3	30.7	35.8	54.91	58.21	3143.5	3143.34	-0.5387	1.645	No
Cobalt	58	54	112	11.35	3.25	4.38	2.8	5.5	20.9	29.1	52.85	60.42	3262.5	3262.68	-1.2317	1.645	No
Copper	58	54	112	21.28	36.4	8.42	11.4	9.7	212	62.8	63.84	48.62	2625.5	2625.48	2.4779	1.645	Yes
Cyanide	58	48	106	0.29	0.19	0.04	0.17	0.22	1.7	0.41	55.86	50.65	2431	2431.2	0.8702	1.645	No
Iron	58	54	112	25369.81	5548.51	7384.31	8520	8770	40300	42500	54.87	58.25	3145.5	3145.5	-0.5503	1.645	No
Lead	55	50	105	17.66	88.53	36.45	5.9	5.4	522	266	63.8	41.12	2056	2056	3.8118	1.645	Yes
Magnesium	58	54	112	10506.67	8649.84	6159.77	2690	2830	47500	29100	54.61	58.53	3160.5	3160.62	-0.6376	1.645	No
Manganese	52	51	103	606.9	163.62	331.46	182	207	956	2380	45.08	59.06	3012	3012.06	-2.3747	1.645	No
Mercury	54	50	104	0.04	0.03	0.03	0.01	0.01	0.17	0.13	53.37	51.56	2578	2578	0.3085	1.645	No
Nickel	58	53	111	31.65	9.49	11.16	6.8	12.3	57.2	62.3	53.41	58.84	3118.5	3118.52	-0.8885	1.645	No
Potassium	58	54	112	1537.02	511.97	510.14	730	628	3130	3160	65.03	47.34	2556.5	2556.36	2.8797	1.645	Yes
Selenium	58	54	112	0.34	0.44	0.34	0.09	0.05	1.8	1.7	71.37	40.53	2188.5	2188.62	5.0235	1.645	Yes
Silver	58	51	109	0.39	0.16	0.24	0.04	0.01	0.6	0.87	40.65	71.32	3637.5	3637.32	-5.0581	1.645	No
Sodium	58	54	112	89.01	40.39	53.68	9.35	12.55	164	269	51.91	61.43	3317	3317.22	-1.5489	1.645	No
Thallium	58	51	109	0.28	0.45	0.27	0.09	0.08	2.9	1.2	51.75	58.7	2993.5	2993.7	-1.1456	1.645	No
Vanadium	58	54	112	22.03	6.05	6.5	6.4	12	41.8	35.8	57.52	55.41	2992	2992.14	0.3436	1.645	No
Zinc	58	51	109	74.67	55.7	19.65	59.2	40.6	338	126	66.99	41.36	2109.5	2109.36	4.2238	1.645	Yes

TABLE G-6
INORGANICS STATISTICAL ANALYSIS - GROUNDWATER
(WILCOXON RANKED SUM TEST)
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Metals	Number of site samples n	Number of background samples m	Total samples N (m+n)	Mean n (ug/L)	Mean m (ug/L)	Stddev n (ug/L)	Stddev m (ug/L)	Min. n (ug/L)	Min. m (ug/L)	Max. n (ug/L)	Max. m (ug/L)	Mean Rank n	Mean Rank m	Wilcoxon Rank Sum n	Wilcoxon Rank Sum m	Zrs	Z(1-alpha)	Reject Null Hypothesis?
Aluminum	10	28	38	857.02	2455.69	986.98	8037.44	80.2	18	2870	42400	21.70	18.71	217	524	0.7293	1.645	No
Antimony	10	28	38	0.69	8.88	0.29	12.95	0.5	0.65	1.5	44.7	9.60	23.04	96	645	-3.3694	1.645	No
Arsenic	10	28	38	1.31	1.53	1	1.61	0.75	0.4	4.1	9.3	16.80	20.46	168	573	-0.9249	1.645	No
Barium	10	28	38	69.94	75.13	27.11	63.22	39.3	19.6	113	337	20.95	18.98	210	531	0.4807	1.645	No
Beryllium	10	26	36	0.06	0.21	0.06	0.42	0.03	0.05	0.23	2.2	10.75	21.48	108	558	-2.8715	1.645	No
Calcium	10	28	38	109480	123664.29	17608.38	33807.65	85600	79100	138000	240000	15.85	20.80	159	582	-1.2103	1.645	No
Chromium	10	27	37	1.73	4.28	1.93	13.22	0.2	0.2	5.3	69.4	17.75	19.46	178	525	-0.4299	1.645	No
Cobalt	10	28	38	1.67	3.64	1.59	7.28	0.25	0.25	4.2	34.6	17.85	20.09	179	563	-0.5483	1.645	No
Copper	10	28	38	1.6	2.77	1.64	4.48	0.25	0.25	4.5	23.3	16.55	20.55	166	575	-0.9831	1.645	No
Iron	10	28	38	1961.9	3919.98	2300.96	13088.81	231	10.85	7170	69400	23.00	18.25	230	511	1.1602	1.645	No
Lead	10	28	38	1	2.67	1.25	6.52	0.4	0.25	4.1	34.8	15.40	20.96	154	587	-1.3727	1.645	No
Magnesium	10	28	38	38760	27082.14	15686.74	13306.2	19000	11400	75600	57600	25.80	17.25	258	483	2.0887	1.645	Yes
Manganese	10	28	38	138.61	194.01	83.38	242.57	18.2	2.5	297	1120	19.85	19.38	199	543	0.1160	1.645	No
Mercury	10	26	36	0.03	0.04	0.02	0.02	0.02	0.01	0.06	0.1	17.90	18.73	179	487	-0.2235	1.645	No
Nickel	10	28	38	4.16	6.75	4.51	18.6	0.35	0.35	12.3	99.8	18.85	19.73	189	552	-0.2156	1.645	No
Potassium	10	28	38	3446	3256.55	1708.16	2679.59	1050	421.5	6240	10200	21.25	18.88	213	529	0.5802	1.645	No
Silver	10	28	38	0.35	1.21	0.17	1.21	0.25	0.25	0.7	4.55	11.70	22.29	117	624	-2.6465	1.645	No
Sodium	10	28	38	8353	19468.39	4728.8	19525.67	2390	1935	18900	73500	14.70	21.21	147	594	-1.5914	1.645	No
Thallium	10	27	37	1.05	1.68	0.48	1.21	0.8	0.6	2.4	4.7	15.90	20.15	159	544	-1.0828	1.645	No
Vanadium	10	28	38	2.02	5.21	1.73	13.48	0.25	0.25	5.2	70.8	20.40	19.18	204	537	0.2986	1.645	No
Zinc	10	25	35	8.2	26.12	6.28	40.36	2.3	1.1	22.5	143	16.40	18.64	164	466	-0.5846	1.645	No

TABLE G-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-43,56,69
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil (1) mg/kg	Ground Water mg/L
Volatile Organics			
Acetone	5.00E-03		
Chloroform	4.00E-03	3.00E-03	
Methylene Chloride	4.00E-03		
Toluene	2.70E-02	3.00E-03	
Xylene (total)	1.20E-02	4.00E-03	
Semivolatile Organics			
2-Methylnaphthalene	8.80E-02	4.60E-02	
4-Methylphenol	5.80E-01	5.80E-01	
Acenaphthene	5.70E-01	3.00E-01	
Anthracene	1.30E+00	7.00E-01	
Benzo(a)anthracene	2.40E+00	1.20E+00	
Benzo(a)pyrene	2.00E+00	1.20E+00	
Benzo(b)fluoranthene	1.60E+00	1.00E+00	
Benzo(g,h,i)perylene	1.30E+00	7.30E-01	
Benzo(k)fluoranthene	2.00E+00	9.60E-01	
Carbazole	6.20E-01	3.50E-01	
Chrysene	2.40E+00	1.20E+00	
Di-n-butylphthalate	6.20E-02	6.20E-02	
Dibenz(a,h)anthracene	5.20E-01	3.00E-01	
Dibenzofuran	3.10E-01	1.70E-01	
Fluoranthene	6.30E+00	3.20E+00	
Fluorene	6.10E-01	3.20E-01	
Indeno(1,2,3-cd)pyrene	1.20E+00	6.60E-01	
Naphthalene	2.00E-01	1.40E-01	
Phenanthrene	5.20E+00	2.60E+00	
Pyrene	4.70E+00	2.70E+00	
bis(2-Ethylhexyl)phthalate	2.70E+00	2.70E+00	
Pesticides/PCBs			
Endosulfan I	1.20E-03	1.20E-03	
alpha-Chlordane	2.40E-03	2.40E-03	
Metals			
Cadmium	1.50E+00	1.50E+00	
Copper	2.81E+01	2.38E+01	
Lead	3.02E+01	3.02E+01	
Magnesium			4.68E+01
Potassium	3.56E+03	3.56E+03	
Selenium	1.80E+00	1.40E+00	
Zinc	3.38E+02	3.38E+02	
Herbicides			
2,4,5-T	1.20E-02	1.20E-02	
2,4,5-TP (Silvex)			4.40E-04
Dicamba	1.10E-02	1.10E-02	
Dichloroprop	7.20E-02	7.20E-02	
MCPP	7.70E+00	7.30E+00	

Note:
(1) Concentrations applied to human health risk assessment only. Surface soil concentrations for ecological risk assessment based on composite of surface soil samples from SEADs 43, 56, 69, 44A, 44B, 52, 62, and 120B

TABLE G-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
Completion Report - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$	Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$
Variables:	Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)	CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³	PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 340 ug/m³
CF = Conversion Factor = 1E-9 kg/ug	CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Acetone		5.00E-03		1.70E-09
Chloroform	3.00E-03	4.00E-03	5.10E-11	1.36E-09
Methylene Chloride		4.00E-03		1.36E-09
Toluene	3.00E-03	2.70E-02	5.10E-11	9.18E-09
Xylene (total)	4.00E-03	1.20E-02	6.80E-11	4.08E-09
Semivolatile Organics				
2-Methylnaphthalene	4.60E-02	8.80E-02	7.82E-10	2.99E-08
4-Methylphenol	5.80E-01	5.80E-01	9.86E-09	1.97E-07
Acenaphthene	3.00E-01	5.70E-01	5.10E-09	1.94E-07
Anthracene	7.00E-01	1.30E+00	1.19E-08	4.42E-07
Benzo(a)anthracene	1.20E+00	2.40E+00	2.04E-08	8.16E-07
Benzo(a)pyrene	1.20E+00	2.00E+00	2.04E-08	6.80E-07
Benzo(b)fluoranthene	1.00E+00	1.60E+00	1.70E-08	5.44E-07
Benzo(g,h,i)perylene	7.30E-01	1.30E+00	1.24E-08	4.42E-07
Benzo(k)fluoranthene	9.60E-01	2.00E+00	1.63E-08	6.80E-07
Carbazole	3.50E-01	6.20E-01	5.95E-09	2.11E-07
Chrysene	1.20E+00	2.40E+00	2.04E-08	8.16E-07
Di-n-butylphthalate	6.20E-02	6.20E-02	1.05E-09	2.11E-08
Dibenz(a,h)anthracene	3.00E-01	5.20E-01	5.10E-09	1.77E-07
Dibenzofuran	1.70E-01	3.10E-01	2.89E-09	1.05E-07
Fluoranthene	3.20E+00	6.30E+00	5.44E-08	2.14E-06
Fluorene	3.20E-01	6.10E-01	5.44E-09	2.07E-07
Indeno(1,2,3-cd)pyrene	6.60E-01	1.20E+00	1.12E-08	4.08E-07
Naphthalene	1.40E-01	2.00E-01	2.38E-09	6.80E-08
Phenanthrene	2.60E+00	5.20E+00	4.42E-08	1.77E-06
Pyrene	2.70E+00	4.70E+00	4.59E-08	1.60E-06
bis(2-Ethylhexyl)phthalate	2.70E+00	2.70E+00	4.59E-08	9.18E-07
Pesticides				
Endosulfan I	1.20E-03	1.20E-03	2.04E-11	4.08E-10
alpha-Chlordane	2.40E-03	2.40E-03	4.08E-11	8.16E-10
Metals				
Cadmium	1.50E+00	1.50E+00	2.55E-08	5.10E-07
Copper	2.38E+01	2.81E+01	4.05E-07	9.55E-06
Lead	3.02E+01	3.02E+01	5.13E-07	1.03E-05
Potassium	3.56E+03	3.56E+03	6.05E-05	1.21E-03
Selenium	1.40E+00	1.80E+00	2.38E-08	6.12E-07
Zinc	3.38E+02	3.38E+02	5.75E-06	1.15E-04
Herbicides				
2,4,5-T	1.20E-02	1.20E-02	2.04E-10	4.08E-09
Dicamba	1.10E-02	1.10E-02	1.87E-10	3.74E-09
Dichloroprop	7.20E-02	7.20E-02	1.22E-09	2.45E-08
MCPP	7.30E+00	7.70E+00	1.24E-07	2.62E-06

ND = Compound was not detected above the detection limit shown

TABLE G-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Air EPC* from Total Soils	Prison Inmate				Prison Worker			
					Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics												
Acetone	NA	NA		1.70E-09								
Chloroform	NA	8.1E-02	5.10E-11	1.36E-09		3.80E-12		3E-13		1.43E-12		1E-13
Methylene Chloride	8.6E-01	1.7E-03		1.36E-09								
Toluene	1.1E-01	NA	5.10E-11	9.18E-09	1.11E-11		1E-10		3.99E-12		3E-11	
Xylene (total)	NA	NA	6.80E-11	4.08E-09								
Semivolatile Organics												
2-Methylnaphthalene	NA	NA	7.82E-10	2.99E-08								
4-Methylphenol	NA	NA	9.86E-09	1.97E-07								
Acenaphthene	NA	NA	5.10E-09	1.94E-07								
Anthracene	NA	NA	1.19E-08	4.42E-07								
Benzo(a)anthracene	NA	NA	2.04E-08	8.16E-07								
Benzo(a)pyrene	NA	NA	2.04E-08	6.80E-07								
Benzo(b)fluoranthene	NA	NA	1.70E-08	5.44E-07								
Benzo(g,h,i)perylene	NA	NA	1.24E-08	4.42E-07								
Benzo(k)fluoranthene	NA	NA	1.63E-08	6.80E-07								
Carbazole	NA	NA	5.95E-09	2.11E-07								
Chrysene	NA	NA	2.04E-08	8.16E-07								
Di-n-butylphthalate	NA	NA	1.05E-09	2.11E-08								
Dibenz(a,h)anthracene	NA	NA	5.10E-09	1.77E-07								
Dibenzofuran	NA	NA	2.89E-09	1.05E-07								
Fluoranthene	NA	NA	5.44E-08	2.14E-06								
Fluorene	NA	NA	5.44E-09	2.07E-07								
Indeno(1,2,3-cd)pyrene	NA	NA	1.12E-08	4.08E-07								
Naphthalene	8.6E-04	NA	2.38E-09	6.80E-08	5.17E-10		6E-07		1.86E-10		2E-07	
Phenanthrene	NA	NA	4.42E-08	1.77E-06								
Pyrene	NA	NA	4.59E-08	1.60E-06								
bis(2-Ethylhexyl)phthalate	NA	NA	4.59E-08	9.18E-07								
Pesticides												
Endosulfan I	NA	NA	2.04E-11	4.08E-10								
alpha-Chlordane	2.0E-04	3.5E-01	4.08E-11	8.16E-10	8.86E-12	3.04E-12	4E-08	1E-12	3.19E-12	1.14E-12	2E-08	4E-13
Metals												
Cadmium	NA	6.3E+00	2.55E-08	5.10E-07		1.90E-09		1E-08		7.13E-10		4E-09
Copper	NA	NA	4.05E-07	9.55E-06								
Lead	NA	NA	5.13E-07	1.03E-05								
Potassium	NA	NA	6.05E-05	1.21E-03								
Selenium	NA	NA	2.38E-08	6.12E-07								
Zinc	NA	NA	5.75E-06	1.15E-04								
Herbicides												
2,4,5-T	NA	NA	2.04E-10	4.08E-09								
Dicamba	NA	NA	1.87E-10	3.74E-09								
Dichloroprop	NA	NA	1.22E-09	2.45E-08								
MCPP	NA	NA	1.24E-07	2.62E-06								
Total Hazard Quotient and Cancer Risk:							6E-07	1E-08			2E-07	4E-09

Assumptions for Prison Inmate		Assumptions for Prison Worker	
CA =	EPC Surface Only	CA =	EPC Surface Only
IR =	15.2 m3/day	IR =	8 m3/day
EF =	365 days/year	EF =	250 days/year
ED =	24 years	ED =	25 years
BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE G-8 for calculation of Air EPCs
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-9

CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR

REASONABLE MAXIMUM EXPOSURE (RME)

Decision Document - Mini Risk Assessment - SEAD-43, 56, 69

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CA = Chemical Concentration in Air, Calculated from Air EPC Data

IR = Inhalation Rate

EF = Exposure Frequency

ED = Exposure Duration

BW = Bodyweight

AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics								
Acetone	NA	NA		1.70E-09				
Chloroform	NA	8.1E-02	5.10E-11	1.36E-09		1.92E-13		2E-14
Methylene Chloride	8.6E-01	1.7E-03		1.36E-09	1.34E-11	1.92E-13	2E-11	3E-16
Toluene	1.1E-01	NA	5.10E-11	9.18E-09	9.06E-11		8E-10	
Xylene (total)	NA	NA	6.80E-11	4.08E-09				
Semivolatile Organics								
2-Methylnaphthalene	NA	NA	7.82E-10	2.99E-08				
4-Methylphenol	NA	NA	9.86E-09	1.97E-07				
Acenaphthene	NA	NA	5.10E-09	1.94E-07				
Anthracene	NA	NA	1.19E-08	4.42E-07				
Benzo(a)anthracene	NA	NA	2.04E-08	8.16E-07				
Benzo(a)pyrene	NA	NA	2.04E-08	6.80E-07				
Benzo(b)fluoranthene	NA	NA	1.70E-08	5.44E-07				
Benzo(g,h,i)perylene	NA	NA	1.24E-08	4.42E-07				
Benzo(k)fluoranthene	NA	NA	1.63E-08	6.80E-07				
Carbazole	NA	NA	5.95E-09	2.11E-07				
Chrysene	NA	NA	2.04E-08	8.16E-07				
Di-n-butylphthalate	NA	NA	1.05E-09	2.11E-08				
Dibenz(a,h)anthracene	NA	NA	5.10E-09	1.77E-07				
Dibenzofuran	NA	NA	2.89E-09	1.05E-07				
Fluoranthene	NA	NA	5.44E-08	2.14E-06				
Fluorene	NA	NA	5.44E-09	2.07E-07				
Indeno(1,2,3-cd)pyrene	NA	NA	1.12E-08	4.08E-07				
Naphthalene	8.6E-04	NA	2.38E-09	6.80E-08	6.71E-10		8E-07	
Phenanthrene	NA	NA	4.42E-08	1.77E-06				
Pyrene	NA	NA	4.59E-08	1.60E-06				
bis(2-Ethylhexyl)phthalate	NA	NA	4.59E-08	9.18E-07				
Pesticides								
Endosulfan I	NA	NA	2.04E-11	4.08E-10				
alpha-Chlordane	2.0E-04	3.5E-01	4.08E-11	8.16E-10	8.05E-12	1.15E-13	4E-08	4E-14
Metals								
Cadmium	NA	6.3E+00	2.55E-08	5.10E-07		7.19E-11		5E-10
Copper	NA	NA	4.05E-07	9.55E-06				
Lead	NA	NA	5.13E-07	1.03E-05				
Potassium	NA	NA	6.05E-05	1.21E-03				
Selenium	NA	NA	2.38E-08	6.12E-07				
Zinc	NA	NA	5.75E-06	1.15E-04				
Herbicides								
2,4,5-T	NA	NA	2.04E-10	4.08E-09				
Dicamba	NA	NA	1.87E-10	3.74E-09				
Dichloroprop	NA	NA	1.22E-09	2.45E-08				
MCPP	NA	NA	1.24E-07	2.62E-06				
Total Hazard Quotient and Cancer Risk:							8E-07	5E-10

Assumptions for Construction Worker

CA =	EPC Surface and Sub-Surface
IR =	10.4 m3/day
EF =	24.25 days/year
ED =	1 years
BW =	70 kg
AT (Nc) =	365 days
AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data

* See TABLE G-8 for calculation of Air EPCs

NA= Information not available.

TABLE G-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* fro Surface Soil	Air EPC* from Total Soils	Day Care Center Child Intake (mg/kg-day)		Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day)		Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics												
Acetone	NA	NA		1.70E-09								
Chloroform	NA	8.1E-02	5.10E-11	1.36E-09		7.98E-13		6E-14		1.43E-12		1E-13
Methylene Chloride	8.6E-01	1.7E-03		1.36E-09								
Toluene	1.1E-01	NA	5.10E-11	9.18E-09	9.32E-12		8E-11		3.99E-12		3E-11	
Xylene (total)	NA	NA	6.80E-11	4.08E-09								
Semivolatile Organics												
2-Methylnaphthalene	NA	NA	7.82E-10	2.99E-08								
4-Methylphenol	NA	NA	9.86E-09	1.97E-07								
Acenaphthene	NA	NA	5.10E-09	1.94E-07								
Anthracene	NA	NA	1.19E-08	4.42E-07								
Benzo(a)anthracene	NA	NA	2.04E-08	8.16E-07								
Benzo(a)pyrene	NA	NA	2.04E-08	6.80E-07								
Benzo(b)fluoranthene	NA	NA	1.70E-08	5.44E-07								
Benzo(g,h,i)perylene	NA	NA	1.24E-08	4.42E-07								
Benzo(k)fluoranthene	NA	NA	1.63E-08	6.80E-07								
Carbazole	NA	NA	5.95E-09	2.11E-07								
Chrysene	NA	NA	2.04E-08	8.16E-07								
Di-n-butylphthalate	NA	NA	1.05E-09	2.11E-08								
Dibenz(a,h)anthracene	NA	NA	5.10E-09	1.77E-07								
Dibenzofuran	NA	NA	2.89E-09	1.05E-07								
Fluoranthene	NA	NA	5.44E-08	2.14E-06								
Fluorene	NA	NA	5.44E-09	2.07E-07								
Indeno(1,2,3-cd)pyrene	NA	NA	1.12E-08	4.08E-07								
Naphthalene	8.6E-04	NA	2.38E-09	6.80E-08	4.35E-10		5E-07		1.86E-10		2E-07	
Phenanthrene	NA	NA	4.42E-08	1.77E-06								
Pyrene	NA	NA	4.59E-08	1.60E-06								
bis(2-Ethylhexyl)phthalate	NA	NA	4.59E-08	9.18E-07								
Pesticides												
Endosulfan I	NA	NA	2.04E-11	4.08E-10								
alpha-Chlordane	2.0E-04	3.5E-01	4.08E-11	8.16E-10	7.45E-12	6.39E-13	4E-08	2E-13	3.19E-12	1.14E-12	2E-08	4E-13
Metals												
Cadmium	NA	6.3E+00	2.55E-08	5.10E-07		3.99E-10		3E-09		7.13E-10		4E-09
Copper	NA	NA	4.05E-07	9.55E-06								
Lead	NA	NA	5.13E-07	1.03E-05								
Potassium	NA	NA	6.05E-05	1.21E-03								
Selenium	NA	NA	2.38E-08	6.12E-07								
Zinc	NA	NA	5.75E-06	1.15E-04								
Herbicides												
2,4,5-T	NA	NA	2.04E-10	4.08E-09								
Dicamba	NA	NA	1.87E-10	3.74E-09								
Dichloroprop	NA	NA	1.22E-09	2.45E-08								
MCPP	NA	NA	1.24E-07	2.62E-06								
Total Hazard Quotient and Cancer Risk:							5E-07	3E-09			2E-07	4E-09

Assumptions for Day Care Center Child		Assumptions for Day Care Center Adult	
CA =	EPC Surface Only	CA =	EPC Surface Only
IR =	4 m3/day	IR =	8 m3/day
EF =	250 days/year	EF =	250 days/year
ED =	6 years	ED =	25 years
BW =	15 kg	BW =	70 kg
AT (Nc) =	2190 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE G-8 for calculation of Air EPCs
NA= Information not available.

TABLE G-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Prison Inmate				Prison Worker			
					Intake (mg/kg-day)		Hazard Quotient	Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics												
Acetone	1.0E-01	NA		5.00E-03								
Chloroform	1.0E-02	6.1E-03	3.00E-03	4.00E-03	4.29E-09	1.47E-09	4E-07	9E-12	2.94E-09	1.05E-09	3E-07	6E-12
Methylene Chloride	6.0E-02	7.5E-03		4.00E-03								
Toluene	2.0E-01	NA	3.00E-03	2.70E-02	4.29E-09		2E-08		2.94E-09		1E-08	
Xylene (total)	2.0E+00	NA	4.00E-03	1.20E-02	5.71E-09		3E-09		3.91E-09		2E-09	
Semivolatile Organics												
2-Methylnaphthalene	4.0E-02	NA	4.60E-02	8.80E-02	6.57E-08		2E-06		4.50E-08		1E-06	
4-Methylphenol	5.0E-03	NA	5.80E-01	5.80E-01	8.29E-07		2E-04		5.68E-07		1E-04	
Acenaphthene	6.0E-02	NA	3.00E-01	5.70E-01	4.29E-07		7E-06		2.94E-07		5E-06	
Anthracene	3.0E-01	NA	7.00E-01	1.30E+00	1.00E-06		3E-06		6.85E-07		2E-06	
Benzo(a)anthracene	NA	7.3E-01	1.20E+00	2.40E+00		5.88E-07		4E-07		4.19E-07		3E-07
Benzo(a)pyrene	NA	7.3E+00	1.20E+00	2.00E+00		5.88E-07		4E-06		4.19E-07		3E-06
Benzo(b)fluoranthene	NA	7.3E-01	1.00E+00	1.60E+00		4.90E-07		4E-07		3.49E-07		3E-07
Benzo(g,h,i)perylene	NA	NA	7.30E-01	1.30E+00								
Benzo(k)fluoranthene	NA	7.3E-02	9.60E-01	2.00E+00		4.70E-07		3E-08		3.35E-07		2E-08
Carbazole	NA	2.0E-02	3.50E-01	6.20E-01		1.71E-07		3E-09		1.22E-07		2E-09
Chrysene	NA	7.3E-03	1.20E+00	2.40E+00		5.88E-07		4E-09		4.19E-07		3E-09
Di-n-butylphthalate	1.0E-01	NA	6.20E-02	6.20E-02	8.86E-08		9E-07		6.07E-08		6E-07	
Dibenz(a,h)anthracene	NA	7.3E+00	3.00E-01	5.20E-01		1.47E-07		1E-06		1.05E-07		8E-07
Dibenzofuran	NA	NA	1.70E-01	3.10E-01								
Fluoranthene	4.0E-02	NA	3.20E+00	6.30E+00	4.57E-06		1E-04		3.13E-06		8E-05	
Fluorene	4.0E-02	NA	3.20E-01	6.10E-01	4.57E-07		1E-05		3.13E-07		8E-06	
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	6.60E-01	1.20E+00		3.23E-07		2E-07		2.31E-07		2E-07
Naphthalene	2.0E-02	NA	1.40E-01	2.00E-01	2.00E-07		1E-05		1.37E-07		7E-06	
Phenanthrene	NA	NA	2.60E+00	5.20E+00								
Pyrene	3.0E-02	NA	2.70E+00	4.70E+00	3.86E-06		1E-04		2.64E-06		9E-05	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	2.70E+00	2.70E+00	3.86E-06	1.32E-06	2E-04	2E-08	2.64E-06	9.44E-07	1E-04	1E-08
Pesticides/PCBs												
Endosulfan I	6.0E-03	NA	1.20E-03	1.20E-03	1.71E-09		3E-07		1.17E-09		2E-07	
alpha-Chlordane	5.0E-04	3.5E-01	2.40E-03	2.40E-03	3.43E-09	1.18E-09	7E-06	4E-10	2.35E-09	8.39E-10	5E-06	3E-10
Metals												
Cadmium	5.0E-04	NA	1.50E+00	1.50E+00	2.14E-06		4E-03		1.47E-06		3E-03	
Copper	4.0E-02	NA	2.38E+01	2.81E+01	3.40E-05		9E-04		2.33E-05		6E-04	
Lead	NA	NA	3.02E+01	3.02E+01								
Potassium	NA	NA	3.56E+03	3.56E+03								
Selenium	5.0E-03	NA	1.40E+00	1.80E+00	2.00E-06		4E-04		1.37E-06		3E-04	
Zinc	3.0E-01	NA	3.38E+02	3.38E+02	4.83E-04		2E-03		3.31E-04		1E-03	
Herbicides												
2,4,5-T	1.0E-02	NA	1.20E-02	1.20E-02	1.71E-08		2E-06		1.17E-08		1E-06	
Dicamba	3.0E-02	NA	1.10E-02	1.10E-02	1.57E-08		5E-07		1.08E-08		4E-07	
Dichloroprop	NA	NA	7.20E-02	7.20E-02								
MCPP	1.0E-03	NA	7.30E+00	7.70E+00	1.04E-05		1E-02		7.14E-06		7E-03	
Total Hazard Quotient and Cancer Risk:							2E-02	6E-06			1E-02	5E-06

Assumptions for Prison Worker		Assumptions for Prison Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only
IR =	100 mg soil/day	IR =	100 mg soil/day
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
FI =	1 unitless	FI =	1 unitless
EF =	365 days/year	EF =	250 days/year
ED =	24 years	ED =	25 years
BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EP
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics								
Acetone	1.0E-01	NA		5.00E-03	2.28E-09		2E-08	
Chloroform	1.0E-02	6.1E-03	3.00E-03	4.00E-03	1.82E-09	2.60E-11	2E-07	2E-13
Methylene Chloride	6.0E-02	7.5E-03		4.00E-03	1.82E-09	2.60E-11	3E-08	2E-13
Toluene	2.0E-01	NA	3.00E-03	2.70E-02	1.23E-08		6E-08	
Xylene (total)	2.0E+00	NA	4.00E-03	1.20E-02	5.47E-09		3E-09	
Semivolatile Organics								
2-Methylnaphthalene	4.0E-02	NA	4.60E-02	8.80E-02	4.01E-08		1E-06	
4-Methylphenol	5.0E-03	NA	5.80E-01	5.80E-01	2.64E-07		5E-05	
Acenaphthene	6.0E-02	NA	3.00E-01	5.70E-01	2.60E-07		4E-06	
Anthracene	3.0E-01	NA	7.00E-01	1.30E+00	5.92E-07		2E-06	
Benzo(a)anthracene	NA	7.3E-01	1.20E+00	2.40E+00		1.56E-08		1E-08
Benzo(a)pyrene	NA	7.3E+00	1.20E+00	2.00E+00		1.30E-08		1E-07
Benzo(b)fluoranthene	NA	7.3E-01	1.00E+00	1.60E+00		1.04E-08		8E-09
Benzo(g,h,i)perylene	NA	NA	7.30E-01	1.30E+00				
Benzo(k)fluoranthene	NA	7.3E-02	9.60E-01	2.00E+00		1.30E-08		1E-09
Carbazole	NA	2.0E-02	3.50E-01	6.20E-01		4.04E-09		8E-11
Chrysene	NA	7.3E-03	1.20E+00	2.40E+00		1.56E-08		1E-10
Di-n-butylphthalate	1.0E-01	NA	6.20E-02	6.20E-02	2.82E-08		3E-07	
Dibenz(a,h)anthracene	NA	7.3E+00	3.00E-01	5.20E-01		3.38E-09		2E-08
Dibenzofuran	NA	NA	1.70E-01	3.10E-01				
Fluoranthene	4.0E-02	NA	3.20E+00	6.30E+00	2.87E-06		7E-05	
Fluorene	4.0E-02	NA	3.20E-01	6.10E-01	2.78E-07		7E-06	
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	6.60E-01	1.20E+00		7.81E-09		6E-09
Naphthalene	2.0E-02	NA	1.40E-01	2.00E-01	9.11E-08		5E-06	
Phenanthrene	NA	NA	2.60E+00	5.20E+00				
Pyrene	3.0E-02	NA	2.70E+00	4.70E+00	2.14E-06		7E-05	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	2.70E+00	2.70E+00	1.23E-06	1.76E-08	6E-05	2E-10
Pesticides/PCBs								
Endosulfan I	6.0E-03	NA	1.20E-03	1.20E-03	5.47E-10		9E-08	
alpha-Chlordane	5.0E-04	3.5E-01	2.40E-03	2.40E-03	1.09E-09	1.56E-11	2E-06	5E-12
Metals								
Cadmium	5.0E-04	NA	1.50E+00	1.50E+00	6.83E-07		1E-03	
Copper	4.0E-02	NA	2.38E+01	2.81E+01	1.28E-05		3E-04	
Lead	NA	NA	3.02E+01	3.02E+01				
Potassium	NA	NA	3.56E+03	3.56E+03				
Selenium	5.0E-03	NA	1.40E+00	1.80E+00	8.20E-07		2E-04	
Zinc	3.0E-01	NA	3.38E+02	3.38E+02	1.54E-04		5E-04	
Herbicides								
2,4,5-T	1.0E-02	NA	1.20E-02	1.20E-02	5.47E-09		5E-07	
Dicamba	3.0E-02	NA	1.10E-02	1.10E-02	5.01E-09		2E-07	
Dichloroprop	NA	NA	7.20E-02	7.20E-02				
MCPP	1.0E-03	NA	7.30E+00	7.70E+00	3.51E-06		4E-03	
Total Hazard Quotient and Cancer Risk:							**6E-03**	**1E-07**

Assumptions for Construction Worker

CS =	EPC Total Soils
IR =	480 mg soil/day
CF =	1E-06 kg/mg
FI =	1 unitless
EF =	24.25 days/year
ED =	1 years
BW =	70 kg
AT (Nc) =	365 days
AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils.
NA= Information not available

TABLE G-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

CS = Chemical Concentration in Soil, Calculated from Soil EP
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics												
Acetone	1.0E-01	NA		5.00E-03								
Chloroform	1.0E-02	6.1E-03	3.00E-03	4.00E-03	2.74E-08	2.35E-09	3E-06	1E-11	2.94E-09	1.05E-09	3E-07	6E-12
Methylene Chloride	6.0E-02	7.5E-03		4.00E-03								
Toluene	2.0E-01	NA	3.00E-03	2.70E-02	2.74E-08		1E-07		2.94E-09		1E-08	
Xylene (total)	2.0E+00	NA	4.00E-03	1.20E-02	3.65E-08		2E-08		3.91E-09		2E-09	
Semivolatile Organics												
2-Methylnaphthalene	4.0E-02	NA	4.60E-02	8.80E-02	4.20E-07		1E-05		4.50E-08		1E-06	
4-Methylphenol	5.0E-03	NA	5.80E-01	5.80E-01	5.30E-06		1E-03		5.68E-07		1E-04	
Acenaphthene	6.0E-02	NA	3.00E-01	5.70E-01	2.74E-06		5E-05		2.94E-07		5E-06	
Anthracene	3.0E-01	NA	7.00E-01	1.30E+00	6.39E-06		2E-05		6.85E-07		2E-06	
Benzo(a)anthracene	NA	7.3E-01	1.20E+00	2.40E+00		9.39E-07		7E-07		4.19E-07		3E-07
Benzo(a)pyrene	NA	7.3E+00	1.20E+00	2.00E+00		9.39E-07		7E-06		4.19E-07		3E-06
Benzo(b)fluoranthene	NA	7.3E-01	1.00E+00	1.60E+00		7.83E-07		6E-07		3.49E-07		3E-07
Benzo(g,h,i)perylene	NA	NA	7.30E-01	1.30E+00								
Benzo(k)fluoranthene	NA	7.3E-02	9.60E-01	2.00E+00		7.51E-07		5E-08		3.35E-07		2E-08
Carbazole	NA	2.0E-02	3.50E-01	6.20E-01		2.74E-07		5E-09		1.22E-07		2E-09
Chrysene	NA	7.3E-03	1.20E+00	2.40E+00		9.39E-07		7E-09		4.19E-07		3E-09
Di-n-butylphthalate	1.0E-01	NA	6.20E-02	6.20E-02	5.66E-07		6E-06		6.07E-08		6E-07	
Dibenz(a,h)anthracene	NA	7.3E+00	3.00E-01	5.20E-01		2.35E-07		2E-06		1.05E-07		8E-07
Dibenzofuran	NA	NA	1.70E-01	3.10E-01								
Fluoranthene	4.0E-02	NA	3.20E+00	6.30E+00	2.92E-05		7E-04		3.13E-06		8E-05	
Fluorene	4.0E-02	NA	3.20E-01	6.10E-01	2.92E-06		7E-05		3.13E-07		8E-06	
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	6.60E-01	1.20E+00		5.17E-07		4E-07		2.31E-07		2E-07
Naphthalene	2.0E-02	NA	1.40E-01	2.00E-01	1.28E-06		6E-05		1.37E-07		7E-06	
Phenanthrene	NA	NA	2.60E+00	5.20E+00								
Pyrene	3.0E-02	NA	2.70E+00	4.70E+00	2.47E-05		8E-04		2.64E-06		9E-05	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	2.70E+00	2.70E+00	2.47E-05	2.11E-06	1E-03	3E-08	2.64E-06	9.44E-07	1E-04	1E-08
Pesticides/PCBs												
Endosulfan I	6.0E-03	NA	1.20E-03	1.20E-03	1.10E-08		2E-06		1.17E-09		2E-07	
alpha-Chlordane	5.0E-04	3.5E-01	2.40E-03	2.40E-03	2.19E-08	1.88E-09	4E-05	7E-10	2.35E-09	8.39E-10	5E-06	3E-10
Metals												
Cadmium	5.0E-04	NA	1.50E+00	1.50E+00	1.37E-05		3E-02		1.47E-06		3E-03	
Copper	4.0E-02	NA	2.38E+01	2.81E+01	2.17E-04		5E-03		2.33E-05		6E-04	
Lead	NA	NA	3.02E+01	3.02E+01								
Potassium	NA	NA	3.56E+03	3.56E+03								
Selenium	5.0E-03	NA	1.40E+00	1.80E+00	1.28E-05		3E-03		1.37E-06		3E-04	
Zinc	3.0E-01	NA	3.38E+02	3.38E+02	3.09E-03		1E-02		3.31E-04		1E-03	
Herbicides												
2,4,5-T	1.0E-02	NA	1.20E-02	1.20E-02	1.10E-07		1E-05		1.17E-08		1E-06	
Dicamba	3.0E-02	NA	1.10E-02	1.10E-02	1.00E-07		3E-06		1.08E-08		4E-07	
Dichloroprop	NA	NA	7.20E-02	7.20E-02								
MCPP	1.0E-03	NA	7.30E+00	7.70E+00	6.67E-05		7E-02		7.14E-06		7E-03	
Total Hazard Quotient and Cancer Risk:							1E-01	1E-05			1E-02	5E-06

Assumptions for Day Care Center Child		Assumptions for Day Care Center Adult	
CS =	EPC Surface Only	CS =	EPC Surface Only
IR =	200 mg soil/day	IR =	100 mg soil/day
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
FI =	1 unitless	FI =	1 unitless
EF =	250 days/year	EF =	250 days/year
ED =	6 years	ED =	25 years
BW =	15 kg	BW =	70 kg
AT (Nc) =	2190 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
Total Soils include surface and subsurface soils.
NA= Information not available.

TABLE G-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Absorbed Dose (mg/kg-day) (Nc)	Prison Inmate Absorbed Dose (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Absorbed Dose (mg/kg-day) (Nc)	Prison Worker Absorbed Dose (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk
Volatile Organics													
Acetone	1.0E-01	NA	NA		5.00E-03								
Chloroform	1.0E-02	6.1E-03	NA	3.00E-03	4.00E-03								
Methylene Chloride	5.9E-02	7.7E-03	NA		4.00E-03								
Toluene	2.0E-01	NA	NA	3.00E-03	2.70E-02								
Xylene (total)	1.8E+00	NA	NA	4.00E-03	1.20E-02								
Semivolatile Organics													
2-Methylnaphthalene	4.0E-02	NA	NA	4.60E-02	8.80E-02								
4-Methylphenol	NA	NA	NA	5.80E-01	5.80E-01								
Acenaphthene	6.0E-02	NA	NA	3.00E-01	5.70E-01								
Anthracene	3.0E-01	NA	NA	7.00E-01	1.30E+00								
Benzo(a)anthracene	NA	7.3E-01	NA	1.20E+00	2.40E+00								
Benzo(a)pyrene	NA	1.5E+01	NA	1.20E+00	2.00E+00								
Benzo(b)fluoranthene	NA	7.3E-01	NA	1.00E+00	1.60E+00								
Benzo(g,h,i)perylene	NA	NA	NA	7.30E-01	1.30E+00								
Benzo(k)fluoranthene	NA	7.3E-02	NA	9.60E-01	2.00E+00								
Carbazole	NA	2.0E-02	NA	3.50E-01	6.20E-01								
Chrysene	NA	7.3E-03	NA	1.20E+00	2.40E+00								
Di-n-butylphthalate	9.0E-02	NA	NA	6.20E-02	6.20E-02								
Dibenz(a,h)anthracene	NA	7.3E+00	NA	3.00E-01	5.20E-01								
Dibenzofuran	NA	NA	NA	1.70E-01	3.10E-01								
Fluoranthene	4.0E-02	NA	NA	3.20E+00	6.30E+00								
Fluorene	4.0E-02	NA	NA	3.20E-01	6.10E-01								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6.60E-01	1.20E+00								
Naphthalene	2.0E-02	NA	NA	1.40E-01	2.00E-01								
Phenanthrene	NA	NA	NA	2.60E+00	5.20E+00								
Pyrene	3.0E-02	NA	NA	2.70E+00	4.70E+00								
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	2.70E+00	2.70E+00								
Pesticides/PCBs													
Endosulfan I	6.0E-03	NA	NA	1.20E-03	1.20E-03								
alpha-Chlordane	5.0E-04	3.5E-01	NA	2.40E-03	2.40E-03								
Metals													
Cadmium	5.0E-05	NA	0.01	1.50E+00	1.50E+00	1.24E-06		2E-02		8.51E-07		2E-02	
Copper	2.4E-02	NA	NA	2.38E+01	2.81E+01								
Lead	NA	NA	NA	3.02E+01	3.02E+01								
Potassium	NA	NA	NA	3.56E+03	3.56E+03								
Selenium	4.5E-03	NA	NA	1.40E+00	1.80E+00								
Zinc	7.5E-02	NA	NA	3.38E+02	3.38E+02								
Herbicides													
2,4,5-T	1.0E-02	NA	NA	1.20E-02	1.20E-02								
Dicamba	5.9E-02	7.7E-03	NA	1.10E-02	1.10E-02								
Dichloroprop	NA	NA	NA	7.20E-02	7.20E-02								
MCPP	1.0E-03	NA	NA	7.30E+00	7.70E+00								
Total Hazard Quotient and Cancer Risk:								2E-02				2E-02	

Assumptions for Prison Inmate		Assumptions for Prison Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	5800 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	365 days/year	EF =	250 days/year
ED =	24 years	ED =	25 years
BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note Cells in this table were intentionally left blank due to a lack of toxicity data
Total Soils include surface and subsurface soils.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = CS x CF x SA x AF x ABS x EF x ED / BW x AT

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics									
Acetone	1.0E-01	NA	NA		5.00E-03				
Chloroform	1.0E-02	6.1E-03	NA	3.00E-03	4.00E-03				
Methylene Chloride	5.9E-02	7.7E-03	NA		4.00E-03				
Toluene	2.0E-01	NA	NA	3.00E-03	2.70E-02				
Xylene (total)	1.8E+00	NA	NA	4.00E-03	1.20E-02				
Semivolatile Organics									
2-Methylnaphthalene	4.0E-02	NA	NA	4.60E-02	8.80E-02				
4-Methylphenol	NA	NA	NA	5.80E-01	5.80E-01				
Acenaphthene	6.0E-02	NA	NA	3.00E-01	5.70E-01				
Anthracene	3.0E-01	NA	NA	7.00E-01	1.30E+00				
Benzo(a)anthracene	NA	7.3E-01	NA	1.20E+00	2.40E+00				
Benzo(a)pyrene	NA	1.5E+01	NA	1.20E+00	2.00E+00				
Benzo(b)fluoranthene	NA	7.3E-01	NA	1.00E+00	1.60E+00				
Benzo(g,h,i)perylene	NA	NA	NA	7.30E-01	1.30E+00				
Benzo(k)fluoranthene	NA	7.3E-02	NA	9.60E-01	2.00E+00				
Carbazole	NA	2.0E-02	NA	3.50E-01	6.20E-01				
Chrysene	NA	7.3E-03	NA	1.20E+00	2.40E+00				
Di-n-butylphthalate	9.0E-02	NA	NA	6.20E-02	6.20E-02				
Dibenz(a,h)anthracene	NA	7.3E+00	NA	3.00E-01	5.20E-01				
Dibenzofuran	NA	NA	NA	1.70E-01	3.10E-01				
Fluoranthene	4.0E-02	NA	NA	3.20E+00	6.30E+00				
Fluorene	4.0E-02	NA	NA	3.20E-01	6.10E-01				
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6.60E-01	1.20E+00				
Naphthalene	2.0E-02	NA	NA	1.40E-01	2.00E-01				
Phenanthrene	NA	NA	NA	2.60E+00	5.20E+00				
Pyrene	3.0E-02	NA	NA	2.70E+00	4.70E+00				
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	2.70E+00	2.70E+00				
Pesticides/PCBs									
Endosulfan I	6.0E-03	NA	NA	1.20E-03	1.20E-03				
alpha-Chlordane	5.0E-04	3.5E-01	NA	2.40E-03	2.40E-03				
Metals									
Cadmium	5.0E-05	NA	0.01	1.50E+00	1.50E+00	8.26E-08		2E-03	
Copper	2.4E-02	NA	NA	2.38E-01	2.81E+01				
Lead	NA	NA	NA	3.02E+01	3.02E+01				
Potassium	NA	NA	NA	3.56E+03	3.56E+03				
Selenium	4.5E-03	NA	NA	1.40E+00	1.80E+00				
Zinc	7.5E-02	NA	NA	3.38E+02	3.38E+02				
Herbicides									
2,4,5-T	1.0E-02	NA	NA	1.20E-02	1.20E-02				
Dicamba	5.9E-02	7.7E-03	NA	1.10E-02	1.10E-02				
Dichloroprop	NA	NA	NA	7.20E-02	7.20E-02				
MCPP	1.0E-03	NA	NA	7.30E+00	7.70E+00				
Total Hazard Quotient and Cancer Risk:								2E-03	

Assumptions for Construction Worker

CS =	EPC Total Soils	
CF =	1.00E-06	kg/mg
SA =	5800	cm2
AF =	1	mg/cm2
EF =	24.25	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Child Absorbed Dose (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Adult Absorbed Dose (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics													
Acetone	1.0E-01	NA	NA		5.00E-03								
Chloroform	1.0E-02	6.1E-03	NA	3.00E-03	4.00E-03								
Methylene Chloride	5.9E-02	7.7E-03	NA		4.00E-03								
Toluene	2.0E-01	NA	NA	3.00E-03	2.70E-02								
Xylene (total)	1.8E+00	NA	NA	4.00E-03	1.20E-02								
Semivolatile Organics													
2-Methylnaphthalene	4.0E-02	NA	NA	4.60E-02	8.80E-02								
4-Methylphenol	NA	NA	NA	5.80E-01	5.80E-01								
Acenaphthene	6.0E-02	NA	NA	3.00E-01	5.70E-01								
Anthracene	3.0E-01	NA	NA	7.00E-01	1.30E+00								
Benzo(a)anthracene	NA	7.3E-01	NA	1.20E+00	2.40E+00								
Benzo(a)pyrene	NA	1.5E+01	NA	1.20E+00	2.00E+00								
Benzo(b)fluoranthene	NA	7.3E-01	NA	1.00E+00	1.60E+00								
Benzo(g,h,i)perylene	NA	NA	NA	7.30E-01	1.30E+00								
Benzo(k)fluoranthene	NA	7.3E-02	NA	9.60E-01	2.00E+00								
Carbazole	NA	2.0E-02	NA	3.50E-01	6.20E-01								
Chrysene	NA	7.3E-03	NA	1.20E+00	2.40E+00								
Di-n-butylphthalate	9.0E-02	NA	NA	6.20E-02	6.20E-02								
Dibenz(a,h)anthracene	NA	7.3E+00	NA	3.00E-01	5.20E-01								
Dibenzofuran	NA	NA	NA	1.70E-01	3.10E-01								
Fluoranthene	4.0E-02	NA	NA	3.20E+00	6.30E+00								
Fluorene	4.0E-02	NA	NA	3.20E-01	6.10E-01								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6.60E-01	1.20E+00								
Naphthalene	2.0E-02	NA	NA	1.40E-01	2.00E-01								
Phenanthrene	NA	NA	NA	2.60E+00	5.20E+00								
Pyrene	3.0E-02	NA	NA	2.70E+00	4.70E+00								
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	2.70E+00	2.70E+00								
Pesticides/PCBs													
Endosulfan I	6.0E-03	NA	NA	1.20E-03	1.20E-03								
alpha-Chlordane	5.0E-04	3.5E-01	NA	2.40E-03	2.40E-03								
Metals													
Cadmium	5.0E-05	NA	0.01	1.50E+00	1.50E+00	1.50E-06		3E-02		8.51E-07		2E-02	
Copper	2.4E-02	NA	NA	2.38E+01	2.81E+01								
Lead	NA	NA	NA	3.02E+01	3.02E+01								
Potassium	NA	NA	NA	3.56E+03	3.56E+03								
Selenium	4.5E-03	NA	NA	1.40E+00	1.80E+00								
Zinc	7.5E-02	NA	NA	3.38E+02	3.38E+02								
Herbicides													
2,4,5-T	1.0E-02	NA	NA	1.20E-02	1.20E-02								
Dicamba	5.9E-02	7.7E-03	NA	1.10E-02	1.10E-02								
Dichloroprop	NA	NA	NA	7.20E-02	7.20E-02								
MCPP	1.0E-03	NA	NA	7.30E+00	7.70E+00								
Total Hazard Quotient and Cancer Risk:								3E-02				2E-02	

Assumptions for Day Care Center Child		Assumptions for Day Care Center Adult	
CS =	EPC Surface Only	CS =	EPC Surface Only
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	2190 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	250 days/year	EF =	250 days/year
ED =	6 years	ED =	25 years
BW =	15 kg	BW =	70 kg
AT (Nc) =	2190 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-12
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Herbicides															
2,4,5-TP (Silvex)	8.0E-03	NA	4.40E-04	1.26E-05		2E-03		4.31E-06		5E-04			**Ingestion of Groundwater Not Applicable for Construction Worker**		
Metals															
Magnesium	NA	NA	4.68E+01												
Total Hazard Quotient and Cancer Risk:						**2E-03**				**5E-04**					

Assumptions for Prison Inmate

IR =	2	liters/day
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

IR	1	liters/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-12
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Herbicides											
2,4,5-TP (Silvex)	8.0E-03	NA	4.40E-04	2.01E-05		3E-03		4.31E-06		5E-04	
Metals											
Magnesium	NA	NA	4.68E+01								
Total Hazard Quotient and Cancer Risk:						**3E-03**				**5E-04**	

Assumptions for Day Care Center Child

IR =	1	liters/day
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

IR =	1	liters/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-13
CALCULATION OF AIR CONCENTRATION IN SHOWER
FROM VOLATILIZATION OF GROUNDWATER (daily)
REASONABLE MAXIMUM EXPOSURE (RME)
COMPLETION REPORT - MINI RISK ASSESSMENT - SEAD-43, 56, 69
SENECA ARMY DEPOT, ROMULUS, NEW YORK

Analyte	EPC Air All-Site Wells (mg/m^3)	Time of Shower -Ts (min)	Flow Rate of Shower - Fw (L/min)	EPC - RME Groundwater (mg/l)	Flow Rate of Air in Shower-Fa (m^3/min)	Volume of Bathroom-Vb (m^3)	Henry Laws Constant-H (m^3-atm/mol)	Asymptotic Air Conc.-Cinf (mg/m^3)	Rate Constant-K (1/min)	Efficiency of Release-E (unitless)	Efficiency of Release for TCE E-TCE	Henry Laws Constant-TCE (m^3-atm/mol)	Fraction Emitted* (percent)	Cderm** (Water) (mg/l)
Herbicides														
2,4,5-TP (Silvex)	2.06E-09	15	19	4.40E-04	2.4	12	1.31E-08	3.01E-09	0.20	8.64E-07	0.6	0.0091	0.00%	4.40E-04
Metals														
Magnesium	0.00E+00	15	19	4.68E+01	2.4	12	NA	0.00E+00	0.20	0.00	0.6	0.0091	0.00%	4.68E+01

Concentration in Air (mg/m^3) = Cinf[1+(1/(kTs)(exp(-kTs)-1)]

Asymptotic Air Conc. - Cinf (mg/m^3) = [(E)(Fw)(Ct)]/Fa

Rate Constant - k (L/min) = Fa/Vb

Efficiency of Release - E (unitless) = (E-tce)(H)/(H-tce)

* Fraction Emitted (fe) = (EPCair x Fa) / (EPCgw x Fw)

** Cderm = EPCgw x (1 - fe)

Variables:

CA = Chemical Concentration in Air (mg/m^3)
Ts = Time of Shower (minutes)
Fw = Flow Rate of Shower (L/min)
Fa = Flow Rate of Air in Shower (m^3/min)
Vb = Volume of Bathroom (m^3)

Assumptions:

EPC - Groundwater Data - RME
15 (RME default)
19 (Estimated RME)
2.4 (Average Air Flow)
12 (Average Bathroom Volume)

TABLE G-14
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Herbicides																		
2,4,5-TP (Silvex)	8.0E-03	NA	1.1E-02	3.9E+00	4.40E-04	1.36E-08	4.47E-06		6E-04		3.06E-06		4E-04		Dermal Contact of Groundwater Not Applicable for Construction Worker			
Metals																		
Magnesium	NA	NA	1.0E-03	NA	1.68E+01	1.17E-05												
Total Hazard Quotient and Cancer Risk:									6E-04				4E-04					

Assumptions for Prison Inmate	
SA =	23000 cm2
CF =	0.001 l/cm3
EF =	365 days/year
ED =	24 years
BW =	70 kg
AT (Nc) =	8760 days
AT (Car) =	25550 days
ET =	0.25 hours/day

Assumptions for Prison Worker	
SA =	23000 cm2
CF =	0.001 l/cm3
EF =	250 days/year
ED =	25 years
BW =	70 kg
AT (Nc) =	9125 days
AT (Car) =	25550 days
ET =	0.25 hours/day

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* Cderm is the concentration of chmeical available for dermal absorption after accounoting for partitioning between the air and water in the shower. The calculation of Cderm is shown in Table G-13.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE G-14
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD 43, 56, 69
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chron

Equation for Cancer Risk = Chronic

Analyte	Dermal RfD (mg/kg-day)	Dermal	Permeability Coefficient Kp (cm/hr)	Tau	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event mg-cm²/event	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Herbicides														
2,4,5-TP (Silvex)	8.0E-03	NA	1.1E-02	3.9E+00	4.40E-04	1.36E-08		Dermal Contact of Groundwater Not Applicable for Day Care Center Child				Dermal Contact of Groundwater Not Applicable for Day Care Center Adult		
Metals														
Magnesium	NA	NA	1.0E-03	NA	4.68E+01	0.0000117								
Total Hazard Quotient and Cancer Risk:														

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* Cderm is the concentration of chmeical available for dermal absorption after accounting for partitioning between the air and water in the shower. The calculation of Cderm is shown in Table G-13..
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3 3-5.

TABLE G-15
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME)
Completion Report - Mini Risk Assessment - SEAD-43, 56, 69
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-43	SEAD-43	SEAD-43	SEAD-43	SEAD-43
							SAMP_DEPTH_TOP	0	0	0	0	1
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	1.5
							SAMP_DATE	06/10/94	06/10/94	06/10/94	06/09/94	02/17/94
							SAMP_ID	SB43-1-1	SB43-1-20	SB43-2-1	SB43-3-1	SB43-4-1
							LAB_ID	223889	223893	223682	223686	211724
							SDG	44725	44725	44694	44694	42460
							LOC_ID	SB43-1	SB43-1	SB43-2	SB43-3	SB43-4
							QC_CODE	SA	DU	SA	SA	SA
									DUP OF SB43-1-1			
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23	13 U	10 UJ	12 U	11 U	15 U
Chloroform	UG/KG	3	4.3%	300	0	1	23	13 U	10 UJ	12 U	11 U	3 J
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23	13 U	10 UJ	12 U	11 U	11 U
Toluene	UG/KG	11	8.7%	1500	0	2	23	13 U	10 UJ	12 U	11 U	3 J
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23	13 U	10 UJ	12 U	11 U	4 J
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23	410 U	410 U	420 U	360 U	46 J
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23	410 U	410 U	420 U	360 U	520 U
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23	410 U	410 U	420 U	360 U	300 J
Anthracene	UG/KG	700	14.8%	50000	0	4	27	410 U	410 U	420 U	35 J	700
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23	410 U	410 U	22 J	110 J	1200
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23	410 U	410 U	420 U	96 J	1200
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23	410 U	410 U	420 U	100 J	1000
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23	410 U	410 U	420 U	88 J	730
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23	410 U	410 U	420 U	86 J	960
Carbazole	UG/KG	350	8.7%	50000	0	2	23	410 U	410 U	420 U	20 J	350 J
Chrysene	UG/KG	1200	29.6%	400	1	8	27	410 U	410 U	25 J	120 J	1200
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23	410 U	410 U	420 U	33 J	300 J
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23	410 U	410 U	420 U	360 U	170 J
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23	410 U	410 U	420 U	360 U	48 J
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29	410 U	410 U	42 J	240 J	3200
Fluorene	UG/KG	320	4.3%	50000	0	1	23	410 U	410 U	420 U	360 U	320 J
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23	410 U	410 U	420 U	75 J	660
Naphthalene	UG/KG	140	4.3%	13000	0	1	23	410 U	410 U	420 U	360 U	140 J
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27	410 U	410 U	27 J	140 J	2600
Pyrene	UG/KG	2700	34.5%	50000	0	10	29	410 U	410 U	45 J	230 J	2700
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23	82 J	510 J	53 J	530	2700
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23	4.1 U	4.1 U	4.2 U	3.6 U	3.9 U
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23	4.1 U	4.1 U	4.2 U	3.6 U	3.9 U
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23	4.1 U	4.1 U	4.2 U	3.6 U	3.9 U
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23	2.1 U	2.1 U	2.2 U	1.8 U	2.4 J
Dieldrin	UG/KG	70	26.1%	44	3	6	23	4.1 U	4.1 U	4.2 U	3.6 U	3.9 U
Endosulfan I	UG/KG	2	8.7%	900	0	2	23	2.1 U	2.1 U	2.2 U	1.2 J	2 U
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 U	130 U	130 U	130 U	130 U
Tetryl	UG/KG	150	2.4%		0	1	42	130 U	130 U	130 U	130 U	130 U
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29	20800	15700	14700 J	10900 J	13300 J
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29	0.23 UJ	0.26 UJ	0.32 UJ	0.24 J	4.6 J
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29	6.1	5.4	6.1	5.3	6 J
Barium	MG/KG	202	96.6%	300	0	28	29	145	112	104 J	60.3 J	92.1 J
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29	0.86 J	0.77 J	0.69 J	0.44 J	0.58 J
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25	0.96	0.85 J	0.68 J	0.58 J	0.41 U
Calcium	MG/KG	111000	96.6%	121000	0	28	29	8980	7830	11800 J	41900 J	60500 J
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29	26.2	21.6	21.2 J	15.7 J	23.1
Cobalt	MG/KG	15.7	96.6%	30	0	28	29	10.9	9 J	9.3 J	8.2 J	8.7 J
Copper	MG/KG	191	96.6%	33	2	28	29	21.8	21.4	21 J	23.6 J	23.8
Iron	MG/KG	31000	96.6%	36500	0	28	29	26800	25400	26800 J	19200 J	23900 J
Lead	MG/KG	522	96.3%	24.8	6	26	27	19.2	18.6	19.8	19.1	15.9
Magnesium	MG/KG	29500	96.6%	21500	2	28	29	5440	5400	6080 J	20000 J	18800 J
Manganese	MG/KG	871	86.2%	1060	0	25	29	782	502	546 J	593 J	530 R

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-43	SEAD-43	SEAD-43	SEAD-43	SEAD-43
							SAMP_DEPTH_TOP	0	0	0	0	1
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	1.5
							SAMP_DATE	06/10/94	06/10/94	06/10/94	06/09/94	02/17/94
							SAMP_ID	SB43-1-1	SB43-1-20	SB43-2-1	SB43-3-1	SB43-4-1
							LAB_ID	223889	223893	223682	223686	211724
							SDG	44725	44725	44694	44694	42460
							LOC_ID	SB43-1	SB43-1	SB43-2	SB43-3	SB43-4
							QC_CODE	SA	DU	SA	SA	SA
			FREQUENCY		NUMBER	NUMBER	NUMBER		DUP OF SB43-1-1			
			OF		ABOVE	OF	OF					
CHEM_CLASS/PARAM	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTIONS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25	0.06 J	0.07 J	0.06 JR	0.08 JR	0.04 J
Nickel	MG/KG	53.4	96.6%	49	1	28	29	28.1	26.2	26.7 J	20.6 J	27
Potassium	MG/KG	3560	96.6%	2380	3	28	29	3560 J	2050 J	2060	2550	1940
Selenium	MG/KG	1.8	79.3%	2	0	23	29	1.1	0.85 J	1.3	0.48 J	0.17 UJ
Sodium	MG/KG	164	41.4%	172	0	12	29	17.8 U	19.6 U	24.8 U	27.5 J	128 J
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27	0.34 U	0.37 U	0.47 U	0.33 U	0.18 U
Vanadium	MG/KG	36.7	96.6%	150	0	28	29	36.7	27	27 J	21.1 J	24.6
Zinc	MG/KG	338	96.6%	110	9	28	29	98.6	92	91.1 J	121 J	71.7 J
HERBICIDES												
2,4,5-T	UG/KG			1900				6.2 U	12 J	6.4 U	5.5 U	5.9 U
Dicamba	UG/KG							6.2 U	11 J	6.4 U	5.5 U	5.9 U
Dichloroprop	UG/KG							62 U	72 J	64 U	55 U	59 U
MCPP	UG/KG							6200 U	7300 J	6400 U	7100	5900 U

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-43	SEAD-56	SEAD-56	SEAD-56	SEAD-69
							SAMP_DEPTH_TOP	1	0	0	0	0
							SAMP_DEPTH_BOT	1.2	0.2	0.2	0.2	0.2
							SAMP_DATE	02/18/94	05/23/94	05/23/94	05/18/94	05/17/94
							SAMP_ID	SB43-4-3	SB56-1-1	SB56-2-1	SB56-3-1	SB69-1-1
							LAB_ID	211726	222124	222127	221480	221354
							SDG	42460	44090	44090	44090	44090
							LOC_ID	SB43-4	SB56-1	SB56-2	SB56-3	SB69-1
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23	52 UR	11 U	11 U	12 U	15 U
Chloroform	UG/KG	3	4.3%	300	0	1	23	11 UR	11 U	11 U	12 U	15 U
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23	11 UR	11 U	11 U	12 U	15 U
Toluene	UG/KG	11	8.7%	1500	0	2	23	11 J	11 U	11 U	12 U	15 U
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23	12 J	11 U	11 U	12 U	15 U
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23	350 U	430 U	380 U	400 U	490 U
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23	350 U	430 U	380 U	400 U	490 U
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23	350 U	430 U	380 U	400 U	490 U
Anthracene	UG/KG	700	14.8%	50000	0	4	27	350 U	430 U	380 U	400 U	490 U
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23	350 U	430 U	380 U	400 U	490 U
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23	350 U	430 U	380 U	400 U	490 U
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23	350 U	430 U	380 U	400 U	490 U
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23	350 U	430 U	380 U	400 U	490 U
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23	350 U	430 U	380 U	400 U	490 U
Carbazole	UG/KG	350	8.7%	50000	0	2	23	350 U	430 U	380 U	400 U	490 U
Chrysene	UG/KG	1200	29.6%	400	1	8	27	350 U	430 U	380 U	400 U	490 U
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23	350 U	430 U	380 U	400 U	490 U
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23	350 U	430 U	380 U	400 U	490 U
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23	350 U	430 U	380 U	400 U	490 U
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29	350 U	430 U	380 U	400 U	490 U
Fluorene	UG/KG	320	4.3%	50000	0	1	23	350 U	430 U	380 U	400 U	490 U
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23	350 U	430 U	380 U	400 U	490 U
Naphthalene	UG/KG	140	4.3%	13000	0	1	23	350 U	430 U	380 U	400 U	490 U
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27	350 U	430 U	380 U	400 U	490 U
Pyrene	UG/KG	2700	34.5%	50000	0	10	29	350 U	430 U	380 U	400 U	490 U
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23	1300	280 J	81 J	1300	490 U
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23	3.5 U	4.3 U	3.8 U	4 U	4.9 U
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23	3.5 U	4.3 U	3.8 U	4 U	4.9 U
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23	3.5 U	4.3 U	3.8 U	4 U	4.9 U
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23	1.8 U	2.2 U	2 U	2.1 U	2.5 U
Dieldrin	UG/KG	70	26.1%	44	3	6	23	3.5 U	4.3 U	3.8 U	4 U	4.9 U
Endosulfan I	UG/KG	2	8.7%	900	0	2	23	1.8 U	2.2 U	2 U	2.1 U	2.5 U
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 U	130 U	130 U	130 U	130 U
Tetryl	UG/KG	150	2.4%		0	1	42	130 U	130 U	130 U	130 U	130 U
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29	15200 J	4620	4850	2900	13800
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29	3.3 J	0.21 UJ	0.19 UJ	0.17 UJ	0.26 UJ
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29	4 J	3.5	3.3	4.5	5.3
Barium	MG/KG	202	96.6%	300	0	28	29	49.9 J	26 J	33 J	14.4 J	124
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29	0.72	0.22 J	0.22 J	0.17 J	0.74 J
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25	0.26 U	1.5	0.51 J	0.55 J	0.79 J
Calcium	MG/KG	111000	96.6%	121000	0	28	29	21500 J	62200	66400	111000	8360
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29	25.7	7.1	7	5.4	19.5
Cobalt	MG/KG	15.7	96.6%	30	0	28	29	15.7	3.8 J	4.5 J	2.8 J	7.5 J
Copper	MG/KG	191	96.6%	33	2	28	29	28.1	18.8	17.3	11.4	20.3
Iron	MG/KG	31000	96.6%	36500	0	28	29	31000 J	10900	11500	8520	23500
Lead	MG/KG	522	96.3%	24.8	6	26	27	15.6	30.2	12.8	19.3	23.2
Magnesium	MG/KG	29500	96.6%	21500	2	28	29	8540 J	29500	26400	17800	4290
Manganese	MG/KG	871	86.2%	1060	0	25	29	479 R	529	533	502	395

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

4/5/02

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-43	SEAD-56	SEAD-56	SEAD-56	SEAD-69
							SAMP_DEPTH_TOP	1	0	0	0	0
							SAMP_DEPTH_BOT	1.2	0.2	0.2	0.2	0.2
							SAMP_DATE	02/18/94	05/23/94	05/23/94	05/18/94	05/17/94
							SAMP_ID	SB43-4-3	SB56-1-1	SB56-2-1	SB56-3-1	SB69-1-1
							LAB_ID	211726	222124	222127	221480	221354
							SDG	42460	44090	44090	44090	44090
							LOC_ID	SB43-4	SB56-1	SB56-2	SB56-3	SB69-1
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25	0.02 J	0.02 J	0.03 J	0.01 J	0.06 J
Nickel	MG/KG	53.4	96.6%	49	1	28	29	53.4	10.9	10.3	6.8	22.2
Potassium	MG/KG	3560	96.6%	2380	3	28	29	1580	1020 J	1030	730 J	2140
Selenium	MG/KG	1.8	79.3%	2	0	23	29	1.8 J	0.35 U	0.55 J	0.29 U	1.4
Sodium	MG/KG	164	41.4%	172	0	12	29	98.5 J	94.6 J	52 J	86.1 J	41 U
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27	0.21 U	0.33 U	0.31 U	0.27 U	0.41 U
Vanadium	MG/KG	36.7	96.6%	150	0	28	29	21.3	10.2 J	10.6	6.4 J	24.5
Zinc	MG/KG	338	96.6%	110	9	28	29	126 J	295	75.4	139	92.8
HERBICIDES												
2,4,5-T	UG/KG			1900				5.4 U	6.5 U	5.9 U	6.1 U	7.4 U
Dicamba	UG/KG							5.4 U	6.5 U	5.9 U	6.1 U	7.4 U
Dichloroprop	UG/KG							54 U	65 U	59 U	61 U	74 U
MCPP	UG/KG							5400 U	6500 U	5900 U	6100 U	7400 U

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS						
							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-69	SEAD-69	SEAD-69	SEAD-44	SEAD-44
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	05/17/94	02/19/94	02/18/94	04/13/94	04/13/94
							SAMP_ID	SB69-1-20	SB69-2-1	SB69-3-1	SS44A-1-1	SS44A-20-1
							LAB_ID	221355	211964	211967	217678	217685
							SDG	44090	42460	42493	43535	43535
							LOC_ID	SB69-1	SB69-2	SB69-3	SS44A-1	SS44A-1
							QC_CODE	DU	SA	SA	SA	DU
							NUMBER OF ANALYSES	DUP OF SB69-1-1 Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23	14 U	24 U	19 U	73	35
Chloroform	UG/KG	3	4.3%	300	0	1	23	14 U	24 U	19 U	16 U	16 U
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23	14 U	24 U	19 U	16 U	16 U
Toluene	UG/KG	11	8.7%	1500	0	2	23	14 U	24 U	19 U	16 U	16 U
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23	14 U	24 U	19 U	16 U	16 U
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23	490 U	620 U	650 U	520 U	510 U
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23	490 U	580 J	650 U	520 U	510 U
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23	490 U	620 U	650 U	520 U	510 U
Anthracene	UG/KG	700	14.8%	50000	0	4	27	490 U	620 U	650 U	520 U	510 U
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23	490 U	620 U	650 U	520 U	510 U
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23	490 U	620 U	650 U	520 U	510 U
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23	490 U	620 U	650 U	520 U	510 U
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23	490 U	620 U	650 U	520 U	510 U
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23	490 U	620 U	650 U	520 U	510 U
Carbazole	UG/KG	350	8.7%	50000	0	2	23	490 U	620 U	650 U	520 U	510 U
Chrysene	UG/KG	1200	29.6%	400	1	8	27	490 U	620 U	650 U	520 U	510 U
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23	490 U	620 U	650 U	520 U	510 U
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23	490 U	620 U	650 U	520 U	510 U
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23	490 U	620 U	62 J	520 U	26 J
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29	490 U	620 U	650 U	520 U	23 J
Fluorene	UG/KG	320	4.3%	50000	0	1	23	490 U	620 U	650 U	520 U	510 U
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23	490 U	620 U	650 U	520 U	510 U
Naphthalene	UG/KG	140	4.3%	13000	0	1	23	490 U	620 U	650 U	520 U	510 U
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27	490 U	620 U	650 U	520 U	510 U
Pyrene	UG/KG	2700	34.5%	50000	0	10	29	490 U	620 U	650 U	520 U	26 J
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23	490 U	690	580 J	520 U	54 J
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23	4.9 U	6.3 U	6.5 U	5.2 U	5.1 U
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23	4.9 U	6.3 U	6.5 U	5.2 U	5.1 U
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23	4.9 U	6.3 U	6.5 U	5.2 U	5.1 U
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23	2.5 U	3.3 U	3.3 U	2.7 U	2.6 U
Dieldrin	UG/KG	70	26.1%	44	3	6	23	4.9 U	6.3 U	6.5 U	20 J	5.1 U
Endosulfan I	UG/KG	2	8.7%	900	0	2	23	2.5 U	3.3 U	3.3 U	2.7 U	2.6 U
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 U	130 U	130 U	130 U	130 U
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 U	130 U	130 U	130 U	130 U
Tetryl	UG/KG	150	2.4%		0	1	42	130 U	130 U	130 U	130 U	130 U
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29	13900	16000 J	14900	14500	16000
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29	0.3 UJ	6 UJ	0.37 UJ	0.21 UJ	0.18 UJ
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29	5.8	5.4 J	4.7	6.5	4.6
Barium	MG/KG	202	96.6%	300	0	28	29	132	133 J	118	93.4	94.1
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29	0.75 J	0.9 J	0.67 J	0.56 J	0.56 J
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25	0.83 J	0.58 U	0.31 J	0.24 J	0.26 J
Calcium	MG/KG	111000	96.6%	121000	0	28	29	6320	7760 J	7510 J	3310	3460
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29	19.9	22.6	21.5	17.6	18.5
Cobalt	MG/KG	15.7	96.6%	30	0	28	29	9.2 J	8.9 J	8.2 J	7.9 J	7.2 J
Copper	MG/KG	191	96.6%	33	2	28	29	20.5	22.9	20.6	20.6	14.2
Iron	MG/KG	31000	96.6%	36500	0	28	29	24600	27100 J	24900	23300	20700
Lead	MG/KG	522	96.3%	24.8	6	26	27	23.9	21.1	25.1	21.4	21.6
Magnesium	MG/KG	29500	96.6%	21500	2	28	29	3810	4940 J	4730	2940	3270
Manganese	MG/KG	871	86.2%	1060	0	25	29	540	576 R	368	370 J	251 J

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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								MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
								AREA	SEAD-69	SEAD-69	SEAD-69	SEAD-44	SEAD-44
								SAMP_DEPTH_TOP	0	0	0	0	0
								SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
								SAMP_DATE	05/17/94	02/19/94	02/18/94	04/13/94	04/13/94
								SAMP_ID	SB69-1-20	SB69-2-1	SB69-3-1	SS44A-1-1	SS44A-20-1
								LAB_ID	221355	211964	211967	217678	217685
								SDG	44090	42460	42493	43535	43535
								LOC_ID	SB69-1	SB69-2	SB69-3	SS44A-1	SS44A-1
								QC_CODE	DU	SA	SA	SA	DU
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES		DUP OF SB69-1-1 Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25		0.06 J	0.08 J	0.06 J	0.05 J	0.03 J
Nickel	MG/KG	53.4	96.6%	49	1	28	29		22.5	28.1	26.6 J	18	20.7
Potassium	MG/KG	3560	96.6%	2380	3	28	29		2080	1930	1940 J	1320	1450
Selenium	MG/KG	1.8	79.3%	2	0	23	29		1.2 J	0.54 J	1.2 J	1 J	0.81 J
Sodium	MG/KG	164	41.4%	172	0	12	29		47.2 U	54.9 U	85.5 J	34 U	28.3 U
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27		0.48 U	0.3 U	0.46 U	0.34 U	0.29 U
Vanadium	MG/KG	36.7	96.6%	150	0	28	29		25	28.3	27.6	27.6	27.1
Zinc	MG/KG	338	96.6%	110	9	28	29		94.2	338 J	273	72.6	85
HERBICIDES													
2,4,5-T	UG/KG			1900					7.5 U	9.4 U	9.8 U		
Dicamba	UG/KG								7.5 U	9.4 U	9.8 U		
Dichloroprop	UG/KG								75 U	94 U	98 U		
MCPP	UG/KG								7500 U	9400 U	9800 U		

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS						
							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-44	SEAD-44	SEAD-44	SEAD-44	SEAD-44
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	04/13/94	04/13/94	04/13/94	04/13/94	04/13/94
							SAMP_ID	SS44A-2-1	SS44A-3-1	SS44A-4-1	SS44A-5-1	SS44A-6-1
							LAB_ID	217680	217681	217682	217683	217684
							SDG	43535	43535	43535	43535	43535
							LOC_ID	SS44A-2	SS44A-3	SS44A-4	SS44A-5	SS44A-6
							QC_CODE	SA	SA	SA	SA	SA
							NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200*	39.1%	200	0	9	23	11 J	26	18	200	16 J
Chloroform	UG/KG	3	4.3%	300	0	1	23	15 U	18 U	16 U	21 U	16 U
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23	15 U	18 U	16 U	28	16 U
Toluene	UG/KG	11	8.7%	1500	0	2	23	15 U	18 U	16 U	21 U	16 U
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23	15 U	18 U	16 U	21 U	16 U
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23	520 U	580 U	580 U	660 U	570 U
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23	520 U	250 J	580 U	660 U	64 J
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23	520 U	580 U	580 U	660 U	570 U
Anthracene	UG/KG	700	14.8%	50000	0	4	27	520 U	580 U	580 U	660 U	570 U
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23	56 J	580 U	580 U	660 U	570 U
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23	49 J	580 U	580 U	660 U	570 U
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23	43 J	580 U	580 U	660 U	570 U
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23	520 U	580 U	580 U	660 U	570 U
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23	52 J	580 U	580 U	660 U	570 U
Carbazole	UG/KG	350	8.7%	50000	0	2	23	520 U	580 U	580 U	660 U	570 U
Chrysene	UG/KG	1200	29.6%	400	1	8	27	53 J	580 U	580 U	660 U	570 U
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23	520 U	580 U	580 U	660 U	570 U
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23	520 U	580 U	580 U	660 U	570 U
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23	520 U	580 U	580 U	53 J	570 U
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29	150 J	580 U	580 U	660 U	570 U
Fluorene	UG/KG	320	4.3%	50000	0	1	23	520 U	580 U	580 U	660 U	570 U
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23	26 J	580 U	580 U	660 U	570 U
Naphthalene	UG/KG	140	4.3%	13000	0	1	23	520 U	580 U	580 U	660 U	570 U
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27	120 J	580 U	580 U	660 U	570 U
Pyrene	UG/KG	2700	34.5%	50000	0	10	29	120 J	580 U	580 U	660 U	570 U
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23	520 U	580 U	580 U	32 J	30 J
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23	5.2 U	5.7 U	5.8 U	6.6 U	5.7 U
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23	5.2 U	5.7 U	5.8 U	6.6 U	5.7 U
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23	5.2 U	5.7 U	5.8 U	6.6 U	5.7 U
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23	2.7 U	2.9 U	3 U	3.4 U	2.9 U
Dieldrin	UG/KG	70	26.1%	44	3	6	23	5.2 U	9.9 J	59	29	70
Endosulfan I	UG/KG	2	8.7%	900	0	2	23	2.7 U	2.9 U	3 U	3.4 U	2.9 U
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 U	130 U	130 U	110 J	130 U
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 U	130 U	130 U	130 U	130 U
Tetryl	UG/KG	150	2.4%		0	1	42	130 U	130 U	130 U	130 U	130 U
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29	15300	15300	12900	17400	11500
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29	0.27 UJ	0.23 UJ	0.2 UJ	0.25 UJ	0.19 UJ
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29	4.9	4.8	4.5	5.7	3.5
Barium	MG/KG	202	96.6%	300	0	28	29	92.5	148	108	164	116
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29	0.63 J	0.72 J	0.63 J	0.91 J	0.57 J
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25	0.26 J	0.36 J	0.39 J	0.48 J	0.36 J
Calcium	MG/KG	111000	96.6%	121000	0	28	29	6230	5690	4900	7160	5950
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29	20.1	20.5	17.9	23.7	15
Cobalt	MG/KG	15.7	96.6%	30	0	28	29	7.7 J	8.6 J	8.3 J	8.8 J	5.1 J
Copper	MG/KG	191	96.6%	33	2	28	29	14.5	18.9	17.2	20	14
Iron	MG/KG	31000	96.6%	36500	0	28	29	24200	23800	21900	27400	16500
Lead	MG/KG	522	96.3%	24.8	6	26	27	18.6	18	16.5	22.5	13.9
Magnesium	MG/KG	29500	96.6%	21500	2	28	29	3970	4090	3630	4370	2690
Manganese	MG/KG	871	86.2%	1060	0	25	29	298 J	489 J	326 J	678 J	301 J

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-44	SEAD-44	SEAD-44	SEAD-44	SEAD-44
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	04/13/94	04/13/94	04/13/94	04/13/94	04/13/94
							SAMP_ID	SS44A-2-1	SS44A-3-1	SS44A-4-1	SS44A-5-1	SS44A-6-1
							LAB_ID	217680	217681	217682	217683	217684
							SDG	43535	43535	43535	43535	43535
							LOC_ID	SS44A-2	SS44A-3	SS44A-4	SS44A-5	SS44A-6
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25	0.03 J	0.05 J	0.04 J	0.07 J	0.05 J
Nickel	MG/KG	53.4	96.6%	49	1	28	29	20.4	24	21.2	26	14.4
Potassium	MG/KG	3560	96.6%	2380	3	28	29	1410	1980	1410	1980	1200
Selenium	MG/KG	1.8	79.3%	2	0	23	29	0.99 J	0.93 J	1.5	1.7	1.3
Sodium	MG/KG	164	41.4%	172	0	12	29	42.1 U	36 U	31 U	40 U	30.2 U
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27	0.42 U	0.36 U	0.31 U	0.4 U	0.3 U
Vanadium	MG/KG	36.7	96.6%	150	0	28	29	26.8	25.3	21.4	30.2	21
Zinc	MG/KG	338	96.6%	110	9	28	29	72.4	88.6	80.5	94	59.2
HERBICIDES												
2,4,5-T	UG/KG			1900								
Dicamba	UG/KG											
Dichloroprop	UG/KG											
MCPP	UG/KG											

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-44	SEAD-44	SEAD-44	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	04/13/94	04/13/94	04/13/94	12/16/93	12/16/93
							SAMP_ID	SS44B-1-1	SS44B-2-1	SS44B-3-1	SS52-1	SS52-19
							LAB_ID	217686	217687	217688	207145	207163
							SDG	43535	43535	43535	41316	41316
							LOC_ID	SS44B-1	SS44B-2	SS44B-3	SS52-1	SS52-1
							QC_CODE	SA	SA	SA	SA	DU
												DUP OF SS52-1
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23	720 R	38	47		
Chloroform	UG/KG	3	4.3%	300	0	1	23	12 UJ	18 U	14 U		
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23	12 UJ	18 U	14 U		
Toluene	UG/KG	11	8.7%	1500	0	2	23	12 UJ	18 U	14 U		
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23	12 UJ	18 U	14 U		
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23	420 U	630 U	460 U		
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23	420 U	630 U	460 U		
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23	420 U	630 U	460 U		
Anthracene	UG/KG	700	14.8%	50000	0	4	27	420 U	630 U	35 J		
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23	33 J	630 U	130 J		
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23	32 J	630 U	98 J		
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23	51 J	630 U	99 J		
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23	420 U	630 U	56 J		
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23	40 J	630 U	110 J		
Carbazole	UG/KG	350	8.7%	50000	0	2	23	420 U	630 U	460 U		
Chrysene	UG/KG	1200	29.6%	400	1	8	27	52 J	630 U	150 J		
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23	420 U	630 U	28 J		
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23	420 U	630 U	460 U		
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23	420 U	630 U	460 U		
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29	82 J	630 U	350 J		
Fluorene	UG/KG	320	4.3%	50000	0	1	23	420 U	630 U	460 U		
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23	24 J	630 U	64 J		
Naphthalene	UG/KG	140	4.3%	13000	0	1	23	420 U	630 U	460 U		
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27	34 J	630 U	330 J		
Pyrene	UG/KG	2700	34.5%	50000	0	10	29	89 J	630 U	380 J		
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23	34 J	630 U	42 J		
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23	48	6.3 U	4.6 U		
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23	28	6.3 U	4.6 U		
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23	27	6.3 U	4.6 U		
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23	2.2 U	3.3 U	2.4 U		
Dieldrin	UG/KG	70	26.1%	44	3	6	23	4.2 U	6.3 U	57		
Endosulfan I	UG/KG	2	8.7%	900	0	2	23	2 J	3.3 U	2.4 U		
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 U	130 U	130 U	130 UJ	130 UJ
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 U	130 U	130 U	110 J	120 J
Tetryl	UG/KG	150	2.4%		0	1	42	130 U	130 U	130 U	130 UJ	130 UJ
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29	11000	16400	9820		
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29	0.22 UJ	0.2 UJ	0.18 UJ		
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29	6.8	8.2	13.1		
Barium	MG/KG	202	96.6%	300	0	28	29	60.6	136	70.8		
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29	0.54 J	0.77 J	0.48 J		
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25	0.33 J	0.34 J	0.24 J		
Calcium	MG/KG	111000	96.6%	121000	0	28	29	10900	5100	33300		
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29	20	20.7	15.2		
Cobalt	MG/KG	15.7	96.6%	30	0	28	29	10.8 J	7.8 J	8.2 J		
Copper	MG/KG	191	96.6%	33	2	28	29	26.2	21.7	19.9		
Iron	MG/KG	31000	96.6%	36500	0	28	29	24100	23100	19600		
Lead	MG/KG	522	96.3%	24.8	6	26	27	39.5	21.4	12.4		
Magnesium	MG/KG	29500	96.6%	21500	2	28	29	5200	3910	9660		
Manganese	MG/KG	871	86.2%	1060	0	25	29	372 J	318 J	364 J		

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-44	SEAD-44	SEAD-44	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	04/13/94	04/13/94	04/13/94	12/16/93	12/16/93
							SAMP_ID	SS44B-1-1	SS44B-2-1	SS44B-3-1	SS52-1	SS52-19
							LAB_ID	217686	217687	217688	207145	207163
							SDG	43535	43535	43535	41316	41316
							LOC_ID	SS44B-1	SS44B-2	SS44B-3	SS52-1	SS52-1
							QC_CODE	SA	SA	SA	SA	DU
			FREQUENCY		NUMBER	NUMBER	NUMBER					DUP OF SS52-1
			OF		ABOVE	OF	OF					
CHEM_CLASS/PARAM	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTIONS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25	0.02 J	0.04 J	0.02 J		
Nickel	MG/KG	53.4	96.6%	49	1	28	29	34.8	20.8	24.3		
Potassium	MG/KG	3560	96.6%	2380	3	28	29	1380	1880	1550		
Selenium	MG/KG	1.8	79.3%	2	0	23	29	1.1 J	1.2	0.44 J		
Sodium	MG/KG	164	41.4%	172	0	12	29	35.3 U	31.5 U	43.2 J		
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27	0.36 U	0.32 U	0.29 U		
Vanadium	MG/KG	36.7	96.6%	150	0	28	29	20.3	28	16.3		
Zinc	MG/KG	338	96.6%	110	9	28	29	145	73.4	68.9		
HERBICIDES												
2,4,5-T	UG/KG			1900								
Dicamba	UG/KG											
Dichloroprop	UG/KG											
MCPP	UG/KG											

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
							LAB_ID	207146	207147	207148	207149	207150
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23					
Chloroform	UG/KG	3	4.3%	300	0	1	23					
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23					
Toluene	UG/KG	11	8.7%	1500	0	2	23					
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23					
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23					
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23					
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23					
Anthracene	UG/KG	700	14.8%	50000	0	4	27					
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23					
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23					
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23					
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23					
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23					
Carbazole	UG/KG	350	8.7%	50000	0	2	23					
Chrysene	UG/KG	1200	29.6%	400	1	8	27					
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23					
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23					
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23					
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29					
Fluorene	UG/KG	320	4.3%	50000	0	1	23					
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23					
Naphthalene	UG/KG	140	4.3%	13000	0	1	23					
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27					
Pyrene	UG/KG	2700	34.5%	50000	0	10	29					
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23					
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23					
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23					
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23					
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23					
Dieldrin	UG/KG	70	26.1%	44	3	6	23					
Endosulfan I	UG/KG	2	8.7%	900	0	2	23					
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 UJ	130 UJ	130 UJ	130 UJ	280 J
Tetryl	UG/KG	150	2.4%		0	1	42	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29					
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29					
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29					
Barium	MG/KG	202	96.6%	300	0	28	29					
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29					
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25					
Calcium	MG/KG	111000	96.6%	121000	0	28	29					
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29					
Cobalt	MG/KG	15.7	96.6%	30	0	28	29					
Copper	MG/KG	191	96.6%	33	2	28	29					
Iron	MG/KG	31000	96.6%	36500	0	28	29					
Lead	MG/KG	522	96.3%	24.8	6	26	27					
Magnesium	MG/KG	29500	96.6%	21500	2	28	29					
Manganese	MG/KG	871	86.2%	1060	0	25	29					

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
							LAB_ID	207146	207147	207148	207149	207150
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25					
Nickel	MG/KG	53.4	96.6%	49	1	28	29					
Potassium	MG/KG	3560	96.6%	2380	3	28	29					
Selenium	MG/KG	1.8	79.3%	2	0	23	29					
Sodium	MG/KG	164	41.4%	172	0	12	29					
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27					
Vanadium	MG/KG	36.7	96.6%	150	0	28	29					
Zinc	MG/KG	338	96.6%	110	9	28	29					
HERBICIDES												
2,4,5-T	UG/KG			1900								
Dicamba	UG/KG											
Dichloroprop	UG/KG											
MCPP	UG/KG											

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-7	SS52-8	SS52-9	SS52-10	SS52-11
							LAB_ID	207151	207152	207153	207154	207155
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-7	SS52-8	SS52-9	SS52-10	SS52-11
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23					
Chloroform	UG/KG	3	4.3%	300	0	1	23					
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23					
Toluene	UG/KG	11	8.7%	1500	0	2	23					
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23					
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23					
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23					
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23					
Anthracene	UG/KG	700	14.8%	50000	0	4	27					
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23					
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23					
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23					
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23					
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23					
Carbazole	UG/KG	350	8.7%	50000	0	2	23					
Chrysene	UG/KG	1200	29.6%	400	1	8	27					
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23					
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23					
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23					
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29					
Fluorene	UG/KG	320	4.3%	50000	0	1	23					
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23					
Naphthalene	UG/KG	140	4.3%	13000	0	1	23					
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27					
Pyrene	UG/KG	2700	34.5%	50000	0	10	29					
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23					
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23					
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23					
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23					
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23					
Dieldrin	UG/KG	70	26.1%	44	3	6	23					
Endosulfan I	UG/KG	2	8.7%	900	0	2	23					
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	130 UJ	130 UJ	490 J	99 J	130 UJ
Tetryl	UG/KG	150	2.4%		0	1	42	130 UJ	130 UJ	130 UJ	130 UJ	150 J
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29					
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29					
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29					
Barium	MG/KG	202	96.6%	300	0	28	29					
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29					
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25					
Calcium	MG/KG	111000	96.6%	121000	0	28	29					
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29					
Cobalt	MG/KG	15.7	96.6%	30	0	28	29					
Copper	MG/KG	191	96.6%	33	2	28	29					
Iron	MG/KG	31000	96.6%	36500	0	28	29					
Lead	MG/KG	522	96.3%	24.8	6	26	27					
Magnesium	MG/KG	29500	96.6%	21500	2	28	29					
Manganese	MG/KG	871	86.2%	1060	0	25	29					

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

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							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-7	SS52-8	SS52-9	SS52-10	SS52-11
							LAB_ID	207151	207152	207153	207154	207155
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-7	SS52-8	SS52-9	SS52-10	SS52-11
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25					
Nickel	MG/KG	53.4	96.6%	49	1	28	29					
Potassium	MG/KG	3560	96.6%	2380	3	28	29					
Selenium	MG/KG	1.8	79.3%	2	0	23	29					
Sodium	MG/KG	164	41.4%	172	0	12	29					
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27					
Vanadium	MG/KG	36.7	96.6%	150	0	28	29					
Zinc	MG/KG	338	96.6%	110	9	28	29					
HERBICIDES												
2,4,5-T	UG/KG			1900								
Dicamba	UG/KG											
Dichloroprop	UG/KG											
MCPP	UG/KG											

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-12	SS52-13	SS52-14	SS52-15	SS52-16
							LAB_ID	207156	207157	207158	207159	207160
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-12	SS52-13	SS52-14	SS52-15	SS52-16
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23					
Chloroform	UG/KG	3	4.3%	300	0	1	23					
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23					
Toluene	UG/KG	11	8.7%	1500	0	2	23					
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23					
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23					
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23					
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23					
Anthracene	UG/KG	700	14.8%	50000	0	4	27					
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23					
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23					
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23					
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23					
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23					
Carbazole	UG/KG	350	8.7%	50000	0	2	23					
Chrysene	UG/KG	1200	29.6%	400	1	8	27					
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23					
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23					
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23					
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29					
Fluorene	UG/KG	320	4.3%	50000	0	1	23					
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23					
Naphthalene	UG/KG	140	4.3%	13000	0	1	23					
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27					
Pyrene	UG/KG	2700	34.5%	50000	0	10	29					
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23					
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23					
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23					
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23					
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23					
Dieldrin	UG/KG	70	26.1%	44	3	6	23					
Endosulfan I	UG/KG	2	8.7%	900	0	2	23					
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	130 UJ	130 UJ	160 J	130 UJ	130 UJ
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	91 J	200 J	1500 J	130 UJ	130 UJ
Tetryl	UG/KG	150	2.4%		0	1	42	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29					
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29					
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29					
Barium	MG/KG	202	96.6%	300	0	28	29					
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29					
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25					
Calcium	MG/KG	111000	96.6%	121000	0	28	29					
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29					
Cobalt	MG/KG	15.7	96.6%	30	0	28	29					
Copper	MG/KG	191	96.6%	33	2	28	29					
Iron	MG/KG	31000	96.6%	36500	0	28	29					
Lead	MG/KG	522	96.3%	24.8	6	26	27					
Magnesium	MG/KG	29500	96.6%	21500	2	28	29					
Manganese	MG/KG	871	86.2%	1060	0	25	29					

TABLE G-16

SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

4/5/02

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
							SAMP_DEPTH_TOP	0	0	0	0	0
							SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2	0.2
							SAMP_DATE	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
							SAMP_ID	SS52-12	SS52-13	SS52-14	SS52-15	SS52-16
							LAB_ID	207156	207157	207158	207159	207160
							SDG	41316	41316	41316	41316	41316
							LOC_ID	SS52-12	SS52-13	SS52-14	SS52-15	SS52-16
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Mercury	MG/KG	0.11	92.0%	0.1	1	23	25					
Nickel	MG/KG	53.4	96 6%	49	1	28	29					
Potassium	MG/KG	3560	96.6%	2380	3	28	29					
Selenium	MG/KG	1.8	79.3%	2	0	23	29					
Sodium	MG/KG	164	41.4%	172	0	12	29					
Thallium	MG/KG	2.9	3.7%	0.7	1	1	27					
Vanadium	MG/KG	36.7	96.6%	150	0	28	29					
Zinc	MG/KG	338	96.6%	110	9	28	29					
HERBICIDES												
2,4,5-T	UG/KG			1900								
Dicamba	UG/KG											
Dichloroprop	UG/KG											
MCPP	UG/KG											

TABLE G-16
SHALLOW SOIL ANALYSIS RESULTS - PRISON SEADs, 43, 56, 69, 44A, 44B, 52, 62, 120B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							AREA	SEAD-52	SEAD-52	SEAD-62	SEAD-62	SEAD-120B
							SAMP_DEPTH_TOP	0	0	0	2	0.6
							SAMP_DEPTH_BOT	0.2	0.2	0.5	2	1
							SAMP_DATE	12/16/93	12/16/93	06/12/94	06/12/94	3/31/98
							SAMP_ID	SS52-17	SS52-18	TP62-1-1	TP62-3-1	EB165
							LAB_ID	207161	207162	224086	224089	EB165
							SDG	41316	41316	44748	44748	EB165
							LOC_ID	SS52-17	SS52-18	TP62-1	TP62-3	TP120B-1
							QC_CODE	SA	SA	SA	SA	SA
CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTIONS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Acetone	UG/KG	200	39.1%	200	0	9	23					
Chloroform	UG/KG	3	4.3%	300	0	1	23					
Methyl ethyl ketone	UG/KG	28	4.3%	300	0	1	23					
Toluene	UG/KG	11	8.7%	1500	0	2	23					
Xylene (total)	UG/KG	12	8.7%	1200	0	2	23					
SEMIVOLATILE ORGANICS												
2-Methylnaphthalene	UG/KG	46	4.3%	36400	0	1	23					
4-Methylphenol	UG/KG	580	13.0%	900	0	3	23					
Acenaphthene	UG/KG	300	4.3%	50000	0	1	23					
Anthracene	UG/KG	700	14.8%	50000	0	4	27					79 U
Benzo(a)anthracene	UG/KG	1200	26.1%	224	1	6	23					
Benzo(a)pyrene	UG/KG	1200	21.7%	61	3	5	23					
Benzo(b)fluoranthene	UG/KG	1000	21.7%	1100	0	5	23					
Benzo(g,h,i)perylene	UG/KG	730	13.0%	50000	0	3	23					
Benzo(k)fluoranthene	UG/KG	960	21.7%	1100	0	5	23					
Carbazole	UG/KG	350	8.7%	50000	0	2	23					
Chrysene	UG/KG	1200	29.6%	400	1	8	27					4.9 J
Dibenz(a,h)anthracene	UG/KG	300	13.0%	14	3	3	23					
Dibenzofuran	UG/KG	170	4.3%	6200	0	1	23					
Di-n-butylphthalate	UG/KG	62	17.4%	8100	0	4	23					
Fluoranthene	UG/KG	3200	34.5%	50000	0	10	29			46 J	410 U	6.2 J
Fluorene	UG/KG	320	4.3%	50000	0	1	23					
Indeno(1,2,3-cd)pyrene	UG/KG	660	21.7%	3200	0	5	23					
Naphthalene	UG/KG	140	4.3%	13000	0	1	23					
Phenanthrene	UG/KG	2600	25.9%	50000	0	7	27					79 U
Pyrene	UG/KG	2700	34.5%	50000	0	10	29			47 J	410 U	5.5 J
bis(2-Ethylhexyl)phthalate	UG/KG	2700	69.6%	50000	0	16	23					
ORGANOCHLORINE PESTICIDES												
4,4'-DDE	UG/KG	48	4.3%	2100	0	1	23					
4,4'-DDD	UG/KG	28	4.3%	2100	0	1	23					
4,4'-DDT	UG/KG	27	4.3%	2100	0	1	23					
alpha-Chlordane	UG/KG	2.4	4.3%	540	0	1	23					
Dieldrin	UG/KG	70	26.1%	44	3	6	23					
Endosulfan I	UG/KG	2	8.7%	900	0	2	23					
EXPLOSIVES												
2,4,6-Trinitrotoluene	UG/KG	410	7.1%		0	3	42	410 J	130 UJ			
2,4-Dinitrotoluene	UG/KG	2100	23.8%		0	10	42	1800 J	2100 J			
Tetryl	UG/KG	150	2.4%		0	1	42	130 UJ	130 UJ			
METALS												
Aluminum	MG/KG	20800	96.6%	19300	1	28	29			14800	16100	13300
Antimony	MG/KG	4.6	17.2%	5.9	0	5	29			0.35 UJ	0.2 UJ	1.1 UJ
Arsenic	MG/KG	13.1	96.6%	8.2	2	28	29			4.9	8.4	2.9
Barium	MG/KG	202	96.6%	300	0	28	29			147	202	105
Beryllium	MG/KG	0.91	96.6%	1.1	0	28	29			0.74 J	0.72 J	0.56
Cadmium	MG/KG	1.5	88.0%	2.3	0	22	25			0.43 J	0.68 J	
Calcium	MG/KG	111000	96.6%	121000	0	28	29			10900	17400	20300
Chromium	MG/KG	28.8	96.6%	29.6	0	28	29			28.8 J	23.6 J	19.7
Cobalt	MG/KG	15.7	96.6%	30	0	28	29			9.4 J	12.6	9.8
Copper	MG/KG	191	96.6%	33	2	28	29			22.8	28.7	191
Iron	MG/KG	31000	96.6%	36500	0	28	29			27500	30300	24100
Lead	MG/KG	522	96.3%	24.8	6	26	27					289
Magnesium	MG/KG	29500	96.6%	21500	2	28	29			4530	5340	6200
Manganese	MG/KG	871	86.2%	1060	0	25	29			323	778	448

APPENDIX H

SEAD-44A: Quality Assurance Test Laboratory – Site A

Table H-1:	Soil Analysis Results
Table H-2:	Groundwater Analysis Results
Table H-3:	Surface Water Analysis Results
Table H-4:	Sediment Analysis Results
Table H-5:	Inorganics Statistical Analysis - Soil
Table H-6:	Inorganics Statistical Analysis – Groundwater
Table H-7:	Exposure Point Concentrations for Chemicals of Potential Concern
Table H-8:	Ambient Air Exposure Point Concentrations
Table H-9:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table H-10:	Calculation of Intake and Risk from the Ingestion of Soil
Table H-11:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table H-12:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table H-13:	Calculation of Air Concentration in Shower from Volatilization of Groundwater
Table H-14:	Calculation of Intake and Risk from Dermal Contact to Groundwater (while Showering)
Table H-15:	Calculation of Intake and Risk from Inhalation of Groundwater (while Showering)
Table H-16:	Ecological Risk Assessment

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND Parameter	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44A-1 217678 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-2 217680 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-3 217681 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-4 217682 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-5 217683 43535 Value (Q)
VOLATILE ORGANIC COMPOUNDS												
Acetone	ug/Kg	200	40%	200	0	6	15	73	11 J	26	18	200
2-Butanone	ug/Kg	28	7%	300	0	1	15	16 U	15 U	18 U	16 U	28
4-Methyl-2-Pentanone	ug/Kg	4	7%	1000	0	1	15	16 U	15 U	18 U	16 U	21 U
2-Hexanone	ug/Kg	4	7%		0	1	15	16 U	15 U	18 U	16 U	21 U
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	600	0	1	15	16 U	15 U	18 U	16 U	21 U
Toluene	ug/Kg	1	7%	1500	0	1	15	16 U	15 U	18 U	16 U	21 U
NITROAROMATIC COMPOUDS												
2,4,6-Trinitrotoluene	ug/Kg	110	7%		0	1	15	130 U	130 U	130 U	130 U	110 J
SEMIVOLATILE ORGANIC COMPOUNDS												
4-Methylphenol	ug/Kg	250	13%	900	0	2	15	520 U	520 U	250 J	580 U	660 U
Naphthalene	ug/Kg	330	13%	13000	0	2	15	520 U	520 U	580 U	580 U	660 U
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	1	15	520 U	520 U	580 U	580 U	660 U
Acenaphthylene	ug/Kg	72	20%	41000	0	3	15	520 U	520 U	580 U	580 U	660 U
Acenaphthene	ug/Kg	380	40%	50000	0	6	15	520 U	520 U	580 U	580 U	660 U
Dibenzofuran	ug/Kg	280	7%	6200	0	1	15	520 U	520 U	580 U	580 U	660 U
Fluorene	ug/Kg	410	40%	50000	0	6	15	520 U	520 U	580 U	580 U	660 U
Hexachlorobenzene	ug/Kg	36	13%	410	0	2	15	520 U	520 U	580 U	580 U	660 U
Phenanthrene	ug/Kg	2100	67%	50000	0	10	15	520 U	120 J	580 U	580 U	660 U
Anthracene	ug/Kg	640	47%	50000	0	7	15	520 U	520 U	580 U	580 U	660 U
Carbazole	ug/Kg	370	40%		0	6	15	520 U	520 U	580 U	580 U	660 U
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	2	15	26 J	520 U	580 U	580 U	53 J
Fluoranthene	ug/Kg	2400	73%	50000	0	11	15	23 J	150 J	580 U	580 U	660 U
Pyrene	ug/Kg	2000	73%	50000	0	11	15	26 J	120 J	580 U	580 U	660 U
Benzo(a)anthracene	ug/Kg	990	67%	224	4	10	15	520 U	56 J	580 U	580 U	660 U
Chrysene	ug/Kg	1200	67%	400	4	10	15	520 U	53 J	580 U	580 U	660 U
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000	0	10	15	54 J	520 U	580 U	580 U	32 J
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	520 U	43 J	580 U	580 U	660 U
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	520 U	52 J	580 U	580 U	660 U
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	10	15	520 U	49 J	580 U	580 U	660 U
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	10	15	520 U	26 J	580 U	580 U	660 U
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	4	15	520 U	520 U	580 U	580 U	660 U
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000	0	9	15	520 U	520 U	580 U	580 U	660 U
PESTICIDES/PCBs												
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	1	15	2.7 U	2.7 U	2.9 U	3 U	3.4 U
Endosulfan I	ug/Kg	5.4	27%	900	0	4	15	2.7 U	2.7 U	2.9 U	3 U	3.4 U
Dieldrin	ug/Kg	70	47%	44	2	7	15	20 J	5.2 U	9.9 J	59	29
4,4'-DDE	ug/Kg	3.1	20%	2100	0	3	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin	ug/Kg	3.5	7%	100	0	1	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endosulfan II	ug/Kg	2.8	13%	900	0	2	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	3	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin ketone	ug/Kg	5.2	7%		0	1	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
Endrin aldehyde	ug/Kg	4.5	13%		0	2	15	5.2 U	5.2 U	5.7 U	5.8 U	6.6 U
METALS												
Aluminum	mg/Kg	17500	100%	19300	0	15	15	16000	15300	15300	12900	17400
Antimony	mg/Kg	10.8	60%	5.9	2	9	15	0.21 UJ	0.27 UJ	0.23 UJ	0.2 UJ	0.25 UJ
Arsenic	mg/Kg	7.7	100%	8.2	0	15	15	6.5	4.9	4.8	4.5	5.7
Barium	mg/Kg	164	100%	300	0	15	15	94.1	92.5	148	108	164
Beryllium	mg/Kg	0.91	100%	1.1	0	15	15	0.56 J	0.63 J	0.72 J	0.63 J	0.91 J
Cadmium	mg/Kg	0.48	87%	2.3	0	13	15	0.26 J	0.26 J	0.36 J	0.39 J	0.48 J
Calcium	mg/Kg	77400	100%	121000	0	15	15	3460	6230	5690	4900	7160
Chromium	mg/Kg	27.1	100%	29.6	0	15	15	18.5	20.1	20.5	17.9	23.7
Cobalt	mg/Kg	14.5	100%	30	0	15	15	7.9 J	7.7 J	8.6 J	8.3 J	8.8 J
Copper	mg/Kg	29	100%	33	0	15	15	20.6	14.5	18.9	17.2	20
Iron	mg/Kg	34900	100%	36500	0	15	15	23300	24200	23800	21900	27400
Lead	mg/Kg	24.9	100%	24.8	1	15	15	21.6	18.6	18	16.5	22.5
Magnesium	mg/Kg	40200	100%	21500	1	15	15	3270	3970	4090	3630	4370
Manganese	mg/Kg	956	87%	1060	0	13	15	370 J	298 J	489 J	326 J	678 J
Mercury	mg/Kg	0.17	93%	0.1	2	14	15	0.05 J	0.03 J	0.05 J	0.04 J	0.07 J
Nickel	mg/Kg	41.8	100%	49	0	15	15	20.7	20.4	24	21.2	26
Potassium	mg/Kg	2530	100%	2380	1	15	15	1450	1410	1980	1410	1980
Selenium	mg/Kg	1.7	100%	2	0	15	15	1 J	0.99 J	0.93 J	1.5	1.7
Sodium	mg/Kg	142	60%	172	0	9	15	34 U	42.1 U	36 U	31 U	40 U
Vanadium	mg/Kg	30.2	100%	150	0	15	15	27.6	26.8	25.3	21.4	30.2
Zinc	mg/Kg	115	100%	110	1	15	15	85	72.4	88.6	80.5	94

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44A-1 217678 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-2 217680 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-3 217681 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-4 217682 43535 Value (Q)	SOIL SEAD-44 0-0.2 04/13/94 SS44A-5 217683 43535 Value (Q)
Parameter												
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	0	15	15	0.19	0.11	0.3	0.11	0.1
Total Solids	%W/W	85.1	1		0	15	15	63.9	64.4	57.5	56.8	50.1

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
f) R = The data was rejected during the data validation process.

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44A-6 217684 43535 Value (Q)	SOIL SEAD-44 3 02/19/94 TP44A-1 211984 42493 Value (Q)	SOIL SEAD-44 3 02/17/94 TP44A-2 211734 42460 Value (Q)	SOIL SEAD-44 3 02/17/94 TP44A-3 211735 42460 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-4 211985 42493 Value (Q)
Parameter												
VOLATILE ORGANIC COMPOUNDS												
Acetone	ug/Kg	200	40%	200	0	6	15	16 J	12 U	13 U	13 U	12 U
2-Butanone	ug/Kg	28	7%	300	0	1	15	16 U	12 U	13 U	13 U	12 U
4-Methyl-2-Pentanone	ug/Kg	4	7%	1000	0	1	15	16 U	12 U	13 U	13 U	12 U
2-Hexanone	ug/Kg	4	7%		0	1	15	16 U	12 U	13 U	13 U	12 U
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	600	0	1	15	16 U	12 U	13 U	13 U	12 U
Toluene	ug/Kg	1	7%	1500	0	1	15	16 U	12 U	13 U	13 U	12 U
NITROAROMATIC COMPOUDS												
2,4,6-Trinitrotoluene	ug/Kg	110	7%		0	1	15	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANIC COMPOUNDS												
4-Methylphenol	ug/Kg	250	13%	900	0	2	15	64 J	390 U	420 U	420 U	390 U
Naphthalene	ug/Kg	330	13%	13000	0	2	15	570 U	330 J	420 U	420 U	390 U
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	1	15	570 U	150 J	420 U	420 U	390 U
Acenaphthylene	ug/Kg	72	20%	41000	0	3	15	570 U	390 U	420 U	420 U	390 U
Acenaphthene	ug/Kg	380	40%	50000	0	6	15	570 U	380 J	36 J	420 U	390 U
Dibenzofuran	ug/Kg	280	7%	6200	0	1	15	570 U	280 J	420 U	420 U	390 U
Fluorene	ug/Kg	410	40%	50000	0	6	15	570 U	410	34 J	420 U	390 U
Hexachlorobenzene	ug/Kg	36	13%	410	0	2	15	570 U	390 U	420 U	420 U	390 U
Phenanthrene	ug/Kg	2100	67%	50000	0	10	15	570 U	2100	240 J	170 J	68 J
Anthracene	ug/Kg	640	47%	50000	0	7	15	570 U	640	69 J	20 J	390 U
Carbazole	ug/Kg	370	40%		0	6	15	570 U	370 J	36 J	420 U	390 U
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	2	15	570 U	390 U	420 U	420 U	390 U
Fluoranthene	ug/Kg	2400	73%	50000	0	11	15	570 U	1900	300 J	330 J	120 J
Pyrene	ug/Kg	2000	73%	50000	0	11	15	570 U	1300	220 J	250 J	100 J
Benzo(a)anthracene	ug/Kg	990	67%	224	4	10	15	570 U	970	130 J	110 J	52 J
Chrysene	ug/Kg	1200	67%	400	4	10	15	570 U	840	140 J	170 J	77 J
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000	0	10	15	30 J	480	420 U	420 U	280 J
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	570 U	790	120 J	170 J	62 J
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	570 U	610	100 J	130 J	66 J
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	10	15	570 U	780	100 J	130 J	68 J
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	10	15	570 U	350 J	51 J	83 J	49 J
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	4	15	570 U	160 J	21 J	32 J	390 U
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000	0	9	15	570 U	300 J	48 J	87 J	49 J
PESTICIDES/PCBs												
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	1	15	2.9 U	1.2 J	2.2 U	2.2 U	2 U
Endosulfan I	ug/Kg	5.4	27%	900	0	4	15	2.9 U	5.4	2.2 U	2.1 J	2.5
Dieldrin	ug/Kg	70	47%	44	2	7	15	70	3.9 U	4.2 U	4.2 U	3.9 U
4,4'-DDE	ug/Kg	3.1	20%	2100	0	3	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
Endrin	ug/Kg	3.5	7%	100	0	1	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
Endosulfan II	ug/Kg	2.8	13%	900	0	2	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	3	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
Endrin ketone	ug/Kg	5.2	7%		0	1	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
Endrin aldehyde	ug/Kg	4.5	13%		0	2	15	5.7 U	3.9 U	4.2 U	4.2 U	3.9 U
METALS												
Aluminum	mg/Kg	17500	100%	19300	0	15	15	11500	11600	14800 J	12700 J	13800
Antimony	mg/Kg	10.8	60%	5.9	2	9	15	0.19 UJ	0.35 J	8.2 J	10.8 J	0.57 J
Arsenic	mg/Kg	7.7	100%	8.2	0	15	15	3.5	3.8	4.1 J	3.9 J	4
Barium	mg/Kg	164	100%	300	0	15	15	116	77.9	86.2 J	93.2 J	69.3
Beryllium	mg/Kg	0.91	100%	1.1	0	15	15	0.57 J	0.44 J	0.64 J	0.52 J	0.6 J
Cadmium	mg/Kg	0.48	87%	2.3	0	13	15	0.36 J	0.22 J	0.33 U	0.41 U	0.14 J
Calcium	mg/Kg	77400	100%	121000	0	15	15	5950	31400 J	22100 J	34100 J	25200 J
Chromium	mg/Kg	27.1	100%	29.6	0	15	15	15	15.5	19.3	16.5	23.9
Cobalt	mg/Kg	14.5	100%	30	0	15	15	5.1 J	7.6 J	9.2	7.6 J	11.6
Copper	mg/Kg	29	100%	33	0	15	15	14	16.1	24.8	16.5	26.9
Iron	mg/Kg	34900	100%	36500	0	15	15	16500	18400	22600 J	20100 J	28400
Lead	mg/Kg	24.9	100%	24.8	1	15	15	13.9	17.3	17	18.4	19.3
Magnesium	mg/Kg	40200	100%	21500	1	15	15	2690	5920	6630 J	6430 J	7510
Manganese	mg/Kg	956	87%	1060	0	13	15	301 J	323	403 R	440 R	479
Mercury	mg/Kg	0.17	93%	0.1	2	14	15	0.05 J	0.12	0.04 J	0.04 J	0.02 U
Nickel	mg/Kg	41.8	100%	49	0	15	15	14.4	20 J	25.6	21.3	41.8 J
Potassium	mg/Kg	2530	100%	2380	1	15	15	1200	1150 J	1430	1310	1480 J
Selenium	mg/Kg	1.7	100%	2	0	15	15	1.3	0.69 J	0.26 J	0.29 J	0.56 J
Sodium	mg/Kg	142	60%	172	0	9	15	30.2 U	70.7 J	69.7 J	73.5 J	81.8 J
Vanadium	mg/Kg	30.2	100%	150	0	15	15	21	19.5	24.6	22.4	20.1
Zinc	mg/Kg	115	100%	110	1	15	15	59.2	71.4	76.1 J	70.7 J	73.4

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND Parameter	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44A-6 217684 43535 Value (Q)	SOIL SEAD-44 3 02/19/94 TP44A-1 211984 42493 Value (Q)	SOIL SEAD-44 3 02/17/94 TP44A-2 211734 42460 Value (Q)	SOIL SEAD-44 3 02/17/94 TP44A-3 211735 42460 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-4 211985 42493 Value (Q)
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	0	15	15	1.14	10 8	6.8	7.9	0.52
Total Solids	%W/W	85 1	1		0	15	15	58	84.5	77.7	78.8	85.1

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND Parameter	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 3 02/18/94 TP44A-5 211986 42493 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-6 211987 42493 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-7 212004 42494 Value (Q)	SOIL SEAD-44 7 02/20/94 TP44A-8 212042 42494 Value (Q)	SOIL SEAD-44 3 02/19/94 TP44A-9 212005 42494 Value (Q)
VOLATILE ORGANIC COMPOUNDS												
Acetone	ug/Kg	200	40%	200	0	6	15	12 U	12 U	12 U	12 U	12 U
2-Butanone	ug/Kg	28	7%	300	0	1	15	12 U	12 U	12 U	12 U	12 U
4-Methyl-2-Pentanone	ug/Kg	4	7%	1000	0	1	15	12 U	12 U	12 U	12 U	4 J
2-Hexanone	ug/Kg	4	7%		0	1	15	12 U	12 U	12 U	12 U	4 J
1,1,2,2-Tetrachloroethane	ug/Kg	2	7%	600	0	1	15	12 U	12 U	12 U	12 U	2 J
Toluene	ug/Kg	1	7%	1500	0	1	15	12 U	12 U	1 J	12 U	12 U
NITROAROMATIC COMPOUDS												
2,4,6-Trinitrotoluene	ug/Kg	110	7%		0	1	15	130 U	130 U	130 U	130 U	130 U
SEMIVOLATILE ORGANIC COMPOUNDS												
4-Methylphenol	ug/Kg	250	13%	900	0	2	15	400 U	410 U	430 U	430 U	400 U
Naphthalene	ug/Kg	330	13%	13000	0	2	15	400 U	410 U	430 U	430 U	22 J
2-Methylnaphthalene	ug/Kg	150	7%	36400	0	1	15	400 U	410 U	430 U	430 U	400 U
Acenaphthylene	ug/Kg	72	20%	41000	0	3	15	400 U	410 U	72 J	46 J	58 J
Acenaphthene	ug/Kg	380	40%	50000	0	6	15	21 J	410 U	40 J	22 J	23 J
Dibenzofuran	ug/Kg	280	7%	6200	0	1	15	400 U	410 U	430 U	430 U	400 U
Fluorene	ug/Kg	410	40%	50000	0	6	15	21 J	410 U	53 J	30 J	38 J
Hexachlorobenzene	ug/Kg	36	13%	410	0	2	15	36 J	24 J	430 U	430 U	400 U
Phenanthrene	ug/Kg	2100	67%	50000	0	10	15	240 J	100 J	980	510	580
Anthracene	ug/Kg	640	47%	50000	0	7	15	43 J	410 U	140 J	77 J	100 J
Carbazole	ug/Kg	370	40%		0	6	15	26 J	410 U	190 J	150 J	150 J
Di-n-butylphthalate	ug/Kg	53	13%	8100	0	2	15	400 U	410 U	430 U	430 U	400 U
Fluoranthene	ug/Kg	2400	73%	50000	0	11	15	400	190 J	2400	1200	1400
Pyrene	ug/Kg	2000	73%	50000	0	11	15	310 J	160 J	2000	910	1000
Benzo(a)anthracene	ug/Kg	990	67%	224	4	10	15	160 J	77 J	990	520	560
Chrysene	ug/Kg	1200	67%	400	4	10	15	200 J	94 J	1200	650	740
bis(2-Ethylhexyl)phthalate	ug/Kg	940	67%	50000	0	10	15	500	200 J	150 J	940	720
Benzo(b)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	190 J	88 J	1100	560	600
Benzo(k)fluoranthene	ug/Kg	1100	67%	1100	0	10	15	180 J	81 J	1100	640	620
Benzo(a)pyrene	ug/Kg	1100	67%	61	9	10	15	180 J	84 J	1100	600	680
Indeno(1,2,3-cd)pyrene	ug/Kg	490	67%	3200	0	10	15	120 J	61 J	490	250 J	400 J
Dibenz(a,h)anthracene	ug/Kg	160	27%	14	4	4	15	58 J	410 U	430 U	430 U	400 U
Benzo(g,h,i)perylene	ug/Kg	510	60%	50000	0	9	15	110 J	58 J	510	220 J	400 J
PESTICIDES/PCBs												
Heptachlor epoxide	ug/Kg	1.2	7%	20	0	1	15	2 U	2.1 U	2.2 U	2.2 U	2.1 U
Endosulfan I	ug/Kg	5.4	27%	900	0	4	15	2 U	1.6 J	2.2 U	2.2 U	2.1 U
Dieldrin	ug/Kg	70	47%	44	2	7	15	5.8 J	4.1 U	4.3 U	4.3 U	12 J
4,4'-DDE	ug/Kg	3.1	20%	2100	0	3	15	4 U	2.8 J	2.8 J	4.3 U	3.1 J
Endrin	ug/Kg	3.5	7%	100	0	1	15	4 U	4.1 U	3.5 J	4.3 U	4 U
Endosulfan II	ug/Kg	2.8	13%	900	0	2	15	4 U	4.1 U	2.8 J	2.7 J	4 U
4,4'-DDT	ug/Kg	5.6	20%	2100	0	3	15	4 U	4.1 U	5.6	2.6 J	3.6 J
Endrin ketone	ug/Kg	5.2	7%		0	1	15	4 U	4.1 U	4.3 U	5.2 J	4 U
Endrin aldehyde	ug/Kg	4.5	13%		0	2	15	4 U	4.1 U	4.5 J	4.3 U	3.5 J
METALS												
Aluminum	mg/Kg	17500	100%	19300	0	15	15	11000	17500	16000 J	17200 J	15700 J
Antimony	mg/Kg	10.8	60%	5.9	2	9	15	0.33 J	0.65 J	0.31 J	0.62 J	0.4 J
Arsenic	mg/Kg	7.7	100%	8.2	0	15	15	3.7	7.7	4.7 J	6 J	6.1 J
Barium	mg/Kg	164	100%	300	0	15	15	62	124	121 J	106 J	130 J
Beryllium	mg/Kg	0.91	100%	1.1	0	15	15	0.42 J	0.77 J	0.64 J	0.74 J	0.69 J
Cadmium	mg/Kg	0.48	87%	2.3	0	13	15	0.28 J	0.18 J	0.25 J	0.29 J	0.23 J
Calcium	mg/Kg	77400	100%	121000	0	15	15	77400 J	13200 J	35400 J	30100 J	11500 J
Chromium	mg/Kg	27.1	100%	29.6	0	15	15	16.7	27.1	21.4 J	24.7 J	24.2 J
Cobalt	mg/Kg	14.5	100%	30	0	15	15	8.4 J	14.5	8.7 J	12.9 J	14.4 J
Copper	mg/Kg	29	100%	33	0	15	15	17.8	29	21.5 J	24.4 J	25.5 J
Iron	mg/Kg	34900	100%	36500	0	15	15	19900	34900	24000 J	30000 J	31300 J
Lead	mg/Kg	24.9	100%	24.8	1	15	15	13.6	23.8	24.9 J	18.7 J	21.4 J
Magnesium	mg/Kg	40200	100%	21500	1	15	15	40200	7130	6610 J	7330 J	6260 J
Manganese	mg/Kg	956	87%	1050	0	13	15	669	528	451 J	741 J	956 J
Mercury	mg/Kg	0.17	93%	0.1	2	14	15	0.17	0.04 J	0.06 J	0.04 J	0.04 J
Nickel	mg/Kg	41.8	100%	49	0	15	15	26.1 J	41.7 J	26.9 J	34.7 J	38.5 J
Potassium	mg/Kg	2530	100%	2380	1	15	15	2090 J	2310 J	2230 J	2530 J	1830 J
Selenium	mg/Kg	1.7	100%	2	0	15	15	0.97	0.66 J	1.1 J	0.69 J	0.67 J
Sodium	mg/Kg	142	60%	172	0	9	15	142 J	56.6 J	57.4 J	73.3 J	49.7 J
Vanadium	mg/Kg	30.2	100%	150	0	15	15	18.2	29.9	28.9 J	29.4 J	27.3 J
Zinc	mg/Kg	115	100%	110	1	15	15	62.3	115	100 J	95.6 J	94.8 J

TABLE H-1
SOIL ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND Parameter	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 3 02/18/94 TP44A-5 211986 42493 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-6 211987 42493 Value (Q)	SOIL SEAD-44 3 02/18/94 TP44A-7 212004 42494 Value (Q)	SOIL SEAD-44 7 02/20/94 TP44A-8 212042 42494 Value (Q)	SOIL SEAD-44 3 02/19/94 TP44A-9 212005 42494 Value (Q)
OTHER ANALYSES												
Nitrate/Nitrite-Nitrogen	mg/Kg	13	100%	NA	0	15	15	4	3.7	13	12.9	8.1
Total Solids	%W/W	85.1	1		0	15	15	83	80.9	77.2	77.4	81.7

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
f) R = The data was rejected during the data validation process

TABLE H-2
GROUNDWATER ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-44 07/12/94 MW44A-1 226786 45282		WATER SEAD-44 07/13/94 MW44A-2 226789 45282		WATER SEAD-44 07/12/94 MW44A-3 226790 45282	
VOLATILE ORGANICS													
Acetone	ug/L	8	33%	50 (b)	0	1	3	10	U	8	J	10	U
1,1,2,2-Tetrachloroethane	ug/L	3	33%	5 (b)	0	1	3	10	U	3	J	10	U
METALS													
Aluminum	ug/L	2240	100%	50 (a)	3	3	3	**125**	J	**2240**		**243**	
Arsenic	ug/L	4.1	33%	10 (c)	0	1	3	2	U	4.1	J	2	U
Barium	ug/L	104	100%	1000 (b)	0	3	3	104	J	41.6	J	52.4	J
Beryllium	ug/L	0.23	33%	4 (c)	0	1	3	0.1	U	0.23	J	0.1	U
Calcium	ug/L	132000	100%	NA	0	3	3	92200		132000		102000	
Chromium	ug/L	4.8	67%	50 (b)	0	2	3	0.4	U	4.8	J	0.74	J
Cobalt	ug/L	4	67%	NA	0	2	3	0.5	U	4	J	0.95	J
Copper	ug/L	4.5	67%	200 (b)	0	2	3	0.5	U	4.5	J	1.9	J
Iron	ug/L	4810	100%	300 (b)	2	3	3	269	J	**4810**		**419**	
Lead	ug/L	4.1	33%	25 (b)	0	1	3	0.9	U	4.1		0.89	U
Magnesium	ug/L	75600	100%	NA	0	3	3	19000		75600		34000	
Manganese	ug/L	217	100%	50 (a)	2	3	3	18.2		**217**		**131**	
Mercury	ug/L	0.06	67%	0.7 (b)	0	2	3	0.04	U	0.06	J	0.05	J
Nickel	ug/L	12.3	67%	100 (b)	0	2	3	0.7	U	12.3	J	2.6	J
Potassium	ug/L	6160	100%	NA	0	3	3	1050	J	6160		4050	J
Silver	ug/L	0.63	33%	50 (b)	0	1	3	0.63	J	0.5	U	0.5	U
Sodium	ug/L	18900	100%	20000 (b)	0	3	3	2390	J	18900		4300	J
Vanadium	ug/L	4.7	100%	NA	0	3	3	0.63	J	4.7	J	1.4	J
Zinc	ug/L	12.8	100%	5000 (a)	0	3	3	3.8	J	12.8	J	4.3	J
OTHER ANALYSES													
Nitrate/Nitrite-Nitrogen	mg/L	0.10	67%	10 (b)	0	2	3	0.05		0.01	U	0.1	
pH	Standard Units	7.8					3	7.8		7.5		7.5	
Conductivity	umhos/cm	900					3	410		900		550	
Temperature	°C	15.4					3	13.4		14.7		15.4	
Turbidity	NTU	693					3	10.7		693		16.8	

NOTES:
a) Secondary Drinking Water Regulation
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE H-3
SURFACE WATER ANALYSIS RESULTS -SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,b)	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-44 04/17/94 SW44A-1 218085 43549	WATER SEAD-44 04/17/94 SW44A-2 218086 43549	WATER SEAD-44 04/17/94 SW44A-3 218087 43549	WATER SEAD-44 04/27/94 SW44A-4 219414 43626
METALS											
Aluminum	ug/L	476	100%	100	4	4	4	476	243	324	382
Barium	ug/L	50.4	100%		0	4	4	29.6 J	27.8 J	28.6 J	50.4 J
Cadmium	ug/L	0.23	25%	3.85	0	1	4	0.23 J	0.1 U	0.1 U	0.1 U
Calcium	ug/L	156000	100%		0	4	4	41800	40600	42700	156000
Chromium	ug/L	1	100%	140	0	4	4	0.92 J	0.52 J	1 J	0.91 J
Cobalt	ug/L	1.1	25%	5	0	1	4	0.6 U	0.6 U	0.59 U	1.1 J
Copper	ug/L	4.7	100%	17.36	0	4	4	4.7 J	2 J	2.3 J	3.2 J
Iron	ug/L	632	100%	300	4	4	4	632	344	479	525
Lead	ug/L	2.2	50%	8.7	0	2	4	2.2 J	0.8 U	0.9 J	0.79 U
Magnesium	ug/L	22500	100%		0	4	4	7800	7670	8190	22500
Manganese	ug/L	165	100%		0	4	4	9.8 J	8.3 J	6.3 J	165
Mercury	ug/L	0.05	75%	0.77	0	3	4	0.05 J	0.05 J	0.05 J	0.03 U
Nickel	ug/L	174	100%	100.16	1	4	4	174	1 J	1.9 J	2.7 J
Potassium	ug/L	3600	100%		0	4	4	1210 J	1150 J	1100 J	3600 J
Sodium	ug/L	3420	100%		0	4	4	3420 J	2760 J	2880 J	2730 J
Vanadium	ug/L	1	50%	14	0	2	4	1 J	0.7 U	1 J	0.69 U
Zinc	ug/L	1050	100%	159.6	1	4	4	1050	5.6 J	10.4 J	5.5 J
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen	mg/L	0.06	100%	NA	NA			0.04	0.02	0.01	0.06
pH	Standard Units	8.7						8	8.6	8.7	7.6
Conductivity	umhos/cm	800						180	168	175	800
Temperature	°C	22.7						8.8	8.1	7.5	22.7
Turbidity	NTU	14.2						12.2	9.1	9.4	14.2

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration
e) J = The reported value is an estimated concentration.
f) NYSDEC guidance value

TABLE H-4
SEDIMENT ANALYSIS RESULTS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND SEMIVOLATILE ORGANICS	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/17/94 SD44A-1 218073 43543	SOIL SEAD-44 0-0.2 04/17/94 SD44A-2 218075 43543	SOIL SEAD-44 0-0.2 04/17/94 SD44A-3 218076 43543	SOIL SEAD-44 0-0.2 04/27/94 SD44A-4 219399 43663
Di-n-butylphthalate	ug/Kg	72	25%		0	1	4	72 J	460 U	490 U	520 U
bis(2-Ethylhexyl)phthalate	ug/Kg	34	25%	7300	0	1	4	480 U	34 J	490 U	520 U
METALS											
Aluminum	mg/Kg	14000	100%		0	4	4	13400	14000	9880	13300
Antimony	mg/Kg	0.4	50%	2	0	2	4	0.4 J	0.19 J	0.27 UJ	0.16 UJ
Arsenic	mg/Kg	5.4	100%	6	0	4	4	4.9	5.4	4.4	5.2
Barium	mg/Kg	121	100%		0	4	4	121	86.8	86.1	91.2
Beryllium	mg/Kg	0.71	100%		0	4	4	0.71 J	0.67 J	0.49 J	0.66 J
Cadmium	mg/Kg	0.41	100%	0.6	0	4	4	0.37 J	0.41 J	0.26 J	0.29 J
Calcium	mg/Kg	79400	100%		0	4	4	3280	79400	12400	22400
Chromium	mg/Kg	20.7	100%	26	0	4	4	19.8	20.7	14.8	18.7
Cobalt	mg/Kg	11	100%		0	4	4	8.5 J	11	7.2 J	10.3
Copper	mg/Kg	25.6	100%	16	4	4	4	**17.5**	**25.6**	**17.8**	**18.6**
Iron	mg/Kg	26300	100%	20000	3	4	4	**23000**	**26300**	19200	**24200**
Lead	mg/Kg	13.6	100%	31	0	4	4	13.1	12.6	10.7	13.6
Magnesium	mg/Kg	12900	100%		0	4	4	4100	12900	5520	7850
Manganese	mg/Kg	510	100%	460	2	4	4	**462**	**510**	365	393 J
Mercury	mg/Kg	0.07	100%	0.15	0	4	4	0.07 J	0.05 J	0.05 J	0.03 J
Nickel	mg/Kg	31.9	100%	16	4	4	4	**25.9**	**31.9**	**21**	**26.2**
Potassium	mg/Kg	2760	100%		0	4	4	1640	2760	1190 J	1200
Sodium	mg/Kg	69.7	50%		0	2	4	41.4 U	69.7 J	42.3 U	52.7 J
Thallium	mg/Kg	0.53	25%		0	1	4	0.53 J	0.29 U	0.43 U	0.25 U
Vanadium	mg/Kg	24	100%		0	4	4	23.9	24	19.1	22.5
Zinc	mg/Kg	83.9	100%	120	0	4	4	83.9	70.2	62.6	66.2
OTHER ANALYSES											
Nitrate/Nitrite-Nitrogen	mg/Kg	1.39	100%	NA	NA	NA	NA	1.39	0.07	0.01	0.03
Total Solids	%W/W							68.9	71.1	67.5	63.2

NOTES.
a) NYSDEC Sediment Criteria - 1994
(based on average organic carbon level of 3.65% in sediment determined in Seneca SEAD 16/17 RI Report, Parsons ES, 1998)
b) A sediment is considered contaminated if either criterion is exceeded.
c) Chronic toxicity sediment criteria for benthic aquatic life.
d) NA = Not Available.
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.

TABLE H-5
INORGANICS ANALYSIS - SOIL
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-5 for the results.

TABLE H-6
INORGANICS ANALYSIS - GROUNDWATER
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-6 for the results.

TABLE H-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-44A
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Ground Water mg/L
Volatile Organics			
1,1,2,2-Tetrachloroethane	2.00E-03		3.00E-03
2-Butanone	2.80E-02	2.80E-02	
2-Hexanone	4.00E-03		
4-Methyl-2-Pentanone	4.00E-03		
Acetone	2.00E-01	2.00E-01	8.00E-03
Toluene	1.00E-03		
Semivolatile Organics			
2-Methylnaphthalene	1.50E-01		
4-Methylphenol	2.50E-01	2.50E-01	
Acenaphthene	3.80E-01		
Acenaphthylene	7.20E-02		
Anthracene	6.40E-01		
Benzo(a)anthracene	9.90E-01	5.60E-02	
Benzo(a)pyrene	1.10E+00	4.90E-02	
Benzo(b)fluoranthene	1.10E+00	4.30E-02	
Benzo(g,h,i)perylene	5.10E-01		
Benzo(k)fluoranthene	1.10E+00	5.20E-02	
Carbazole	3.70E-01		
Chrysene	1.20E+00	5.30E-02	
Di-n-butylphthalate	5.30E-02	5.30E-02	
Dibenz(a,h)anthracene	1.60E-01		
Dibenzofuran	2.80E-01		
Fluoranthene	2.40E+00	1.50E-01	
Fluorene	4.10E-01		
Hexachlorobenzene	3.60E-02		
Indeno(1,2,3-cd)pyrene	4.90E-01	2.60E-02	
Naphthalene	3.30E-01		
Phenanthrene	2.10E+00	1.20E-01	
Pyrene	2.00E+00	1.20E-01	
bis(2-Ethylhexyl)phthalate	9.40E-01	5.40E-02	
Pesticides/PCBs			
4,4'-DDE	3.10E-03		
4,4'-DDT	5.60E-03		
Dieldrin	7.00E-02	7.00E-02	
Endosulfan I	5.40E-03		
Endosulfan II	2.80E-03		
Endrin	3.50E-03		
Endrin aldehyde	4.50E-03		
Endrin ketone	5.20E-03		
Heptachlor epoxide	1.20E-03		
Nitroaromatics			
2,4,6-Trinitrotoluene	1.10E-01	1.10E-01	
Metals			
Cadmium	4.80E-01	4.80E-01	
Copper	2.90E+01	2.06E+01	
Lead	2.49E+01	2.25E+01	
Magnesium			7.56E+01
Potassium	2.53E+03	1.98E+03	
Selenium	1.70E+00	1.70E+00	
Zinc	1.15E+02	9.40E+01	

TABLE H-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = CSsurf x PM10 x CF

Variables:
CSsurf = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM10 = Average Measured PM10 Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = CStot x PM10 x CF

Variables:
CStot = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM10 = PM10 Concentration Calculated for Construction Worker= 340 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
1,1,2,2-Tetrachloroethane		2.00E-03	0.00E+00	6.80E-10
Butanone, 2-	2.80E-02	2.80E-02	4.76E-10	9.52E-09
2-Hexanone		4.00E-03	0.00E+00	1.36E-09
4-Methyl-2-Pentanone		4.00E-03	0.00E+00	1.36E-09
Acetone	2.00E-01	2.00E-01	3.40E-09	6.80E-08
Toluene		1.00E-03	0.00E+00	3.40E-10
				0.00E+00
Semivolatile Organics				0.00E+00
2-Methylnaphthalene		1.50E-01	0.00E+00	5.10E-08
4-Methylphenol	2.50E-01	2.50E-01	4.25E-09	8.50E-08
Acenaphthene		3.80E-01	0.00E+00	1.29E-07
Acenaphthylene		7.20E-02	0.00E+00	2.45E-08
Anthracene		6.40E-01	0.00E+00	2.18E-07
Benzo(a)anthracene	5.60E-02	9.90E-01	9.52E-10	3.37E-07
Benzo(a)pyrene	4.90E-02	1.10E+00	8.33E-10	3.74E-07
Benzo(b)fluoranthene	4.30E-02	1.10E+00	7.31E-10	3.74E-07
Benzo(g,h,i)perylene		5.10E-01	0.00E+00	1.73E-07
Benzo(k)fluoranthene	5.20E-02	1.10E+00	8.84E-10	3.74E-07
Carbazole		3.70E-01	0.00E+00	1.26E-07
Chrysene	5.30E-02	1.20E+00	9.01E-10	4.08E-07
Di-n-butylphthalate	5.30E-02	5.30E-02	9.01E-10	1.80E-08
Dibenz(a,h)anthracene		1.60E-01	0.00E+00	5.44E-08
Dibenzofuran		2.80E-01	0.00E+00	9.52E-08
Fluoranthene	1.50E-01	2.40E+00	2.55E-09	8.16E-07
Fluorene		4.10E-01	0.00E+00	1.39E-07
Hexachlorobenzene		3.60E-02	0.00E+00	1.22E-08
Indeno(1,2,3-cd)pyrene	2.60E-02	4.90E-01	4.42E-10	1.67E-07
Naphthalene		3.30E-01	0.00E+00	1.12E-07
Phenanthrene	1.20E-01	2.10E+00	2.04E-09	7.14E-07
Pyrene	1.20E-01	2.00E+00	2.04E-09	6.80E-07
bis(2-Ethylhexyl)phthalate	5.40E-02	9.40E-01	9.18E-10	3.20E-07
				0.00E+00
Pesticides				0.00E+00
4,4'-DDE		3.10E-03	0.00E+00	1.05E-09
4,4'-DDT		5.60E-03	0.00E+00	1.90E-09
Dieldrin	7.00E-02	7.00E-02	1.19E-09	2.38E-08
Endosulfan I		5.40E-03	0.00E+00	1.84E-09
Endosulfan II		2.80E-03	0.00E+00	9.52E-10
Endrin		3.50E-03	0.00E+00	1.19E-09
Endrin aldehyde		4.50E-03	0.00E+00	1.53E-09
Endrin ketone		5.20E-03	0.00E+00	1.77E-09
Heptachlor epoxide		1.20E-03	0.00E+00	4.08E-10
			0.00E+00	0.00E+00
Nitroaromatics			0.00E+00	0.00E+00
2,4,6-Trinitrotoluene	1.10E-01	1.10E-01	1.87E-09	3.74E-08
				0.00E+00
Metals				0.00E+00
Cadmium	4.80E-01	4.80E-01	8.16E-09	1.63E-07
Copper	2.06E+01	2.90E+01	3.50E-07	9.86E-06
Lead	2.25E+01	2.49E+01	3.83E-07	8.47E-06
Potassium	1.98E+03	2.53E+03	3.37E-05	8.60E-04
Selenium	1.70E+00	1.70E+00	2.89E-08	5.78E-07
Zinc	9.40E+01	1.15E+02	1.60E-06	3.91E-05

ND = Compound was not detected above the detection limit shown

TABLE H-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m³)	Air EPC* from Total Soils (mg/m³)	Prisoner Inmate Intake (mg/kg-day) (Nc)	Prisoner Inmate Intake (mg/kg-day) (Car)	Prisoner Inmate Hazard Quotient	Prisoner Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk
Volatile Organics												
1,1,2,2-Tetrachloroethane	NA	2.0E-01		6.80E-10								
Butanone, 2-	2.9E-01	NA	4.76E-10	9.52E-09	1.03E-10		4E-10		3.73E-11		1E-10	
2-Hexanone				1.36E-09								
4-Methyl-2-Pentanone	2.3E-02	NA		1.36E-09								
Acetone	NA	NA	3.40E-09	6.80E-08								
Toluene	1.1E-01	NA		3.40E-10								
Semivolatile Organics												
2-Methylnaphthalene	NA	NA		5.10E-08								
4-Methylphenol	NA	NA	4.25E-09	8.50E-08								
Acenaphthene	NA	NA		1.29E-07								
Acenaphthylene	NA	NA		2.45E-08								
Anthracene	NA	NA		2.18E-07								
Benzo(a)anthracene	NA	NA	9.52E-10	3.37E-07								
Benzo(a)pyrene	NA	NA	8.33E-10	3.74E-07								
Benzo(b)fluoranthene	NA	NA	7.31E-10	3.74E-07								
Benzo(g,h,i)perylene	NA	NA		1.73E-07								
Benzo(k)fluoranthene	NA	NA	8.84E-10	3.74E-07								
Carbazole	NA	NA		1.26E-07								
Chrysene	NA	NA	9.01E-10	4.08E-07								
Di-n-butylphthalate	NA	NA	9.01E-10	1.80E-08								
Dibenz(a,h)anthracene	NA	NA		5.44E-08								
Dibenzofuran	NA	NA		9.52E-08								
Fluoranthene	NA	NA	2.55E-09	8.16E-07								
Fluorene	NA	NA		1.39E-07								
Hexachlorobenzene	NA	1.6E+00		1.22E-08								
Indeno(1,2,3-cd)pyrene	NA	NA	4.42E-10	1.67E-07								
Naphthalene	8.6E-04	NA		1.12E-07								
Phenanthrene	NA	NA	2.04E-09	7.14E-07								
Pyrene	NA	NA	2.04E-09	6.80E-07								
bis(2-Ethylhexyl)phthalate	NA	NA	9.18E-10	3.20E-07								
Pesticides												
4,4'-DDE	NA	NA		1.05E-09								
4,4'-DDT	NA	3.4E-01		1.90E-09								
Dieldrin	NA	1.6E+01	1.19E-09	2.38E-08		8.86E-11		1E-09		3.33E-11		5E-10
Endosulfan I	NA	NA		1.84E-09								
Endosulfan II	NA	NA		9.52E-10								
Endrin	NA	NA		1.19E-09								
Endrin aldehyde	NA	NA		1.53E-09								
Endrin ketone	NA	NA		1.77E-09								
Heptachlor epoxide	NA	9.1E+00		4.08E-10								
Nitroaromatics												
2,4,6-Trinitrotoluene	NA	NA	1.87E-09	3.74E-08								
Metals												
Cadmium	NA	6.3E+00	8.16E-09	1.63E-07		6.08E-10		4E-09		2.28E-10		1E-09
Copper	NA	NA	3.50E-07	9.86E-06								
Lead	NA	NA	3.83E-07	8.47E-06								
Potassium	NA	NA	3.37E-05	8.60E-04								
Selenium	NA	NA	2.89E-08	5.78E-07								
Zinc	NA	NA	1.60E-06	3.91E-05								
Total Hazard Quotient and Cancer Risk:							4E-10	5E-09			1E-10	2E-09

Assumptions for Prisoner Inmate			Assumptions for Prison Worker		
CA =	EPC Surface Only		CA =	EPC Surface Only	
IR =	15.2	m3/day	IR =	8	m3/day
EF =	365	days/year	EF =	250	days/year
ED =	24	years	ED =	25	years
BW =	70	kg	BW =	70	kg
AT (Nc) =	8760	days	AT (Nc) =	9125	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE H-8 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3-3-5

TABLE H-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m³)	Air EPC* from Total Soils (mg/m³)	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk
Volatile Organics												
1,1,2,2-Tetrachloroethane	NA	2.0E-01		6.80E-10		1.27E-13		3E-14				
Butanone, 2-	2.9E-01	NA	4.76E-10	9.52E-09	1.24E-10		4E-10		8.69E-11		3E-10	
2-Hexanone				1.36E-09	1.77E-11	2.53E-13						
4-Methyl-2-Pentanone	2.3E-02	NA		1.36E-09	1.77E-11		8E-10					
Acetone	NA	NA	3.40E-09	6.80E-08								
Toluene	1.1E-01	NA		3.40E-10	4.43E-12		4E-11					
Semivolatile Organics												
2-Methylnaphthalene	NA	NA		5.10E-08								
4-Methylphenol	NA	NA	4.25E-09	8.50E-08								
Acenaphthene	NA	NA		1.29E-07								
Acenaphthylene	NA	NA		2.45E-08								
Anthracene	NA	NA		2.18E-07								
Benzo(a)anthracene	NA	NA	9.52E-10	3.37E-07								
Benzo(a)pyrene	NA	NA	8.33E-10	3.74E-07								
Benzo(b)fluoranthene	NA	NA	7.31E-10	3.74E-07								
Benzo(g,h,i)perylene	NA	NA		1.73E-07								
Benzo(k)fluoranthene	NA	NA	8.84E-10	3.74E-07								
Carbazole	NA	NA		1.26E-07								
Chrysene	NA	NA	9.01E-10	4.08E-07								
Di-n-butylphthalate	NA	NA	9.01E-10	1.80E-08								
Dibenz(a,h)anthracene	NA	NA		5.44E-08								
Dibenzofuran	NA	NA		9.52E-08								
Fluoranthene	NA	NA	2.55E-09	8.16E-07								
Fluorene	NA	NA		1.39E-07								
Hexachlorobenzene	NA	1.6E+00		1.22E-08		2.28E-12		4E-12				
Indeno(1,2,3-cd)pyrene	NA	NA	4.42E-10	1.67E-07								
Naphthalene	8.6E-04	NA		1.12E-07	1.46E-09		2E-06					
Phenanthrene	NA	NA	2.04E-09	7.14E-07								
Pyrene	NA	NA	2.04E-09	6.80E-07								
bis(2-Ethylhexyl)phthalate	NA	NA	9.18E-10	3.20E-07								
Pesticides												
4,4'-DDE	NA	NA		1.05E-09								
4,4'-DDT	NA	3.4E-01		1.90E-09		3.54E-13		1E-13				
Dieldrin	NA	1.6E+01	1.19E-09	2.38E-08		4.43E-12		7E-11		1.86E-11		[illegible]
Endosulfan I	NA	NA		1.84E-09								
Endosulfan II	NA	NA		9.52E-10								
Endrin	NA	NA		1.19E-09								
Endrin aldehyde	NA	NA		1.53E-09								
Endrin ketone	NA	NA		1.77E-09								
Heptachlor epoxide	NA	9.1E+00		4.08E-10		7.59E-14		7E-13				
Nitroaromatics												
2,4,6-Trinitrotoluene	NA	NA	1.87E-09	3.74E-08								
Metals												
Cadmium	NA	6.3E+00	8.16E-09	1.63E-07		3.04E-11		2E-10		1.28E-10		8E-10
Copper	NA	NA	3.50E-07	9.86E-06								
Lead	NA	NA	3.83E-07	8.47E-06								
Potassium	NA	NA	3.37E-05	8.60E-04								
Selenium	NA	NA	2.89E-08	5.78E-07								
Zinc	NA	NA	1.60E-06	3.91E-05								
Total Hazard Quotient and Cancer Risk:							2E-06	3E-10			3E-10	1E-09

Assumptions for Construction Worker		Assumptions for Day Care Center Child	
CA =	EPC Surface and Sub-Surface	CA =	EPC Surface Only
IR =	10.4 m3/day	IR =	4 m3/day
EF =	32 days/year	EF =	250 days/year
ED =	1 years	ED =	6 years
BW =	70 kg	BW =	15 kg
AT (Nc) =	365 days	AT (Nc) =	2190 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE H-8 for calculation of Air EPCs
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* fro Surface Soil (mg/m³)	Air EPC* from Total Soils (mg/m³)	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk
Volatile Organics								
1,1,2,2-Tetrachloroethane	NA	2.0E-01		6.80E-10				
Butanone, 2-	2.9E-01	NA	4.76E-10	9.52E-09	3.73E-11		1E-10	
2-Hexanone				1.36E-09				
4-Methyl-2-Pentanone	2.3E-02	NA		1.36E-09				
Acetone	NA	NA	3.40E-09	6.80E-08				
Toluene	1.1E-01	NA		3.40E-10				
Semivolatile Organics								
2-Methylnaphthalene	NA	NA		5.10E-08				
4-Methylphenol	NA	NA	4.25E-09	8.50E-08				
Acenaphthene	NA	NA		1.29E-07				
Acenaphthylene	NA	NA		2.45E-08				
Anthracene	NA	NA		2.18E-07				
Benzo(a)anthracene	NA	NA	9.52E-10	3.37E-07				
Benzo(a)pyrene	NA	NA	8.33E-10	3.74E-07				
Benzo(b)fluoranthene	NA	NA	7.31E-10	3.74E-07				
Benzo(g,h,i)perylene	NA	NA		1.73E-07				
Benzo(k)fluoranthene	NA	NA	8.84E-10	3.74E-07				
Carbazole	NA	NA		1.26E-07				
Chrysene	NA	NA	9.01E-10	4.08E-07				
Di-n-butylphthalate	NA	NA	9.01E-10	1.80E-08				
Dibenz(a,h)anthracene	NA	NA		5.44E-08				
Dibenzofuran	NA	NA		9.52E-08				
Fluoranthene	NA	NA	2.55E-09	8.16E-07				
Fluorene	NA	NA		1.39E-07				
Hexachlorobenzene	NA	1.6E+00		1.22E-08				
Indeno(1,2,3-cd)pyrene	NA	NA	4.42E-10	1.67E-07				
Naphthalene	8.6E-04	NA		1.12E-07				
Phenanthrene	NA	NA	2.04E-09	7.14E-07				
Pyrene	NA	NA	2.04E-09	6.80E-07				
bis(2-Ethylhexyl)phthalate	NA	NA	9.18E-10	3.20E-07				
Pesticides								
4,4'-DDE	NA	NA		1.05E-09				
4,4'-DDT	NA	3.4E-01		1.90E-09				
Dieldrin	NA	1.6E+01	1.19E-09	2.38E-08		3.33E-11		5E-10
Endosulfan I	NA	NA		1.84E-09				
Endosulfan II	NA	NA		9.52E-10				
Endrin	NA	NA		1.19E-09				
Endrin aldehyde	NA	NA		1.53E-09				
Endrin ketone	NA	NA		1.77E-09				
Heptachlor epoxide	NA	9.1E+00		4.08E-10				
Nitroaromatics								
2,4,6-Trinitrotoluene	NA	NA	1.87E-09	3.74E-08				
Metals								
Cadmium	NA	6.3E+00	8.16E-09	1.63E-07		2.28E-10		1E-09
Copper	NA	NA	3.50E-07	9.86E-06				
Lead	NA	NA	3.83E-07	8.47E-06				
Potassium	NA	NA	3.37E-05	8.60E-04				
Selenium	NA	NA	2.89E-08	5.78E-07				
Zinc	NA	NA	1.60E-06	3.91E-05				
Total Hazard Quotient and Cancer Risk:							1E-10	2E-09

Assumptions for Day Care Center Adult

CA =	EPC Surface Only
IR =	8 m3/day
EF =	250 days/year
ED =	25 years
BW =	70 kg
AT (Nc) =	9125 days
AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE H-8 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Prison Inmate Intake (mg/kg-day)		Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day)		Prison Worker Hazard Quotient	Prison Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics												
1,1,2,2,-Tetrachloroethane	NA	2.0E-01		2.00E-03								
Butanone, 2-	6.0E-01	NA	2.80E-02	2.80E-02	4.00E-08		7E-08		2.74E-08		5E-08	
2-Hexanone				4.00E-03								
4-Methyl-2-Pentanone	8.0E-02	NA		4.00E-03								
Acetone	1.0E-01	NA	2.00E-01	2.00E-01	2.86E-07		3E-06		1.96E-07		2E-06	
Toluene	2.0E-01	NA		1.00E-03								
Semivolatile Organics												
2-Methylnaphthalene	4.0E-02	NA		1.50E-01								
4-Methylphenol	5.0E-03	NA	2.50E-01	2.50E-01	3.57E-07		7E-05		2.45E-07		5E-05	
Acenaphthene	6.0E-02	NA		3.80E-01								
Acenaphthylene	NA	NA		7.20E-02								
Anthracene	3.0E-01	NA		6.40E-01								
Benzo(a)anthracene	NA	7.3E-01	5.60E-02	9.90E-01		2.74E-08		2E-08		1.96E-08		1E-08
Benzo(a)pyrene	NA	7.3E+00	4.90E-02	1.10E+00		2.40E-08		2E-07		1.71E-08		1E-07
Benzo(b)fluoranthene	NA	7.3E-01	4.30E-02	1.10E+00		2.11E-08		2E-08		1.50E-08		1E-08
Benzo(g,h,i)perylene	NA	NA		5.10E-01								
Benzo(k)fluoranthene	NA	7.3E-02	5.20E-02	1.10E+00		2.55E-08		2E-09		1.82E-08		1E-09
Carbazole	NA	2.0E-02		3.70E-01								
Chrysene	NA	7.3E-03	5.30E-02	1.20E+00		2.60E-08		2E-10		1.85E-08		1E-10
Di-n-butylphthalate	1.0E-01	NA	5.30E-02	5.30E-02	7.57E-08		8E-07		5.19E-08		5E-07	
Dibenz(a,h)anthracene	NA	7.3E+00		1.60E-01								
Dibenzofuran	NA	NA		2.80E-01								
Fluoranthene	4.0E-02	NA	1.50E-01	2.40E+00	2.14E-07		5E-06		1.47E-07		4E-06	
Fluorene	4.0E-02	NA		4.10E-01								
Hexachlorobenzene	8.0E-04	1.6E+00		3.60E-02								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	2.60E-02	4.90E-01		1.27E-08		9E-09		9.09E-09		7E-09
Naphthalene	2.0E-02	NA		3.30E-01								
Phenanthrene	NA	NA	1.20E-01	2.10E+00								
Pyrene	3.0E-02	NA	1.20E-01	2.00E+00	1.71E-07		6E-06		1.17E-07		4E-06	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	5.40E-02	9.40E-01	7.71E-08	2.64E-08	4E-06	4E-10	5.28E-08	1.89E-08	3E-06	3E-10
Pesticides/PCBs												
4,4'-DDE	NA	3.4E-01		3.10E-03								
4,4'-DDT	5.0E-04	3.4E-01		5.60E-03								
Dieldrin	5.0E-05	1.6E+01	7.00E-02	7.00E-02	1.00E-07	3.43E-08	2E-03	5E-07	6.85E-08	2.45E-08	1E-03	4E-07
Endosulfan I	6.0E-03	NA		5.40E-03								
Endosulfan II	6.0E-03	NA		2.80E-03								
Endrin	3.0E-04	NA		3.50E-03								
Endrin aldehyde	NA	NA		4.50E-03								
Endrin ketone	NA	NA		5.20E-03								
Heptachlor epoxide	1.3E-05	9.1E+00		1.20E-03								
Nitroaromatics												
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	1.10E-01	1.10E-01	1.57E-07	5.39E-08	3E-04	2E-09	1.08E-07	3.84E-08	2E-04	1E-09
Metals												
Cadmium	5.0E-04	NA	4.80E-01	4.80E-01	6.86E-07		1E-03		4.70E-07		9E-04	
Copper	4.0E-02	NA	2.06E+01	2.90E+01	2.94E-05		7E-04		2.02E-05		5E-04	
Lead	NA	NA	2.25E+01	2.49E+01								
Potassium	NA	NA	1.98E+03	2.53E+03								
Selenium	5.0E-03	NA	1.70E+00	1.70E+00	2.43E-06		5E-04		1.66E-06		3E-04	
Zinc	3.0E-01	NA	9.40E-01	1.15E+02	1.34E-04		4E-04		9.20E-05		3E-04	
Total Hazard Quotient and Cancer Risk:							5E-03	8E-07			4E-03	6E-07

Assumptions for Prison Inmate		Assumptions for Prison Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only
IR =	100 mg soil/day	IR =	100 mg soil/day
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
FI =	1 unitless	FI =	1 unitless
EF =	365 days/year	EF =	250 days/year
ED =	24 years	ED =	25 years
BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
Total soils includes surface and subsurface soils
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk
Volatile Organics												
1,1,2,2,-Tetrachloroethane	NA	2.0E-01		2.00E-03		1.72E-11		3E-12				
Butanone, 2-	6.0E-01	NA	2.80E-02	2.80E-02	1.68E-08		3E-08		2.56E-07		4E-07	
2-Hexanone				4.00E-03	2.40E-09	3.44E-11						
4-Methyl-2-Pentanone	8.0E-02	NA		4.00E-03	2.40E-09		3E-08					
Acetone	1.0E-01	NA	2.00E-01	2.00E-01	1.20E-07		1E-06		1.83E-06		2E-05	
Toluene	2.0E-01	NA		1.00E-03	6.01E-10		3E-09					
Semivolatile Organics												
2-Methylnaphthalene	4.0E-02	NA		1.50E-01	9.02E-08		2E-06					
4-Methylphenol	5.0E-03	NA	2.50E-01	2.50E-01	1.50E-07		3E-05		2.28E-06		5E-04	
Acenaphthene	6.0E-02	NA		3.80E-01	2.28E-07		4E-06					
Acenaphthylene	NA	NA		7.20E-02								
Anthracene	3.0E-01	NA		6.40E-01	3.85E-07		1E-06					
Benzo(a)anthracene	NA	7.3E-01	5.60E-02	9.90E-01		8.50E-09		6E-09		4.38E-08		3E-08
Benzo(a)pyrene	NA	7.3E+00	4.90E-02	1.10E+00		9.45E-09		7E-08		3.84E-08		3E-07
Benzo(b)fluoranthene	NA	7.3E-01	4.30E-02	1.10E+00		9.45E-09		7E-09		3.37E-08		2E-08
Benzo(g,h,i)perylene	NA	NA		5.10E-01								
Benzo(k)fluoranthene	NA	7.3E-02	5.20E-02	1.10E+00		9.45E-09		7E-10		4.07E-08		3E-09
Carbazole	NA	2.0E-02		3.70E-01		3.18E-09		6E-11				
Chrysene	NA	7.3E-03	5.30E-02	1.20E+00		1.03E-08		8E-11		4.15E-08		3E-10
Di-n-butylphthalate	1.0E-01	NA	5.30E-02	5.30E-02	3.19E-08		3E-07		4.84E-07		5E-06	
Dibenz(a,h)anthracene	NA	7.3E+00		1.60E-01		1.37E-09		1E-08				
Dibenzofuran	NA	NA		2.80E-01								
Fluoranthene	4.0E-02	NA	1.50E-01	2.40E+00	1.44E-06		4E-05		1.37E-06		3E-05	
Fluorene	4.0E-02	NA		4.10E-01	2.46E-07		6E-06					
Hexachlorobenzene	8.0E-04	1.6E+00		3.60E-02	2.16E-08	3.09E-10	3E-05	5E-10				
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	2.60E-02	4.90E-01		4.21E-09		3E-09		2.04E-08		1E-08
Naphthalene	2.0E-02	NA		3.30E-01	1.98E-07		1E-05					
Phenanthrene	NA	NA	1.20E-01	2.10E+00								
Pyrene	3.0E-02	NA	1.20E-01	2.00E+00	1.20E-06		4E-05		1.10E-06		4E-05	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	5.40E-02	9.40E-01	5.65E-07	8.07E-09	3E-05	1E-10	4.93E-07	4.23E-08	2E-05	6E-10
Pesticides/PCBs												
4,4'-DDE	NA	3.4E-01		3.10E-03		2.66E-11		9E-12				
4,4'-DDT	5.0E-04	3.4E-01		5.60E-03	3.37E-09	4.81E-11	7E-06	2E-11				
Dieldrin	5.0E-05	1.6E+01	7.00E-02	7.00E-02	4.21E-08	6.01E-10	8E-04	1E-08	6.39E-07	5.48E-08	1E-02	9E-07
Endosulfan I	6.0E-03	NA		5.40E-03	3.25E-09		5E-07					
Endosulfan II	6.0E-03	NA		2.80E-03	1.68E-09		3E-07					
Endrin	3.0E-04	NA		3.50E-03	2.10E-09		7E-06					
Endrin aldehyde	NA	NA		4.50E-03								
Endrin ketone	NA	NA		5.20E-03								
Heptachlor epoxide	1.3E-05	9.1E+00		1.20E-03	7.21E-10	1.03E-11	6E-05	9E-11				
Nitroaromatics												
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	1.10E-01	1.10E-01	6.61E-08	9.45E-10	1E-04	3E-11	1.00E-06	8.61E-08	2E-03	3E-09
Metals												
Cadmium	5.0E-04	NA	4.80E-01	4.80E-01	2.89E-07		6E-04		4.38E-06		9E-03	
Copper	4.0E-02	NA	2.06E+01	2.90E+01	1.74E-05		4E-04		1.88E-04		5E-03	
Lead	NA	NA	2.25E+01	2.49E+01								
Potassium	NA	NA	1.98E+03	2.53E+03								
Selenium	5.0E-03	NA	1.70E+00	1.70E+00	1.02E-06		2E-04		1.55E-05		3E-03	
Zinc	3.0E-01	NA	9.40E+01	1.15E+02	6.91E-05		2E-04		8.58E-04		3E-03	
Total Hazard Quotient and Cancer Risk:							3E-03	1E-07			3E-02	1E-06

Assumptions for Construction Worker		Assumptions fore Day Care Center Child	
CS =	EPC Total Soils	CS =	EPC Surface Only
IR =	480 mg soil/day	IR =	200 mg soil/day
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
FI =	1 unitless	FI =	1 unitless
EF =	32 days/year	EF =	250 days/year
ED =	1 years	ED =	6 years
BW =	70 kg	BW =	15 kg
AT (Nc) =	365 days	AT (Nc) =	2190 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
Total soils includes surface and subsurface soils
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE H-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk
Volatile Organics								
1,1,2,2,-Tetrachloroethane	NA	2.0E-01		2.00E-03				
Butanone, 2-	6.0E-01	NA	2.80E-02	2.80E-02	2.74E-08		5E-08	
2-Hexanone				4.00E-03				
4-Methyl-2-Pentanone	8.0E-02	NA		4.00E-03				
Acetone	1.0E-01	NA	2.00E-01	2.00E-01	1.96E-07		2E-06	
Toluene	2.0E-01	NA		1.00E-03				
Semivolatile Organics								
2-Methylnaphthalene	4.0E-02	NA		1.50E-01				
4-Methylphenol	5.0E-03	NA	2.50E-01	2.50E-01	2.45E-07		5E-05	
Acenaphthene	6.0E-02	NA		3.80E-01				
Acenaphthylene	NA	NA		7.20E-02				
Anthracene	3.0E-01	NA		6.40E-01				
Benzo(a)anthracene	NA	7.3E-01	5.60E-02	9.90E-01		1.96E-08		1E-08
Benzo(a)pyrene	NA	7.3E+00	4.90E-02	1.10E+00		1.71E-08		1E-07
Benzo(b)fluoranthene	NA	7.3E-01	4.30E-02	1.10E+00		1.50E-08		1E-08
Benzo(g,h,i)perylene	NA	NA		5.10E-01				
Benzo(k)fluoranthene	NA	7.3E-02	5.20E-02	1.10E+00		1.82E-08		1E-09
Carbazole	NA	2.0E-02		3.70E-01				
Chrysene	NA	7.3E-03	5.30E-02	1.20E+00		1.85E-08		1E-10
Di-n-butylphthalate	1.0E-01	NA	5.30E-02	5.30E-02	5.19E-08		5E-07	
Dibenz(a,h)anthracene	NA	7.3E+00		1.60E-01				
Dibenzofuran	NA	NA		2.80E-01				
Fluoranthene	4.0E-02	NA	1.50E-01	2.40E+00	1.47E-07		4E-06	
Fluorene	4.0E-02	NA		4.10E-01				
Hexachlorobenzene	8.0E-04	1.6E+00		3.60E-02				
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	2.60E-02	4.90E-01		9.09E-09		7E-09
Naphthalene	2.0E-02	NA		3.30E-01				
Phenanthrene	NA	NA	1.20E-01	2.10E+00				
Pyrene	3.0E-02	NA	1.20E-01	2.00E+00	1.17E-07		4E-06	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	5.40E-02	9.40E-01	5.28E-08	1.89E-08	3E-06	3E-10
Pesticides/PCBs								
4,4'-DDE	NA	3.4E-01		3.10E-03				
4,4'-DDT	5.0E-04	3.4E-01		5.60E-03				
Dieldrin	5.0E-05	1.6E+01	7.00E-02	7.00E-02	6.85E-08	2.45E-08	1E-03	4E-07
Endosulfan I	6.0E-03	NA		5.40E-03				
Endosulfan II	6.0E-03	NA		2.80E-03				
Endrin	3.0E-04	NA		3.50E-03				
Endrin aldehyde	NA	NA		4.50E-03				
Endrin ketone	NA	NA		5.20E-03				
Heptachlor epoxide	1.3E-05	9.1E+00		1.20E-03				
Nitroaromatics								
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	1.10E-01	1.10E-01	1.08E-07	3.84E-08	2E-04	1E-09
Metals								
Cadmium	5.0E-04	NA	4.80E-01	4.80E-01	4.70E-07		9E-04	
Copper	4.0E-02	NA	2.06E+01	2.90E+01	2.02E-05		5E-04	
Lead	NA	NA	2.25E+01	2.49E+01				
Potassium	NA	NA	1.98E+03	2.53E+03				
Selenium	5.0E-03	NA	1.70E+00	1.70E+00	1.66E-06		3E-04	
Zinc	3.0E-01	NA	9.40E+01	1.15E+02	9.20E-05		3E-04	
Total Hazard Quotient and Cancer Risk:							4E-03	6E-07

Assumptions for Day Care Center Adult

CS =	EPC Surface Only
IR =	100 mg soil/day
CF =	1E-06 kg/mg
FI =	1 unitless
EF =	250 days/year
ED =	25 years
BW =	70 kg
AT (Nc) =	9125 days
AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
Total soils includes surface and subsurface soils
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE H-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Surface Soil	EPC from Total Soils	Prison Inmate Absorbed Dose (mg/kg-day)		Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Absorbed Dose (mg/kg-day)		Prison Worker Hazard Quotient	Prison Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics													
1,1,2,2,-Tetrachloroethane	NA	2.0E-01	NA		2.00E-03								
2-Butanone	6.0E-01	NA	NA	2.80E-02	2.80E-02								
2-Hexanone			NA		4.00E-03								
4-Methyl-2-Pentanone	NA	NA	NA		4.00E-03								
Acetone	1.0E-01	NA	NA	2.00E-01	2.00E-01								
Toluene	2.0E-01	NA	NA		1.00E-03								
Semivolatile Organics													
2-Methylnaphthalene	4.0E-02	NA	NA		1.50E-01								
4-Methylphenol	NA	NA	NA	2.50E-01	2.50E-01								
Acenaphthene	6.0E-02	NA	NA		3.80E-01								
Acenaphthylene	NA	NA	NA		7.20E-02								
Anthracene	3.0E-01	NA	NA		6.40E-01								
Benzo(a)anthracene	NA	7.3E-01	NA	5.60E-02	9.90E-01								
Benzo(a)pyrene	NA	1.5E+01	NA	4.90E-02	1.10E+00								
Benzo(b)fluoranthene	NA	7.3E-01	NA	4.30E-02	1.10E+00								
Benzo(g,h,i)perylene	NA	NA	NA		5.10E-01								
Benzo(k)fluoranthene	NA	7.3E-02	NA	5.20E-02	1.10E+00								
Carbazole	NA	2.0E-02	NA		3.70E-01								
Chrysene	NA	7.3E-03	NA	5.30E-02	1.20E+00								
Di-n-butylphthalate	9.0E-02	NA	NA	5.30E-02	5.30E-02								
Dibenz(a,h)anthracene	NA	7.3E+00	NA		1.60E-01								
Dibenzofuran	NA	NA	NA		2.80E-01								
Fluoranthene	4.0E-02	NA	NA	1.50E-01	2.40E+00								
Fluorene	4.0E-02	NA	NA		4.10E-01								
Hexachlorobenzene	8.0E-04	NA	NA		3.60E-02								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	2.60E-02	4.90E-01								
Naphthalene	2.0E-02	NA	NA		3.30E-01								
Phenanthrene	NA	NA	NA	1.20E-01	2.10E+00								
Pyrene	3.0E-02	NA	NA	1.20E-01	2.00E+00								
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	5.40E-02	9.40E-01								
Pesticides/PCBs													
4,4'-DDE	NA	1.7E+00	NA		3.10E-03								
4,4'-DDT	1.0E-04	1.7E+00	NA		5.60E-03								
Dieldrin	2.5E-05	3.2E-01	NA	7.00E-02	7.00E-02								
Endosulfan I	6.0E-03	NA	NA		5.40E-03								
Endosulfan II	6.0E-03	NA	NA		2.80E-03								
Endrin	3.0E-04	NA	NA		3.50E-03								
Endrin aldehyde	NA	NA	NA		4.50E-03								
Endrin ketone	NA	NA	NA		5.20E-03								
Heptachlor epoxide	1.3E-05	9.1E+00	NA		1.20E-03								
Nitroaromatics													
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	NA	1.10E-01	1.10E-01								
Metals													
Cadmium	5.0E-05	NA	0.01	4.80E-01	4.80E-01	3.98E-07		8E-03		2.72E-07		5E-03	
Copper	2.4E-02	NA	NA	2.06E+01	2.90E+01								
Lead	NA	NA	NA	2.25E+01	2.49E+01								
Potassium	NA	NA	NA	1.98E+03	2.53E+03								
Selenium	4.5E-03	NA	NA	1.70E+00	1.70E+00								
Zinc	7.5E-02	NA	NA	9.40E+01	1.15E+02								
Total Hazard Quotient and Cancer Risk:								8E-03				5E-03	

Assumptions for Prison Inmate			Assumptions for Prison Worker		
CS =	EPC Surface Only		CS =	EPC Surface Only	
CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg
SA =	5800	cm2	SA =	5800	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	365	days/year	EF =	250	days/year
ED =	24	years	ED =	25	years
BW =	70	kg	BW =	70	kg
AT (Nc) =	8760	days	AT (Nc) =	9125	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = (CS x CF x SA x AF x ABS x EF x ED) / (BW x AT)

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Surface Soil	EPC from Total Soils	Construction Worker: Absorbed Dose (mg/kg-day)		Construction Worker: Hazard Quotient	Construction Worker: Cancer Risk	Day Care Center Child: Absorbed Dose (mg/kg-day)		Day Care Center Child: Hazard Quotient	Day Care Center Child: Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics													
1,1,2,2,-Tetrachloroethane	NA	2.0E-01	NA		2.00E-03								
2-Butanone	6.0E-01	NA	NA	2.80E-02	2.80E-02								
2-Hexanone			NA		4.00E-03								
4-Methyl-2-Pentanone	NA	NA	NA		4.00E-03								
Acetone	1.0E-01	NA	NA	2.00E-01	2.00E-01								
Toluene	2.0E-01	NA	NA		1.00E-03								
Semivolatile Organics													
2-Methylnaphthalene	4.0E-02	NA	NA		1.50E-01								
4-Methylphenol	NA	NA	NA	2.50E-01	2.50E-01								
Acenaphthene	6.0E-02	NA	NA		3.80E-01								
Acenaphthylene	NA	NA	NA		7.20E-02								
Anthracene	3.0E-01	NA	NA		6.40E-01								
Benzo(a)anthracene	NA	7.3E-01	NA	5.60E-02	9.90E-01								
Benzo(a)pyrene	NA	1.5E+01	NA	4.90E-02	1.10E+00								
Benzo(b)fluoranthene	NA	7.3E-01	NA	4.30E-02	1.10E+00								
Benzo(g,h,i)perylene	NA	NA	NA		5.10E-01								
Benzo(k)fluoranthene	NA	7.3E-02	NA	5.20E-02	1.10E+00								
Carbazole	NA	2.0E-02	NA		3.70E-01								
Chrysene	NA	7.3E-03	NA	5.30E-02	1.20E+00								
Di-n-butylphthalate	9.0E-02	NA	NA	5.30E-02	5.30E-02								
Dibenz(a,h)anthracene	NA	7.3E+00	NA		1.60E-01								
Dibenzofuran	NA	NA	NA		2.80E-01								
Fluoranthene	4.0E-02	NA	NA	1.50E-01	2.40E+00								
Fluorene	4.0E-02	NA	NA		4.10E-01								
Hexachlorobenzene	8.0E-04	NA	NA		3.60E-02								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	2.60E-02	4.90E-01								
Naphthalene	2.0E-02	NA	NA		3.30E-01								
Phenanthrene	NA	NA	NA	1.20E-01	2.10E+00								
Pyrene	3.0E-02	NA	NA	1.20E-01	2.00E+00								
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	5.40E-02	9.40E-01								
Pesticides/PCBs													
4,4'-DDE	NA	1.7E+00	NA		3.10E-03								
4,4'-DDT	1.0E-04	1.7E+00	NA		5.60E-03								
Dieldrin	2.5E-05	3.2E+01	NA	7.00E-02	7.00E-02								
Endosulfan I	6.0E-03	NA	NA		5.40E-03								
Endosulfan II	6.0E-03	NA	NA		2.80E-03								
Endrin	3.0E-04	NA	NA		3.50E-03								
Endrin aldehyde	NA	NA	NA		4.50E-03								
Endrin ketone	NA	NA	NA		5.20E-03								
Heptachlor epoxide	1.3E-05	9.1E+00	NA		1.20E-03								
Nitroaromatics													
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	NA	1.10E-01	1.10E-01								
Metals													
Cadmium	5.0E-05	NA	0.01	4.80E-01	4.80E-01	3.49E-08		7E-04		4.80E-07		1E-02	
Copper	2.4E-02	NA	NA	2.06E-01	2.90E+01								
Lead	NA	NA	NA	2.25E+01	2.49E+01								
Potassium	NA	NA	NA	1.98E+03	2.53E+03								
Selenium	4.5E-03	NA	NA	1.70E+00	1.70E+00								
Zinc	7.5E-02	NA	NA	9.40E-01	1.15E+02								
Total Hazard Quotient and Cancer Risk:								7E-04				1E-02	

Assumptions for Construction Worker			Assumptions for Day Care Center Child		
CS =	EPC Surface and Subsurface		CS =	EPC Surface Only	
CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg
SA =	5800	cm2	SA =	2190	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	32	days/year	EF =	250	days/year
ED =	1	years	ED =	6	years
BW =	70	kg	BW =	15	kg
AT (Nc) =	365	days	AT (Nc) =	2190	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-11

CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Adult Absorbed Dose (mg/kg-day) (Nc)	Absorbed Dose (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk
Volatile Organics									
1,1,2,2,-Tetrachloroethane	NA	2.0E-01	NA		2.00E-03				
2-Butanone	6.0E-01	NA	NA	2.80E-02	2.80E-02				
2-Hexanone			NA		4.00E-03				
4-Methyl-2-Pentanone	NA	NA	NA		4.00E-03				
Acetone	1.0E-01	NA	NA	2.00E-01	2.00E-01				
Toluene	2.0E-01	NA	NA		1.00E-03				
Semivolatile Organics									
2-Methylnaphthalene	4.0E-02	NA	NA		1.50E-01				
4-Methylphenol	NA	NA	NA	2.50E-01	2.50E-01				
Acenaphthene	6.0E-02	NA	NA		3.80E-01				
Acenaphthylene	NA	NA	NA		7.20E-02				
Anthracene	3.0E-01	NA	NA		6.40E-01				
Benzo(a)anthracene	NA	7.3E-01	NA	5.60E-02	9.90E-01				
Benzo(a)pyrene	NA	1.5E+01	NA	4.90E-02	1.10E+00				
Benzo(b)fluoranthene	NA	7.3E-01	NA	4.30E-02	1.10E+00				
Benzo(g,h,i)perylene	NA	NA	NA		5.10E-01				
Benzo(k)fluoranthene	NA	7.3E-02	NA	5.20E-02	1.10E+00				
Carbazole	NA	2.0E-02	NA		3.70E-01				
Chrysene	NA	7.3E-03	NA	5.30E-02	1.20E+00				
Di-n-butylphthalate	9.0E-02	NA	NA	5.30E-02	5.30E-02				
Dibenz(a,h)anthracene	NA	7.3E+00	NA		1.60E-01				
Dibenzofuran	NA	NA	NA		2.80E-01				
Fluoranthene	4.0E-02	NA	NA	1.50E-01	2.40E+00				
Fluorene	4.0E-02	NA	NA		4.10E-01				
Hexachlorobenzene	8.0E-04	NA	NA		3.60E-02				
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	2.60E-02	4.90E-01				
Naphthalene	2.0E-02	NA	NA		3.30E-01				
Phenanthrene	NA	NA	NA	1.20E-01	2.10E+00				
Pyrene	3.0E-02	NA	NA	1.20E-01	2.00E+00				
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	5.40E-02	9.40E-01				
Pesticides/PCBs									
4,4'-DDE	NA	1.7E+00	NA		3.10E-03				
4,4'-DDT	1.0E-04	1.7E+00	NA		5.60E-03				
Dieldrin	2.5E-05	3.2E+01	NA	7.00E-02	7.00E-02				
Endosulfan I	6.0E-03	NA	NA		5.40E-03				
Endosulfan II	6.0E-03	NA	NA		2.80E-03				
Endrin	3.0E-04	NA	NA		3.50E-03				
Endrin aldehyde	NA	NA	NA		4.50E-03				
Endrin ketone	NA	NA	NA		5.20E-03				
Heptachlor epoxide	1.3E-05	9.1E+00	NA		1.20E-03				
Nitroaromatics									
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	NA	1.10E-01	1.10E-01				
Metals									
Cadmium	5.0E-05	NA	0.01	4.80E-01	4.80E-01	2.72E-07		5E-03	
Copper	2.4E-02	NA	NA	2.06E+01	2.90E+01				
Lead	NA	NA	NA	2.25E+01	2.49E+01				
Potassium	NA	NA	NA	1.98E+03	2.53E+03				
Selenium	4.5E-03	NA	NA	1.70E+00	1.70E+00				
Zinc	7.5E-02	NA	NA	9.40E+01	1.15E+02				
Total Hazard Quotient and Cancer Risk:								5E-03	

Assumptions for Day Care Center Adult

CS =	EPC Surface Only	
CF =	1.00E-06	kg/mg
SA =	5800	cm2
AF =	1	mg/cm2
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

NA= Information not available.

* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE II-12
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED= Exposure Duration
BW=Bodyweight
AT=Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics															
Acetone	1.0E-01	NA	8.00E-03	2.29E-04		2E-03		7.83E-05		8E-04			Ingestion of Groundwater Not Applicable for Construction Worker		
1,1,2,2-Tetrachloroethane	NA	2.0E-01	3.00E-03		2.94E-05		6E-06		1.05E-05		2E-06				
Metals															
Magnesium	NA	NA	7.56E+01												
Total Hazard Quotient and Cancer Risk:						**2E-03**	**6E-06**			**8E-04**	**2E-06**				

Assumptions for Prison Inmate			Assumptions for Site Worker		
IR =	2	liters/day	IR =	1	liters/day
EF =	365	days/year	EF =	250	days/year
ED =	24	years	ED =	25	years
BW =	70	kg	BW =	70	kg
AT (Nc) =	8760	days	AT (Nc) =	9125	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-12
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW =Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics											
Acetone	1.0E-01	NA	8.00E-03	3.65E-04		4E-03		7.83E-05		8E-04	
1,1,2,2-Tetrachloroethane	NA	2.0E-01	3.00E-03		1.17E-05		2E-06		1.05E-05		2E-06
Metals											
Magnesium	NA	NA	7.56E+01								
Total Hazard Quotient and Cancer Risk:						**4E-03**	**2E-06**			**8E-04**	**2E-06**

Assumptions for Day Care Center Child

IR =	1	liters/day
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

IR =	1	liters/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-13
CALCULATION OF AIR CONCENTRATION IN SHOWER
FROM VOLATILIZATION OF GROUNDWATER (daily)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Analyte	EPC Air All-Site Wells (mg/m³)	Time of Shower -Ts (min)	Flow Rate of Shower - Fw (L/min)	EPC - RME Groundwater (mg/l)	Flow Rate of Air in Shower-Fa (m³/min)	Volume of Bathroom-Vb (m³)	Henry Laws Constant-H (m³-atm/mol)	Asymptotic Air Conc.-Cinf (mg/m³)	Rate Constant-K (1/min)	Efficiency of Release-E (unitless)	Efficiency of Release for TCE E-TCE	Henry Laws Constant-TCE (m³-atm/mol)	Fraction Emitted* (percent)	Cderm** (Water) (mg/l)
Volatile Organics														
Acetone	7.13E-05	15	19	8.00E-03	2.4	12	2.50E-05	1.04E-04	0.20	1.65E-03	0.6	0.0091	0.11%	7.99E-03
1,1,2,2-Tetrachloroethane	2.67E-04	15	19	3.00E-03	2.4	12	2.50E-04	3.91E-04	0.20	1.65E-02	0.6	0.0091	1.13%	2.97E-03
Metals														
Magnesium	0.00E+00	15	19	7.56E+01	2.4	12	NA	0.00E+00	0.20	0.00	0.6	0.0091	0.00%	7.56E+01

Concentration in Air (mg/m³) = Cinf[1+(1/(kTs)(exp(-kTs)-1)]

Asymptotic Air Conc. - Cinf (mg/m³) = [(E)(Fw)(Ct)]/Fa

Rate Constant - k (L/min) = Fa/Vb

Efficiency of Release - E (unitless) = (E-tce)(H)/(H-tce)

* Fraction Emitted (fe) = (EPCair x Fa) / (EPCgw x Fw)

** Cderm = EPCgw x (1 - fe)

Variables:

CA = Chemical Concentration in Air (mg/m³)
Ts = Time of Shower (minutes)
Fw = Flow Rate of Shower (L/min)
Fa = Flow Rate of Air in Shower (m³/min)
Vb = Volume of Bathroom (m³)

Assumptions:

EPC - Groundwater Data - RME
15 (RME default)
19 (Estimated RME)
2.4 (Average Air Flow)
12 (Average Bathroom Volume)

TABLE H-14

CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):

DA = Absorbed Dose per Event — ED = Exposure Duration
SA = Surface Area Contact — BW = Bodyweight
EF = Exposure Frequency — AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2Kp \times CW \times \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient *Kp* (cm/hr)	Tau (hours)	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																Dermal Contact of Groundwater		
Acetone	1.0E-01	NA	5.7E-04	2.0E-01	7.99E-03	2.80E-09	9.18E-07		9E-06		6.29E-07		6E-06			Not Applicable		
1,1,2,2-Tetrachloroethane	NA	2.0E-01	9.0E-03	9.1E-01	2.97E-03	3.52E-08		3.96E-06		8E-07		2.83E-06		6E-07		for Construction Worker		
Metals																		
Magnesium	NA	NA	1.0E-03	NA	7.56E+01	1.89E-05												
Total Hazard Quotient and Cancer Risk:									**9E-06**	**8E-07**			**6E-06**	**6E-07**				

Assumptions for Prison Inmate

SA =	23000	cm2
CF =	0.001	l/cm3
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days
ET =	0.25	hours/day

Assumptions for Prison Worker

SA =	23000	cm2
CF =	0.001	l/cm3
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days
ET =	0.25	hours/day

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* Cderm is the concentration of chmeical available for dermal absorption after accounoting for partitioning between the air and water in the shower. The calculation of Cderm is shown in Table H-13.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE H-14

CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):

DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2 K_p \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: $DA = K_p \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	0.0E+00 Dermal 0.0E+00	Permeability Coefficient Kp (cm/hr)	Tau	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event mg-cm²/event	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics								Dermal Contact of Groundwater				Dermal Contact of Groundwater		
Acetone	1.0E-01	NA	5.7E-04	2.0E-01	7.99E-03	2.80E-09		Not Applicable for				Not Applicable for		
1,1,2,2-Tetrachloroethane	NA	2.0E-01	9.0E-03	9.1E-01	2.97E-03	3.52E-08		Day Care Center Child				Day Care Center Adult		
Metals														
Magnesium	NA	NA	1.0E-03	NA	7.56E+01	1.89E-05								
Total Hazard Quotient and Cancer Risk:														

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.

NA= Information not available.

* Cderm is the concentration of chmeical available for dermal absorption after accounoting for partitioning between the air and water in the shower. The calculation of Cderm is shown in Table H-13.

Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE H-15
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	EPC* Air (mg/m3)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics														Inhalation of Groundwater Not Applicable for Construciton Worker	
Acetone	NA	NA	7.13E-05												
1,1,2,2-Tetrachloroethane	NA	2.0E-01	2.67E-04		6.55E-07		1E-07		4.67E-07		9E-08				
Total Hazard Quotient and Cancer Risk:							**1E-07**				**9E-08**				

Assumptions for Prison Inmate

IR =	0.50	m3/day
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

IR =	0.50	m3/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* EPC air is the concentration of chemical available for inhalation after accounting for partitioning between the air and water in the shower The calculation of the EPC air is shown in Table H-14
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE H-15
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
CA = Chemical Concentration in Air
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation	EPC * Air (mg/m3)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics					Inhalation of Groundwater Not Applicable for Day Care Center Child				Inhalation of Groundwater Not Applicable for Day Care Center Adult		
Acetone	NA	NA	7.13E-05								
1,1,2,2-Tetrachloroethane	NA	2.0E-01	2.67E-04								
Total Hazard Quotient and Cancer Risk:											

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* EPC air is the concentration of chemical available for inhalation after accounting for partitioning between the air and water in the shower. The calculation of the EPC air is shown in Table H-14.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE H-16
ECOLOGICAL RISK ASSESSMENT
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One ecological risk assessment was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Tables G-16 through G-19 for the results.

APPENDIX I

SEAD-44B: Quality Assurance Test Laboratory – Site B

Table I-1:	Soil Analysis Results
Table I-2:	Groundwater Analysis Results
Table I-3:	Surface Water Analysis Results
Table I-4:	Sediment Analysis Results
Table I-5:	Inorganics Statistical Analysis - Soil
Table I-6:	Inorganics Statistical Analysis – Groundwater
Table I-7:	Exposure Point Concentrations for Chemicals of Potential Concern
Table I-8:	Ambient Air Exposure Point Concentrations
Table I-9:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table I-10:	Calculation of Intake and Risk from the Ingestion of Soil
Table I-11:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table I-12:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table I-13:	Calculation of Air Concentration in Shower from Volatilization of Groundwater
Table I-14:	Calculation of Intake and Risk from Dermal Contact to Groundwater (while Showering)
Table I-15:	Ecological Risk Assessment

TABLE I-1
SOIL ANALYSIS RESULTS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44B-1 217686 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-2 217687 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-3 217688 43535
VOLATILE ORGANICS										
Acetone	ug/Kg	47	100%	200	0	3	3	45	38	47
2-Butanone	ug/Kg	10	33%	300	0	1	3	10 J	18 U	14 U
SEMIVOLATILE ORGANICS										
Phenanthrene	ug/Kg	330	67%	50000	0	2	3	34 J	630 U	330 J
Anthracene	ug/Kg	35	33%	50000	0	1	3	420 U	630 U	35 J
Fluoranthene	ug/Kg	350	67%	50000	0	2	3	82 J	630 U	350 J
Pyrene	ug/Kg	380	67%	50000	0	2	3	89 J	630 U	380 J
Benzo(a)anthracene	ug/Kg	130	67%	224	0	2	3	33 J	630 U	130 J
Chrysene	ug/Kg	150	67%	400	0	2	3	52 J	630 U	150 J
bis(2-Ethylhexyl)phthalate	ug/Kg	42	67%	50000	0	2	3	34 J	630 U	42 J
Benzo(b)fluoranthene	ug/Kg	99	67%	1100	0	2	3	51 J	630 U	99 J
Benzo(k)fluoranthene	ug/Kg	110	67%	1100	0	2	3	40 J	630 U	110 J
Benzo(a)pyrene	ug/Kg	98	67%	61	1	2	3	32 J	630 U	**98** J
Indeno(1,2,3-cd)pyrene	ug/Kg	64	67%	3200	0	2	3	24 J	630 U	64 J
Dibenz(a,h)anthracene	ug/Kg	28	33%	14	1	1	3	420 U	630 U	**28** J
Benzo(g,h,i)perylene	ug/Kg	56	33%	50000	0	1	3	420 U	630 U	56 J
PESTICIDES/PCB										
Endosulfan I	ug/Kg	2	33%	900	0	1	3	2 J	3.3 U	2.4 U
Dieldrin	ug/Kg	57	33%	44	1	1	3	4.2 U	6.3 U	**57**
4,4'-DDE	ug/Kg	48	33%	2100	0	1	3	48	6.3 U	4.6 U
4,4'-DDD	ug/Kg	28	33%	2900	0	1	3	28	6.3 U	4.6 U
4,4'-DDT	ug/Kg	27	33%	2100	0	1	3	27	6.3 U	4.6 U
METALS										
Aluminum	mg/Kg	16400	100%	19300	0	3	3	11000	16400	9820
Arsenic	mg/Kg	13.1	100%	8.2	1	3	3	6.8	8.2	**13.1**
Barium	mg/Kg	136	100%	300	0	3	3	60.6	136	70.8
Beryllium	mg/Kg	0.77	100%	1.1	0	3	3	0.54 J	0.77 J	0.48 J
Cadmium	mg/Kg	0.34	100%	2.3	0	3	3	0.33 J	0.34 J	0.24 J
Calcium	mg/Kg	33300	100%	121000	0	3	3	10900	5100	33300
Chromium	mg/Kg	20.7	100%	29.6	0	3	3	20	20.7	15.2
Cobalt	mg/Kg	10.8	100%	30	0	3	3	10.8 J	7.8 J	8.2 J

TABLE I-1
SOIL ANALYSIS RESULTS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SOIL SEAD-44 0-0.2 04/13/94 SS44B-1 217686 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-2 217687 43535	SOIL SEAD-44 0-0.2 04/13/94 SS44B-3 217688 43535
Copper	mg/Kg	26.2	100%	33	0	3	3	26.2	21.7	19.9
Iron	mg/Kg	24100	100%	36500	0	3	3	24100	23100	19600
Lead	mg/Kg	39.5	100%	24.8	1	3	3	**39.5**	21.4	12.4
Magnesium	mg/Kg	9660	100%	21500	0	3	3	5200	3910	9660
Manganese	mg/Kg	372	100%	1060	0	3	3	372 J	318 J	364 J
Mercury	mg/Kg	0.04	100%	0.1	0	3	3	0.02 J	0.04 J	0.02 J
Nickel	mg/Kg	34.8	100%	49	0	3	3	34.8	20.8	24.3
Potassium	mg/Kg	1880	100%	2380	0	3	3	1380	1880	1550
Selenium	mg/Kg	1.2	100%	2	0	3	3	1.1 J	1.2	0.44 J
Sodium	mg/Kg	43.2	33%	172	0	1	3	35.3 U	31.5 U	43.2 J
Vanadium	mg/Kg	28	100%	150	0	3	3	20.3	28	16.3
Zinc	mg/Kg	145	100%	110	1	3	3	**145**	73.4	68.9
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/Kg	0.47	100%	NA	NA			0.47	0.06	0.04
Total Solids	%W/W							78.1	52.4	72.5

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.

b) NA = Not Available.

c) U = The compound was not detected below this concentration.

d) J = The reported value is an estimated concentration.

e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

f) R = The data was rejected during the data validation process

TABLE I-2
GROUNDWATER ANALYSIS RESULTS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-44 07/12/94 MW44B-1 226792 45332 Value (Q)	WATER SEAD-44 03/29/94 MW44B-2 215835 43179 Value (Q)	WATER SEAD-44 07/13/94 MW44B-3 226793 45332 Value (Q)
METALS										
Aluminum	ug/L	1230	100%	50 (a)	3	3	3	288 J	1230	80.2 J
Barium	ug/L	77.7	100%	1000 (b)	0	3	3	72.6 J	77.7 J	39.3 J
Calcium	ug/L	120000	100%	NA	0	3	3	120000	92000	114000
Chromium	ug/L	2.5	33%	50 (b)	0	1	3	0.4 U	2.5 J	0.4 U
Cobalt	ug/L	1.8	67%	NA	0	2	3	0.91 J	1.8 J	0.5 U
Copper	ug/L	2.4	33%	200 (b)	0	1	3	0.5 U	2.4 J	0.5 U
Iron	ug/L	2340	100%	300 (b)	2	3	3	666	2340	231
Magnesium	ug/L	32900	100%	NA	0	3	3	31800	22500	32900
Manganese	ug/L	219	100%	50 (a)	2	3	3	219	29.4	151
Nickel	ug/L	4.4	67%	100 (b)	0	2	3	0.73 J	4.4 J	0.69 U
Potassium	ug/L	2910	100%	NA	0	3	3	2150 J	1360 J	2910 J
Silver	ug/L	0.7	67%	50 (b)	0	2	3	0.68 J	0.7 J	0.5 U
Sodium	ug/L	8350	100%	20000 (b)	0	3	3	7190	8350	6110
Thallium	ug/L	4.7	33%	2 (c)	1	1	3	4.7 J	1.6 U	1.9 U
Vanadium	ug/L	2.7	67%	NA	0	2	3	0.5 U	2.7 J	0.63 J
Zinc	ug/L	10.4	67%	5000 (a)	0	2	3	2.2 U	10.4 J	4.9 J
OTHER ANALYSES										
Nitrate/Nitrite-Nitrogen	mg/L	0.13	100%	10			0	0.11	0.06	0.13
pH	Standard Units	8.0						7.1	8	7.2
Conductivity	umhos/cm	620.0						620	383	600
Temperature	°C	15.3						15.3	5.9	15
Turbidity	NTU	67.0						16.5	67	2.5

NOTES:
a) Secondary Drinking Water Regulations
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.

TABLE I-3
SURFACE WATER ANALYSIS RESULTS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-44 04/17/94 SW44B-1 218088 43549 Value (Q)	WATER SEAD-44 04/17/94 SW44B-2 218089 43549 Value (Q)
METALS									
Aluminum	ug/L	76.5	100%	100	0	2	2	76.5 J	64.4 J
Arsenic	ug/L	11.6	100%	150	0	2	2	5.8 J	11.6
Barium	ug/L	34	100%		0	2	2	34 J	33.3 J
Calcium	ug/L	93000	100%		0	2	2	87000	93000
Copper	ug/L	2.2	100%	17.36	0	2	2	1.2 J	2.2 J
Iron	ug/L	79.8	100%	300	0	2	2	79.8 J	75.5 J
Magnesium	ug/L	9070	100%		0	2	2	8990	9070
Manganese	ug/L	5.3	100%		0	2	2	2.7 J	5.3 J
Mercury	ug/L	0.05	100%	0.77	0	2	2	0.05 J	0.05 J
Nickel	ug/L	0.68	100%	100.16	0	2	2	0.68 J	0.66 J
Potassium	ug/L	3290	100%		0	2	2	2680 J	3290 J
Sodium	ug/L	73200	100%		0	2	2	73200	61000
Zinc	ug/L	2.2	100%	159.6	0	2	2	2 J	2.2 J
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/L	0.01	50%	NA	NA			0.01	0.01 U
pH	Standard Units	8.7						8.7	8.5
Conductivity	umhos/cm	700						700	690
Temperature	°C	16.5						16.2	16.5
Turbidity	NTU	2.9						2.9	2.8

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) NA = Not Available
d) U = The compound was not detected below this concentration.
e) J = The reported value is an estimated concentration.

TABLE I-4
SEDIMENT ANALYSIS RESULTS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CRITERIA	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	SEDIMENT SEAD-44 0-0.2 04/17/94 SD44B-1 218077 43543 Value (Q)	SEDIMENT SEAD-44 0-0.2 04/17/94 SD44B-2 218078 43543 Value (Q)
VOLATILE ORGANICS									
2-Butanone	ug/Kg	12	50%		0	1	2	16 U	12 J
SEMIVOLATILE ORGANICS									
Di-n-butylphthalate	ug/Kg	110	100%		0	2	2	65 J	110 J
METALS									
Aluminum	mg/Kg	13000	100%		0	2	2	13000	10300
Antimony	mg/Kg	0.37	50%	2	0	1	2	0.37 J	0.3 UJ
Arsenic	mg/Kg	58 3	100%	6	2	2	2	58.3	9.4
Barium	mg/Kg	93.8	100%		0	2	2	93.8	68.6
Beryllium	mg/Kg	0.66	100%		0	2	2	0.66 J	0.53 J
Cadmium	mg/Kg	0.38	100%	0.6	0	2	2	0.38 J	0.23 J
Calcium	mg/Kg	8780	100%		0	2	2	4240	8780
Chromium	mg/Kg	19.8	100%	26	0	2	2	19.8	14.6
Cobalt	mg/Kg	11.9	100%		0	2	2	11.9	7.1 J
Copper	mg/Kg	19.1	100%	16	1	2	2	19.1	14.6
Iron	mg/Kg	28400	100%	20000	1	2	2	28400	17600
Lead	mg/Kg	17 7	100%	31	0	2	2	17.7	13.6
Magnesium	mg/Kg	4880	100%		0	2	2	4530	4880
Manganese	mg/Kg	679	100%	460	1	2	2	679	230
Mercury	mg/Kg	0 06	100%	0.15	0	2	2	0.05 J	0.06 J
Nickel	mg/Kg	28 4	100%	16	2	2	2	28.4	18.2
Potassium	mg/Kg	1500	100%		0	2	2	1500	1160 J
Sodium	mg/Kg	378	100%		0	2	2	378 J	97.6 J
Vanadium	mg/Kg	23.8	100%		0	2	2	23.8	18.5
Zinc	mg/Kg	76.3	100%	120	0	2	2	76.3	56.5
		0	0%		0	0	2		
OTHER ANALYSES									
Nitrate/Nitrite-Nitrogen	mg/Kg	0.06	100%	NA	NA	NA	NA	0.06	0.03
Total Solids	%W/W							65	61.2

NOTES:

a) NYSDEC Sediment Criteria - 1994

b) A sediment is considered contaminated if either criterion is exceeded.

c) 2% = 20,000 mg/Kg; 4% = 40,000 mg/Kg

d) NA = Not Available.

e) U = The compound was not detected below this concentration.

f) J = The reported value is an estimated concentration.

g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE I-5
INORGANICS ANALYSIS - SOIL
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-5 for the results.

TABLE I-6
INORGANICS ANALYSIS - GROUNDWATER
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-6 for the results.

TABLE I-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-44B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Ground Water mg/L
Volatile Organics			
Acetone	4.70E-02	4.70E-02	
2-Butanone	1.00E-02	1.00E-02	
Semivolatile Organics			
Anthracene	3.50E-02	3.50E-02	
Benzo(a)anthracene	1.30E-01	1.30E-01	
Benzo(a)pyrene	9.80E-02	9.80E-02	
Benzo(b)fluoranthene	9.90E-02	9.90E-02	
Benzo(g,h,i)perylene	5.60E-02	5.60E-02	
Benzo(k)fluoranthene	1.10E-01	1.10E-01	
Chrysene	1.50E-01	1.50E-01	
Dibenz(a,h)anthracene	2.80E-02	2.80E-02	
Fluoranthene	3.50E-01	3.50E-01	
Indeno(1,2,3-cd)pyrene	6.40E-02	6.40E-02	
Phenanthrene	3.30E-01	3.30E-01	
Pyrene	3.80E-01	3.80E-01	
bis(2-Ethylhexyl)phthalate	4.20E-02	4.20E-02	
Pesticides/PCBs			
4,4'-DDD	2.80E-02	2.80E-02	
4,4'-DDE	4.80E-02	4.80E-02	
4.4'-DDT	2.70E-02	2.70E-02	
Dieldrin	5.70E-02	5.70E-02	
Endosulfan I	2.00E-03	2.00E-03	
Metals			
Cadmium	3.40E-01	3.40E-01	
Copper	2.62E+01	2.62E+01	
Lead	3.95E+01	3.95E+01	
Magnesium			3.29E+01
Potassium	1.88E+03	1.88E+03	
Selenium	1.20E+00	1.20E+00	
Zinc	1.45E+02	1.45E+02	

TABLE I-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m^3) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 340 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)	Calculated Air EPC Total Soils (mg/m^3)
Volatile Organics				
Butanone, 2-	4.70E-02	4.70E-02	7.99E-10	1.60E-08
Acetone	1.00E-02	1.00E-02	1.70E-10	3.40E-09
Semivolatile Organics				
Anthracene	3.50E-02	3.50E-02	5.95E-10	1.19E-08
Benzo(a)anthracene	1.30E-01	1.30E-01	2.21E-09	4.42E-08
Benzo(a)pyrene	9.80E-02	9.80E-02	1.67E-09	3.33E-08
Benzo(b)fluoranthene	9.90E-02	9.90E-02	1.68E-09	3.37E-08
Benzo(g,h,i)perylene	5.60E-02	5.60E-02	9.52E-10	1.90E-08
Benzo(k)fluoranthene	1.10E-01	1.10E-01	1.87E-09	3.74E-08
Chrysene	1.50E-01	1.50E-01	2.55E-09	5.10E-08
Dibenz(a,h)anthracene	2.80E-02	2.80E-02	4.76E-10	9.52E-09
Fluoranthene	3.50E-01	3.50E-01	5.95E-09	1.19E-07
Indeno(1,2,3-cd)pyrene	6.40E-02	6.40E-02	1.09E-09	2.18E-08
Phenanthrene	3.30E-01	3.30E-01	5.61E-09	1.12E-07
Pyrene	3.80E-01	3.80E-01	6.46E-09	1.29E-07
bis(2-Ethylhexyl)phthalate	4.20E-02	4.20E-02	7.14E-10	1.43E-08
Pesticides				
4,4'-DDD	2.80E-02	2.80E-02	4.76E-10	9.52E-09
4,4'-DDE	4.80E-02	4.80E-02	8.16E-10	1.63E-08
4,4'-DDT	2.70E-02	2.70E-02	4.59E-10	9.18E-09
Dieldrin	5.70E-02	5.70E-02	9.69E-10	1.94E-08
Endosulfan I	2.00E-03	2.00E-03	3.40E-11	6.80E-10
Metals				
Cadmium	3.40E-01	3.40E-01	5.78E-09	1.16E-07
Copper	2.62E+01	2.62E+01	4.45E-07	8.91E-06
Lead	3.95E+01	3.95E+01	6.72E-07	1.34E-05
Potassium	1.88E+03	1.88E+03	3.20E-05	6.39E-04
Selenium	1.20E+00	1.20E+00	2.04E-08	4.08E-07
Zinc	1.45E+02	1.45E+02	2.47E-06	4.93E-05

ND = Compound was not detected above the detection limit shown

TABLE I-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Butanone, 2-	2.9E-01	NA	7.99E-10	1.60E-08	1.73E-10		6E-10		6.25E-11		2E-10		2.11E-11		7E-11	
Acetone	NA	NA	1.70E-10	3.40E-09												
Semivolatile Organics																
Anthracene	NA	NA	5.95E-10	1.19E-08												
Benzo(a)anthracene	NA	NA	2.21E-09	4.42E-08												
Benzo(a)pyrene	NA	NA	1.67E-09	3.33E-08												
Benzo(b)fluoranthene	NA	NA	1.68E-09	3.37E-08												
Benzo(g,h,i)perylene	NA	NA	9.52E-10	1.90E-08												
Benzo(k)fluoranthene	NA	NA	1.87E-09	3.74E-08												
Chrysene	NA	NA	2.55E-09	5.10E-08												
Dibenz(a,h)anthracene	NA	NA	4.76E-10	9.52E-09												
Fluoranthene	NA	NA	5.95E-09	1.19E-07												
Indeno(1,2,3-cd)pyrene	NA	NA	1.09E-09	2.18E-08												
Phenanthrene	NA	NA	5.61E-09	1.12E-07												
Pyrene	NA	NA	6.46E-09	1.29E-07												
bis(2-Ethylhexyl)phthalate	NA	NA	7.14E-10	1.43E-08												
Pesticides																
4,4'-DDD	NA	NA	4.76E-10	9.52E-09												
4,4'-DDE	NA	NA	8.16E-10	1.63E-08												
4,4'-DDT	NA	3.4E-01	4.59E-10	9.18E-09		3.42E-11		1E-11		1.28E-11		4E-12		1.73E-13		6E-14
Dieldrin	NA	1.6E+01	9.69E-10	1.94E-08		7.21E-11		1E-09		2.71E-11		4E-10		3.66E-13		6E-12
Endosulfan I	NA	NA	3.40E-11	6.80E-10												
Metals																
Cadmium	NA	6.3E+00	5.78E-09	1.16E-07		4.30E-10		3E-09		1.62E-10		1E-09		2.18E-12		1E-11
Copper	NA	NA	4.45E-07	8.91E-06												
Lead	NA	NA	6.72E-07	1.34E-05												
Potassium	NA	NA	3.20E-05	6.39E-04												
Selenium	NA	NA	2.04E-08	4.08E-07												
Zinc	NA	NA	2.47E-06	4.93E-05												
Total Hazard Quotient and Cancer Risk:							**6E-10**	**4E-09**			**2E-10**	**1E-09**			**7E-11**	**2E-11**

Assumptions for Prison Inmate			Assumptions for Prison Worker			Assumptions for Construction Worker		
CA =	EPC Surface Only		CA =	EPC Surface Only		CA =	EPC Surface and Sub-Surface	
IR =	15.2	m3/day	IR =	8	m3/day	IR =	10.4	m3/day
EF =	365	days/year	EF =	250	days/year	EF =	3.25	days/year
ED =	24	years	ED =	25	years	ED =	1	years
BW =	70	kg	BW =	70	kg	BW =	70	kg
AT (Nc) =	8760	days	AT (Nc) =	9125	days	AT (Nc) =	365	days
AT (Car) =	25550	days	AT (Car) =	25550	days	AT (Car) =	25550	days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE I-8 for calculation of Air EPCs
NA= Information not available.

TABLE I-9

CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics												
Butanone, 2-	2.9E-01	NA	7.99E-10	1.60E-08	1.46E-10		5E-10		6.25E-11		2E-10	
Acetone	NA	NA	1.70E-10	3.40E-09								
Semivolatile Organics												
Anthracene	NA	NA	5.95E-10	1.19E-08								
Benzo(a)anthracene	NA	NA	2.21E-09	4.42E-08								
Benzo(a)pyrene	NA	NA	1.67E-09	3.33E-08								
Benzo(b)fluoranthene	NA	NA	1.68E-09	3.37E-08								
Benzo(g,h,i)perylene	NA	NA	9.52E-10	1.90E-08								
Benzo(k)fluoranthene	NA	NA	1.87E-09	3.74E-08								
Chrysene	NA	NA	2.55E-09	5.10E-08								
Dibenz(a,h)anthracene	NA	NA	4.76E-10	9.52E-09								
Fluoranthene	NA	NA	5.95E-09	1.19E-07								
Indeno(1,2,3-cd)pyrene	NA	NA	1.09E-09	2.18E-08								
Phenanthrene	NA	NA	5.61E-09	1.12E-07								
Pyrene	NA	NA	6.46E-09	1.29E-07								
bis(2-Ethylhexyl)phthalate	NA	NA	7.14E-10	1.43E-08								
Pesticides												
4,4'-DDD	NA	NA	4.76E-10	9.52E-09								
4,4'-DDE	NA	NA	8.16E-10	1.63E-08								
4,4'-DDT	NA	3.4E-01	4.59E-10	9.18E-09		7.19E-12		2E-12		1.28E-11		4E-12
Dieldrin	NA	1.6E+01	9.69E-10	1.94E-08		1.52E-11		2E-10		2.71E-11		4E-10
Endosulfan I	NA	NA	3.40E-11	6.80E-10								
Metals												
Cadmium	NA	6.3E+00	5.78E-09	1.16E-07		9.05E-11		6E-10		1.62E-10		1E-09
Copper	NA	NA	4.45E-07	8.91E-06								
Lead	NA	NA	6.72E-07	1.34E-05								
Potassium	NA	NA	3.20E-05	6.39E-04								
Selenium	NA	NA	2.04E-08	4.08E-07								
Zinc	NA	NA	2.47E-06	4.93E-05								
Total Hazard Quotient and Cancer Risk:							**5E-10**	**8E-10**			**2E-10**	**1E-09**

Assumptions for Day Care Center Child

CA =	EPC Surface Only	
IR =	4	m3/day
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CA =	EPC Surface Only	
IR =	8	m3/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE I-8 for calculation of Air EPC's
NA= Information not available.

TABLE I-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) =

$$\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Acetone	1.0E-01	NA	4.70E-02	4.70E-02	6.71E-08		7E-07		4.60E-08		5E-07		2.87E-09		3E-08	
Butanone, 2-	6.0E-01	NA	1.00E-02	1.00E-02	1.43E-08		2E-08		9.78E-09		2E-08		6.11E-10		1E-09	
Semivolatile Organics																
Anthracene	3.0E-01	NA	3.50E-02	3.50E-02	5.00E-08		2E-07		3.42E-08		1E-07		2.14E-09		7E-09	
Benzo(a)anthracene	NA	7.3E-01	1.30E-01	1.30E-01		6.37E-08		5E-08		4.54E-08		3E-08		1.13E-10		8E-11
Benzo(a)pyrene	NA	7.3E+00	9.80E-02	9.80E-02		4.80E-08		4E-07		3.42E-08		3E-07		8.55E-11		6E-10
Benzo(b)fluoranthene	NA	7.3E-01	9.90E-02	9.90E-02		4.85E-08		4E-08		3.46E-08		3E-08		8.64E-11		6E-11
Benzo(g,h,i)perylene	NA	NA	5.60E-02	5.60E-02												
Benzo(k)fluoranthene	NA	7.3E-02	1.10E-01	1.10E-01		5.39E-08		4E-09		3.84E-08		3E-09		9.59E-11		7E-12
Chrysene	NA	7.3E-03	1.50E-01	1.50E-01		7.35E-08		5E-10		5.24E-08		4E-10		1.31E-10		1E-12
Dibenz(a,h)anthracene	NA	7.3E+00	2.80E-02	2.80E-02		1.37E-08		1E-07		9.78E-09		7E-08		2.44E-11		2E-10
Fluoranthene	4.0E-02	NA	3.50E-01	3.50E-01	5.00E-07		1E-05		3.42E-07		9E-06		2.14E-08		5E-07	
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	6.40E-02	6.40E-02		3.13E-08		2E-08		2.24E-08		2E-08		5.58E-11		4E-11
Phenanthrene	NA	NA	3.30E-01	3.30E-01												
Pyrene	3.0E-02	NA	3.80E-01	3.80E-01	5.43E-07		2E-05		3.72E-07		1E-05		2.32E-08		8E-07	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	4.20E-02	4.20E-02	6.00E-08	2.06E-08	3E-06	3E-10	4.11E-08	1.47E-08	2E-06	2E-10	2.56E-09	3.66E-11	1E-07	5E-13
Pesticides/PCBs																
4,4'-DDD	NA	2.4E-01	2.80E-02	2.80E-02		1.37E-08		3E-09		9.78E-09		2E-09		2.44E-11		6E-12
4,4'-DDE	NA	3.4E-01	4.80E-02	4.80E-02		2.35E-08		8E-09		1.68E-08		6E-09		4.19E-11		1E-11
4,4'-DDT	5.0E-04	3.4E-01	2.70E-02	2.70E-02	3.86E-08	1.32E-08	8E-05	4E-09	2.64E-08	9.44E-09	5E-05	3E-09	1.65E-09	2.36E-11	3E-06	8E-12
Dieldrin	5.0E-05	1.6E+01	5.70E-02	5.70E-02	8.14E-08	2.79E-08	2E-03	4E-07	5.58E-08	1.99E-08	1E-03	3E-07	3.48E-09	4.97E-11	7E-05	8E-10
Endosulfan I	6.0E-03	NA	2.00E-03	2.00E-03	2.86E-09		5E-07		1.96E-09		3E-07		1.22E-10		2E-08	
Metals																
Cadmium	5.0E-04	NA	3.40E-01	3.40E-01	4.86E-07		1E-03		3.33E-07		7E-04		2.08E-08		4E-05	
Copper	4.0E-02	NA	2.62E+01	2.62E+01	3.74E-05		9E-04		2.56E-05		6E-04		1.60E-06		4E-05	
Lead	NA	NA	3.95E+01	3.95E+01												
Potassium	NA	NA	1.88E+03	1.88E+03												
Selenium	5.0E-03	NA	1.20E+00	1.20E+00	1.71E-06		3E-04		1.17E-06		2E-04		7.33E-08		1E-05	
Zinc	3.0E-01	NA	1.45E+02	1.45E+02	2.07E-04		7E-04		1.42E-04		5E-04		8.85E-06		3E-05	
Total Hazard Quotient and Cancer Risk:							**5E-03**	**1E-06**			**3E-03**	**7E-07**			**2E-04**	**2E-09**

Assumptions for Prison Inmate

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Assumptions for Construction Worker

CS =	EPC Surface and Subsurface	
IR =	480	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	3.25	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA = Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE I-10

CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS = Chemical Concentration in Soil, Calculated from Soil EPC
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics												
Acetone	1.0E-01	NA	4.70E-02	4.70E-02	4.29E-07		4E-06		4.60E-08		5E-07	
Butanone, 2-	6.0E-01	NA	1.00E-02	1.00E-02	9.13E-08		2E-07		9.78E-09		2E-08	
Semivolatile Organics												
Anthracene	3.0E-01	NA	3.50E-02	3.50E-02	3.20E-07		1E-06		3.42E-08		1E-07	
Benzo(a)anthracene	NA	7.3E-01	1.30E-01	1.30E-01		1.02E-07		7E-08		4.54E-08		3E-08
Benzo(a)pyrene	NA	7.3E+00	9.80E-02	9.80E-02		7.67E-08		6E-07		3.42E-08		3E-07
Benzo(b)fluoranthene	NA	7.3E-01	9.90E-02	9.90E-02		7.75E-08		6E-08		3.46E-08		3E-08
Benzo(g,h,i)perylene	NA	NA	5.60E-02	5.60E-02								
Benzo(k)fluoranthene	NA	7.3E-02	1.10E-01	1.10E-01		8.61E-08		6E-09		3.84E-08		3E-09
Chrysene	NA	7.3E-03	1.50E-01	1.50E-01		1.17E-07		9E-10		5.24E-08		4E-10
Dibenz(a,h)anthracene	NA	7.3E+00	2.80E-02	2.80E-02		2.19E-08		2E-07		9.78E-09		7E-08
Fluoranthene	4.0E-02	NA	3.50E-01	3.50E-01	3.20E-06		8E-05		3.42E-07		9E-06	
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	6.40E-02	6.40E-02		5.01E-08		4E-08		2.24E-08		2E-08
Phenanthrene	NA	NA	3.30E-01	3.30E-01								
Pyrene	3.0E-02	NA	3.80E-01	3.80E-01	3.47E-06		1E-04		3.72E-07		1E-05	
bis(2-Ethylhexyl)phthalate	2.0E-02	1.4E-02	4.20E-02	4.20E-02	3.84E-07	3.29E-08	2E-05	5E-10	4.11E-08	1.47E-08	2E-06	2E-10
Pesticides/PCBs												
4,4'-DDD	NA	2.4E-01	2.80E-02	2.80E-02		2.19E-08		5E-09		9.78E-09		2E-09
4,4'-DDE	NA	3.4E-01	4.80E-02	4.80E-02		3.76E-08		1E-08		1.68E-08		6E-09
4,4'-DDT	5.0E-04	3.4E-01	2.70E-02	2.70E-02	2.47E-07	2.11E-08	5E-04	7E-09	2.64E-08	9.44E-09	5E-05	3E-09
Dieldrin	5.0E-05	1.6E+01	5.70E-02	5.70E-02	5.21E-07	4.46E-08	1E-02	7E-07	5.58E-08	1.99E-08	1E-03	3E-07
Endosulfan I	6.0E-03	NA	2.00E-03	2.00E-03	1.83E-08		3E-06		1.96E-09		3E-07	
Metals												
Cadmium	5.0E-04	NA	3.40E-01	3.40E-01	3.11E-06		6E-03		3.33E-07		7E-04	
Copper	4.0E-02	NA	2.62E+01	2.62E+01	2.39E-04		6E-03		2.56E-05		6E-04	
Lead	NA	NA	3.95E+01	3.95E+01								
Potassium	NA	NA	1.88E+03	1.88E+03								
Selenium	5.0E-03	NA	1.20E+00	1.20E+00	1.10E-05		2E-03		1.17E-06		2E-04	
Zinc	3.0E-01	NA	1.45E+02	1.45E+02	1.32E-03		4E-03		1.42E-04		5E-04	
Total Hazard Quotient and Cancer Risk:							**3E-02**	**2E-06**			**3E-03**	**7E-07**

Assumptions for Day Care Center Child

CS =	EPC Surface Only	
IR =	200	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE I-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Absorbed Dose (mg/kg-day) (Nc)	Prison Inmate Absorbed Dose (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Absorbed Dose (mg/kg-day) (Nc)	Prison Worker Absorbed Dose (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																	
Acetone	1.0E-01	NA	NA	4.70E-02	4.70E-02												
Butanone, 2-	6.0E-01	NA	NA	1.00E-02	1.00E-02												
Semivolatile Organics																	
Anthracene	3.0E-01	NA	NA	3.50E-02	3.50E-02												
Benzo(a)anthracene	NA	7.3E-01	NA	1.30E-01	1.30E-01												
Benzo(a)pyrene	NA	1.5E+01	NA	9.80E-02	9.80E-02												
Benzo(b)fluoranthene	NA	7.3E-01	NA	9.90E-02	9.90E-02												
Benzo(g,h,i)perylene	NA	NA	NA	5.60E-02	5.60E-02												
Benzo(k)fluoranthene	NA	7.3E-02	NA	1.10E-01	1.10E-01												
Chrysene	NA	7.3E-03	NA	1.50E-01	1.50E-01												
Dibenz(a,h)anthracene	NA	7.3E+00	NA	2.80E-02	2.80E-02												
Fluoranthene	4.0E-02	NA	NA	3.50E-01	3.50E-01												
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6.40E-02	6.40E-02												
Phenanthrene	NA	NA	NA	3.30E-01	3.30E-01												
Pyrene	3.0E-02	NA	NA	3.80E-01	3.80E-01												
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	4.20E-02	4.20E-02												
Pesticides/PCBs																	
4,4'-DDD	NA	1.2E+00	NA	2.80E-02	2.80E-02												
4,4'-DDE	NA	1.7E+00	NA	4.80E-02	4.80E-02												
4,4'-DDT	1.0E-04	1.7E+00	NA	2.70E-02	2.70E-02												
Dieldrin	2.5E-05	3.2E+01	NA	5.70E-02	5.70E-02												
Endosulfan I	6.0E-03	NA	NA	2.00E-03	2.00E-03												
Metals																	
Cadmium	5.0E-05	NA	0.01	3.40E-01	3.40E-01	2.82E-07		6E-03		1.93E-07		4E-03		2.51E-09		5E-05	
Copper	2.4E-02	NA	NA	2.62E+01	2.62E+01												
Lead	NA	NA	NA	3.95E+01	3.95E+01												
Potassium	NA	NA	NA	1.88E+03	1.88E+03												
Selenium	4.5E-03	NA	NA	1.20E+00	1.20E+00												
Zinc	7.5E-02	NA	NA	1.45E+02	1.45E+02												
Total Hazard Quotient and Cancer Risk:								**6E-03**				**4E-03**				**5E-05**	

Assumptions for Prison Inmate		Assumptions for Prison Worker		Assumptions for Construction Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only	CS =	EPC Surface and Subsurface
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	5800 cm2	SA =	5800 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	365 days/year	EF =	250 days/year	EF =	3.25 days/year
ED =	24 years	ED =	25 years	ED =	1 years
BW =	70 kg	BW =	70 kg	BW =	70 kg
AT (Nc)	8760 days	AT (Nc) =	9125 days	AT (Nc) =	365 days
AT (Car)	25550 days	AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.

TABLE I-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Child Absorbed Dose (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Adult Absorbed Dose (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics													
Acetone	1.0E-01	NA	NA	4.70E-02	4.70E-02								
Butanone, 2-	6.0E-01	NA	NA	1.00E-02	1.00E-02								
Semivolatile Organics													
Anthracene	3.0E-01	NA	NA	3.50E-02	3.50E-02								
Benzo(a)anthracene	NA	7.3E-01	NA	1.30E-01	1.30E-01								
Benzo(a)pyrene	NA	1.5E+01	NA	9.80E-02	9.80E-02								
Benzo(b)fluoranthene	NA	7.3E-01	NA	9.90E-02	9.90E-02								
Benzo(g,h,i)perylene	NA	NA	NA	5.60E-02	5.60E-02								
Benzo(k)fluoranthene	NA	7.3E-02	NA	1.10E-01	1.10E-01								
Chrysene	NA	7.3E-03	NA	1.50E-01	1.50E-01								
Dibenz(a,h)anthracene	NA	7.3E+00	NA	2.80E-02	2.80E-02								
Fluoranthene	4.0E-02	NA	NA	3.50E-01	3.50E-01								
Indeno(1,2,3-cd)pyrene	NA	7.3E-01	NA	6.40E-02	6.40E-02								
Phenanthrene	NA	NA	NA	3.30E-01	3.30E-01								
Pyrene	3.0E-02	NA	NA	3.80E-01	3.80E-01								
bis(2-Ethylhexyl)phthalate	1.0E-02	2.8E-02	NA	4.20E-02	4.20E-02								
Pesticides/PCBs													
4,4'-DDD	NA	1.2E+00	NA	2.80E-02	2.80E-02								
4,4'-DDE	NA	1.7E+00	NA	4.80E-02	4.80E-02								
4,4'-DDT	1.0E-04	1.7E+00	NA	2.70E-02	2.70E-02								
Dieldrin	2.5E-05	3.2E+01	NA	5.70E-02	5.70E-02								
Endosulfan I	6.0E-03	NA	NA	2.00E-03	2.00E-03								
Metals													
Cadmium	5.0E-05	NA	0.01	3.40E-01	3.40E-01	3.40E-07		7E-03		1.93E-07		4E-03	
Copper	2.4E-02	NA	NA	2.62E+01	2.62E+01								
Lead	NA	NA	NA	3.95E+01	3.95E+01								
Potassium	NA	NA	NA	1.88E+03	1.88E+03								
Selenium	4.5E-03	NA	NA	1.20E+00	1.20E+00								
Zinc	7.5E-02	NA	NA	1.45E+02	1.45E+02								
Total Hazard Quotient and Cancer Risk:								**7E-03**				**4E-03**	

Assumptions for Day Care Center Child			Assumptions for Day Care Center Adult		
CS =	EPC Surface Only		CS =	EPC Surface Only	
CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg
SA =	2190	cm2	SA =	5800	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	250	days/year	EF =	250	days/year
ED =	6	years	ED =	25	years
BW =	15	kg	BW =	70	kg
AT (Nc) =	2190	days	AT (Nc) =	9125	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.

TABLE I-12

CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. oral RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE I-13
CALCULATION OF AIR CONCENTRATION IN SHOWER
FROM VOLATILIZATION OF GROUNDWATER (daily)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Analyte	EPC Air All-Site Wells (mg/m^3)	Time of Shower -Ts (min)	Flow Rate of Shower - Fw (L/min)	EPC - RME Groundwater (mg/l)	Flow Rate of Air in Shower-Fa (m^3/min)	Volume of Bathroom-Vb (m^3)	Henry Laws Constant-H (m^3-atm/mol)	Asymptotic Air Conc.-Cinf (mg/m^3)	Rate Constant-K (1/min)	Efficiency of Release-E (unitless)	Efficiency of Release for TCE E-TCE	Henry Laws Constant-TCE (m^3-atm/mol)	Fraction Emitted* (percent)	Cderm** (Water) (mg/l)
Metals														
Magnesium	0.00E+00	15	19	3.29E+01	2.4	12	NA	0.00E+00	0.20	0.00	0.6	0.0091	0.00%	3.29E+01

Concentration in Air (mg/m^3) = Cinf[1+(1/(kTs)(exp(-kTs)-1)]

Asymptotic Air Conc. - Cinf (mg/m^3) = [(E)(Fw)(Ct)]/Fa

Rate Constant - k (L/min) = Fa/Vb

Efficiency of Release - E (unitless) = (E-tce)(H)/(H-tce)

* Fraction Emitted (fe) = (EPCair x Fa) / (EPCgw x Fw)

** Cderm = EPCgw x (1 - fe)

Variables:

CA = Chemical Concentration in Air (mg/m^3)
Ts = Time of Shower (minutes)
Fw = Flow Rate of Shower (L/min)
Fa = Flow Rate of Air in Shower (m^3/min)
Vb = Volume of Bathroom (m^3)

Assumptions:

EPC - Groundwater Data - RME
15 (RME default)
19 (Estimated RME)
2.4 (Average Air Flow)
12 (Average Bathroom Volume)

TABLE I-14
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-44B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. dermal RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE I-15
ECOLOGICAL RISK ASSESSMENT
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One ecological risk assessment was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Tables G-16 through G-19 for the results.

APPENDIX J
SEAD-52: Ammunition Breakdown Area

Table J-1:	Soil Analysis Results
Table J-2:	Inorganics Statistical Analysis - Soil
Table J-3:	Exposure Point Concentrations for Chemicals of Potential Concern
Table J-4:	Ambient Air Exposure Point Concentrations
Table J-5:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table J-6:	Calculation of Intake and Risk from the Ingestion of Soil
Table J-7:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table J-8:	Ecological Risk Assessment

TABLE J-1
SOIL ANALYSIS RESULTS - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
								SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
								0	0	0	0	0	0	0
								0.2	0.2	0.2	0.2	0.2	0.2	0.2
								12/16/93	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
								SS52-1	SS52-19	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
								207145	207163	207146	207147	207148	207149	207150
								41316	41316	41316	41316	41316	41316	41316
								SS52-1	SS52-1	SS52-2	SS52-3	SS52-4	SS52-5	SS52-6
			FREQUENCY OF		NUMBER ABOVE	NUMBER OF	NUMBER OF	SA	DU	SA	SA	SA	SA	SA
									DUP OF SS52-1					
COMPOUND	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
NITROAROMATICS														
HMX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
RDX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3,5-Trinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3-Dinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
Tetryl	ug/Kg	150	5%		0	1	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4,6-Trinitrotoluene	ug/Kg	410	11%		0	2	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
4-amino-2,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2-amino-4,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,6-Dinitrotoluene	ug/Kg	0	0%	1000	0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4-Dinitrotoluene	ug/Kg	2100	53%		0	10	19	110 J	120 J	130 UJ	130 UJ	130 UJ	130 UJ	280 J

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

TABLE J-1
SOIL ANALYSIS RESULTS - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
								SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
								0	0	0	0	0	0	0
								0.2	0.2	0.2	0.2	0.2	0.2	0.2
								12/16/93	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
								SS52-7	SS52-8	SS52-9	SS52-10	SS52-11	SS52-12	SS52-13
								207151	207152	207153	207154	207155	207156	207157
								41316	41316	41316	41316	41316	41316	41316
								SS52-7	SS52-8	SS52-9	SS52-10	SS52-11	SS52-12	SS52-13
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SA Value (Q)	SA Value (Q)	SA Value (Q)	SA Value (Q)	SA Value (Q)	SA Value (Q)	SA Value (Q)
NITROAROMATICS														
HMX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
RDX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3,5-Trinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3-Dinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
Tetryl	ug/Kg	150	5%		0	1	19	130 UJ	130 UJ	130 UJ	130 UJ	150 J	130 UJ	130 UJ
2,4,6-Trinitrotoluene	ug/Kg	410	11%		0	2	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
4-amino-2,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2-amino-4,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,6-Dinitrotoluene	ug/Kg	0	0%	1000	0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4-Dinitrotoluene	ug/Kg	2100	53%		0	10	19	130 UJ	130 UJ	490 J	99 J	130 UJ	91 J	200 J

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process

TABLE J-1
SOIL ANALYSIS RESULTS - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SOIL	SOIL	SOIL	SOIL	SOIL
								SEAD-52	SEAD-52	SEAD-52	SEAD-52	SEAD-52
								0	0	0	0	0
								0.2	0.2	0.2	0.2	0.2
								12/16/93	12/16/93	12/16/93	12/16/93	12/16/93
								SS52-14	SS52-15	SS52-16	SS52-17	SS52-18
								207158	207159	207160	207161	207162
								41316	41316	41316	41316	41316
								SS52-14	SS52-15	SS52-16	SS52-17	SS52-18
			FREQUENCY OF		NUMBER ABOVE	NUMBER OF	NUMBER OF	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
NITROAROMATICS												
HMX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
RDX	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3,5-Trinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
1,3-Dinitrobenzene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
Tetryl	ug/Kg	150	5%		0	1	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4,6-Trinitrotoluene	ug/Kg	410	11%		0	2	19	160 J	130 UJ	130 UJ	410 J	130 UJ
4-amino-2,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2-amino-4,6-Dinitrotoluene	ug/Kg	0	0%		0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,6-Dinitrotoluene	ug/Kg	0	0%	1000	0	0	19	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ
2,4-Dinitrotoluene	ug/Kg	2100	53%		0	10	19	1500 J	130 UJ	130 UJ	1800 J	2100 J

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.
b) NA = Not Available.
c) U = The compound was not detected below this concentration
d) J = The reported value is an estimated concentration
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process

TABLE J-2
INORGANICS ANALYSIS - SOIL
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B.
See Appendix G, Table G-5 for the results.

TABLE J-3

EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-52

Decision Document- Mini Risk Assessment

Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg
Nitroaromatics		
Tetryl	1.50E-01	1.50E-01
2,4,6-Trinitrotoluene	4.10E-01	4.10E-01
2,4-Dinitrotoluene	2.10E+00	2.10E+00

TABLE J-4
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 340 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Nitroaromatics				
Tetryl	1.50E-01	1.50E-01	2.55E-09	5.10E-08
2,4,6-Trinitrotoluene	4.10E-01	4.10E-01	6.97E-09	1.39E-07
2,4-Dinitrotoluene	2.10E+00	2.10E+00	3.57E-08	7.14E-07

ND = Compound was not detected above the detection limit shown

TABLE J-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-52

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

E.4-6

CALCULATION OF INTAKE [illegible]SK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Nitroaromatics																
2,4-Dinitrotoluene	2.0E-03	6.8E-01	2.10E+00	2.10E+00	3.00E-06	1.03E-06	2E-03	7E-07	2.05E-06	7.34E-07	1E-03	5E-07	4.93E-07	7.05E-09	2E-04	5E-09
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	4.10E-01	4.10E-01	5.86E-07	2.01E-07	1E-03	6E-09	4.01E-07	1.43E-07	8E-04	4E-09	9.63E-08	1.38E-09	2E-04	4E-11
Tetryl	1.0E-02	NA	1.50E-01	1.50E-01	2.14E-07		2E-05		1.47E-07		1E-05		3.52E-08		4E-06	
Total Hazard Quotient and Cancer Risk:							**3E-03**	**7E-07**			**2E-03**	**5E-07**			**4E-04**	**5E-09**

Assumptions for Prison Inmate

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Assumptions for Construction Worker

CS =	EPC Totals	
IR =	480	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	12.5	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total soils include surface and subsurface soils
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE J-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Nitroaromatics												
2,4-Dinitrotoluene	2.0E-03	6.8E-01	2.10E+00	2.10E+00	1.92E-05	1.64E-06	1E-02	1E-06	2.05E-06	7.34E-07	1E-03	5E-07
2,4,6-Trinitrotoluene	5.0E-04	3.0E-02	4.10E-01	4.10E-01	1.74E-06	3.21E-07	7E-03	1E-08	4.01E-07	1.43E-07	8E-04	4E-09
Tetryl	1.0E-02	NA	1.50E-01	1.50E-01	1.37E-06		1E-04		1.47E-07		1E-05	
Total Hazard Quotient and Cancer Risk:							**2E-02**	**1E-06**			**2E-03**	**5E-07**

Assumptions for Day Care Center Child

CS =	EPC Surface Only	
IR =	200	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total soils include surface and subsurface soils.
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE J-7
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-52
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. dermal absorption factors for the analytes detected) risks from this pathway were not quantified.

TABLE J-8
ECOLOGICAL RISK ASSESSMENT
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One ecological risk assessment was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Tables G-16 through G-19 for the results.

APPENDIX K

SEAD-58: Debris Area near Booster Station 2131

Table K-1: Soil Analysis Results
Table K-2: Groundwater Analysis Results
Table K-3: Surface Water Analysis Results
Table K-4: Sediment Analysis Results
Table K-5: Inorganics Analysis of Soil
Table K-6: Inorganics Analysis of Groundwater
Table K-7: Exposure Point Concentrations for Chemicals of Potential Concern
Table K-8: Ambient Air Exposure Point Concentrations
Table K-9: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table K-10: Calculation of Intake and Risk from the Ingestion of Soil
Table K-11: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table K-12: Calculation of Absorbed Dose and Risk from Dermal Contact to Surface Water
Table K-13: Calculation of Absorbed Dose and Risk from Dermal Contact to Sediment
Table K-14: Calculated Soil Receptor Exposure
Table K-15: Calculation of Soil Hazard Quotients – Mammals
Table K-16: Calculation of Soil Hazard Quotients – Bird

TABLE K-1
SOIL ANALYSIS RESULTS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES							
SEAD								SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58
LOCATION ID								SB58-1	SB58-1	SB58-1	SB58-2	SB58-2	SB58-2	SB58-3
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB58-1-1	SB58-1-2	SB58-1-3	SB58-2-1	SB58-2-2	SB58-2-3	SB58-3-1
SAMP_DEPTH_TOP								0	2	4	0	2	4	0
SAMP_DEPTH_BOT								0.2	4	5	0.2	4	6	0.2
SAMP_DATE								06/09/94	06/09/94	06/09/94	06/09/94	06/09/94	06/09/94	06/09/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANIC COMPOUNDS														
Methylene chloride	ug/Kg	64	17%	100	0	3	18	11 U	11 U	11 U	11 U	11 U	11 U	UJ
SEMIVOLATILE ORGANICS														
Bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000	0	13	18	24 J	79 J	49 J	260 J	52 J	110 J	25 J
Chrysene	ug/Kg	18	6%	400	0	1	18	380 U	360 U	340 U	18 J	350 U	350 U	410 U
Di-n-octylphthalate	ug/Kg	81	6%	50000	0	1	18	380 U	360 U	340 U	380 U	350 U	350 U	410 U
Fluoranthene	ug/Kg	26	11%	50000	0	2	18	380 U	360 U	340 U	26 J	350 U	350 U	410 U
Pyrene	ug/Kg	22	11%	50000	0	2	18	380 U	360 U	340 U	22 J	350 U	350 U	410 U
PESTICIDES/PCBs														
Endosulfan I	ug/Kg	1.3	6%	900	0	1	18	2 U	1.8 U	1.8 U	2 U	1.8 U	1.8 U	1.3 J
METALS														
Aluminum	mg/Kg	19100	100%	19300	0	18	18	17000 J	11400 J	10500 J	9990 J	10400 J	11700 J	13800 J
Antimony	mg/Kg	0.36	11%	5.9	0	2	18	0.25 UJ	0.24 UJ	0.26 J	0.36 J	0.22 UJ	0.24 UJ	0.22 UJ
Arsenic	mg/Kg	9	100%	8.2	1	18	18	7	5	4.6	4.5	4.7	4.5	4.6
Barium	mg/Kg	111	100%	300	0	18	18	101 J	76.8 J	71.7 J	63.2 J	72 J	77.6 J	88.3 J
Beryllium	mg/Kg	0.85	100%	1.1	0	18	18	0.76 J	0.52 J	0.52 J	0.45 J	0.42 J	0.51 J	0.57 J
Cadmium	mg/Kg	0.92	100%	2.3	0	18	18	0.69 J	0.61 J	0.6 J	0.53 J	0.5 J	0.48 J	0.32 J
Calcium	mg/Kg	106000	100%	121000	0	18	18	31300 J	64600 J	81500 J	55000 J	67100 J	91100 J	3250 J
Chromium	mg/Kg	28.6	100%	29.6	0	18	18	25.6 J	18.9 J	17.3 J	15.7 J	17.4 J	19.5 J	19.6 J
Cobalt	mg/Kg	15.8	100%	30	0	18	18	15.8 J	10.2 J	12 J	8.9 J	11.4 J	12.2 J	6.7 J
Copper	mg/Kg	33.4	100%	33	1	18	18	25.7 J	29.4 J	28.4 J	21.2 J	25.8 J	20.4 J	15.1 J
Iron	mg/Kg	32300	100%	36500	0	18	18	30900 J	23900 J	21800 J	19700 J	21900 J	24800 J	23000 J
Lead	mg/Kg	22.5	67%	24.8	0	12	18	17.3	11	8.7	14.9	10.7	6	16.3
Magnesium	mg/Kg	34100	100%	21500	1	18	18	9920 J	11800 J	12300 J	9510 J	15600 J	11900 J	3770 J
Manganese	mg/Kg	959	100%	1060	0	18	18	679 J	437 J	576 J	415 J	414 J	714 J	241 J
Mercury	mg/Kg	0.07	83%	0.1	0	15	18	0.05 JR	0.03 J	0.03 J	0.03 J	0.03 J	0.02 J	0.07 JR
Nickel	mg/Kg	44.8	100%	49	0	18	18	39.7 J	33 J	32.2 J	26.5 J	32.6 J	31 J	21.6 J
Potassium	mg/Kg	3230	100%	2380	3	18	18	$\boxed{2640}$	2150	2040	1510	2030	1610	1500
Selenium	mg/Kg	1	22%	2	0	4	18	0.84 J	0.49 U	0.35 U	0.57 J	0.45 U	0.5 U	1
Sodium	mg/Kg	189	94%	172	1	17	18	53.4 J	110 J	117 J	82.9 J	113 J	172 J	16.8 U
Vanadium	mg/Kg	29.5	100%	150	0	18	18	29.5 J	19 J	17.1 J	17.2 J	17.6 J	16.8 J	25.4 J
Zinc	mg/Kg	117	100%	110	1	18	18	100 J	89.3 J	87.8 J	81.9 J	81.8 J	51.9 J	63.8 J

NOTES:

a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
g) R = The data was rejected during the data validation process.

TABLE K-1
SOIL ANALYSIS RESULTS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES							
SEAD								SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58
LOCATION ID								SB58-3	SB58-3	SS58-1	SS58-2	SS58-3	TP58-1	TP58-2
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB58-3-2	SB58-3-3	SS58-1-1	SS58-2-1	SS58-3-1	TP58-1-1	TP58-2-1
SAMP_DEPTH_TOP								0.2	1.5	0	0	0	2.5	5
SAMP_DEPTH_BOT								1.5	3	0.2	0.2	0.2	2.5	5
SAMP_DATE								06/09/94	06/09/94	04/13/94	04/13/94	04/13/94	06/10/94	06/11/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANIC COMPOUNDS														
Methylene chloride	ug/Kg	64	17%	100	0	3	18	64	3 J	12 U	13 U	14 U	2 J	12 U
SEMIVOLATILE ORGANICS														
Bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000	0	13	18	170 J	30 J	28 J	25 J	23 J	25 J	360 U
Chrysene	ug/Kg	18	6%	400	0	1	18	380 U	360 U	400 U	430 U	440 U	380 U	360 U
Di-n-octylphthalate	ug/Kg	81	6%	50000	0	1	18	380 U	81 J	400 U	430 U	440 U	380 U	360 U
Fluoranthene	ug/Kg	26	11%	50000	0	2	18	380 U	360 U	400 U	430 U	21 J	380 U	360 U
Pyrene	ug/Kg	22	11%	50000	0	2	18	380 U	360 U	400 U	430 U	22 J	380 U	360 U
PESTICIDES/PCBs														
Endosulfan I	ug/Kg	1.3	6%	900	0	1	18	2 U	1.8 U	2 U	2.2 U	2.3 U	2 U	UJ
METALS														
Aluminum	mg/Kg	19100	100%	19300	0	18	18	19100	14100	12600	14300	8350	9280	8220
Antimony	mg/Kg	0.36	11%	5.9	0	2	18	0.29 UJ	0.19 UJ	0.16 UJ	0.15 UJ	0.14 UJ	0.17 UJ	0.27 UJ
Arsenic	mg/Kg	9	100%	8.2	1	18	18	3.7	4.9	6.6	5	3.8	9	3.6
Barium	mg/Kg	111	100%	300	0	18	18	76.2	62.8	111	73.7	51.1	47	79.7
Beryllium	mg/Kg	0.85	100%	1.1	0	18	18	0.85 J	0.6 J	0.65 J	0.66 J	0.4 J	0.49 J	0.38 J
Cadmium	mg/Kg	0.92	100%	2.3	0	18	18	0.92 J	0.76	0.59 J	0.42 J	0.32 J	0.5 J	0.38 J
Calcium	mg/Kg	106000	100%	121000	0	18	18	94700	55400	66000	63400	79900	106000	69900
Chromium	mg/Kg	28.6	100%	29.6	0	18	18	28.6	20.8	19.3	21.7	12.8	16.2 J	13.1 J
Cobalt	mg/Kg	15.8	100%	30	0	18	18	15	11.9	13.6	12.3	8.5	9.2	8.2 J
Copper	mg/Kg	33.4	100%	33	1	18	18	20.7	27.6	28.3	22.8	19	24	**33.4**
Iron	mg/Kg	32300	100%	36500	0	18	18	32300	23400	26100	26800	16400	21900	19600
Lead	mg/Kg	22.5	67%	24.8	0	12	18	4.1	11.2	22.5	13	11.1	11.2 R	7.8 R
Magnesium	mg/Kg	34100	100%	21500	1	18	18	9580	11800	13700	10800	19800	**34100**	20900
Manganese	mg/Kg	959	100%	1060	0	18	18	872	620	741 J	577 J	315 J	487	959
Mercury	mg/Kg	0.07	83%	0.1	0	15	18	0.04 J	0.03 J	0.01 J	0.01 J	0.02 J	0.07 J	0.01 U
Nickel	mg/Kg	44.8	100%	49	0	18	18	44.8	33.5	38.8	35.3	21.8	25.4	33
Potassium	mg/Kg	3230	100%	2380	3	18	18	**3220** J	**3230** J	1440	1630	1450	1370 J	1420 J
Selenium	mg/Kg	1	22%	2	0	4	18	0.6 U	0.39 U	0.27 U	0.28 J	0.23 U	0.36 U	0.55 U
Sodium	mg/Kg	189	94%	172	1	17	18	**189** J	96.5 J	79.9 J	95.1 J	80.1 J	97.6 J	94.6 J
Vanadium	mg/Kg	29.5	100%	150	0	18	18	26.1	24.3	21.5	21.2	15.1	19.5	15.8
Zinc	mg/Kg	117	100%	110	1	18	18	76.3	72.2	**117**	82.1	58.9	82.7	104

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with th
g) R = The data was rejected during the data validation process.

TABLE K-1

SOIL ANALYSIS RESULTS - SEAD-58

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

							SEAD	SEAD-58	SEAD-58	SEAD-58	SEAD-58
							LOCATION ID	TP58-3	TP58-4	TP58-5	TP58-6
							MATRIX	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER	TP58-3-1	TP58-4-1	TP58-5-1	TP58-6-1
							SAMP_DEPTH_TOP	2	3	5	2
							SAMP_DEPTH_BOT	2	3	5	2
							SAMP_DATE	06/11/94	06/11/94	06/11/94	06/11/94
							SAMPLE TYPE	SA	SA	SA	SA
COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANIC COMPOUNDS											
Methylene chloride	ug/Kg	64	17%	100	0	3	18	11 U	11 U	11 U	12 U
SEMIVOLATILE ORGANICS											
Bis(2-Ethylhexyl)phthalate	ug/Kg	260	72%	50000	0	13	18	370 U	380 U	370 U	380 U
Chrysene	ug/Kg	18	6%	400	0	1	18	370 U	380 U	370 U	380 U
Di-n-octylphthalate	ug/Kg	81	6%	50000	0	1	18	370 U	380 U	370 U	380 U
Fluoranthene	ug/Kg	26	11%	50000	0	2	18	370 U	380 U	370 U	380 U
Pyrene	ug/Kg	22	11%	50000	0	2	18	370 U	380 U	370 U	380 U
PESTICIDES/PCBs											
Endosulfan I	ug/Kg	1.3	6%	900	0	1	18	1.9 U	2 U	1.9 U	2 U
METALS											
Aluminum	mg/Kg	19100	100%	19300	0	18	18	9980	10100	8980	14100
Antimony	mg/Kg	0.36	11%	5.9	0	2	18	0.26 UJ	0.16 UJ	0.15 UJ	0.17 UJ
Arsenic	mg/Kg	9	100%	8.2	1	18	18	4.3	3.4	4	4.4
Barium	mg/Kg	111	100%	300	0	18	18	63.1	40.8	49.8	76.3
Beryllium	mg/Kg	0.85	100%	1.1	0	18	18	0.46 J	0.47 J	0.43 J	0.66 J
Cadmium	mg/Kg	0.92	100%	2.3	0	18	18	0.37 J	0.39 J	0.42 J	0.54 J
Calcium	mg/Kg	106000	100%	121000	0	18	18	72200	91700	101000	45500
Chromium	mg/Kg	28.6	100%	29.6	0	18	18	16.3 J	16.3 J	14.5 J	22.5 J
Cobalt	mg/Kg	15.8	100%	30	0	18	18	10.9	8.8	9.7	9.6
Copper	mg/Kg	33.4	100%	33	1	18	18	25.4	18	20.8	23.7
Iron	mg/Kg	32300	100%	36500	0	18	18	21000	20400	18700	27900
Lead	mg/Kg	22.5	67%	24.8	0	12	18	8.9 R	5.5 R	6.8 R	9.5 R
Magnesium	mg/Kg	34100	100%	21500	1	18	18	12900	7740	12900	9680
Manganese	mg/Kg	959	100%	1060	0	18	18	498	451	588	436
Mercury	mg/Kg	0.07	83%	0.1	0	15	18	0.02 J	0.01 J	0.01 J	0.02 J
Nickel	mg/Kg	44.8	100%	49	0	18	18	31.2	25.7	26.6	35.1
Potassium	mg/Kg	3230	100%	2380	3	18	18	1900 J	1480 J	1500 J	1810 J
Selenium	mg/Kg	1	22%	2	0	4	18	0.54 U	0.34 U	0.32 U	0.36 U
Sodium	mg/Kg	189	94%	172	1	17	18	118 J	108 J	115 J	73.2 J
Vanadium	mg/Kg	29.5	100%	150	0	18	18	16.7	15.3	14.5	22.9
Zinc	mg/Kg	117	100%	110	1	18	18	74.9	62.4	64.8	110

NOTES:

a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)

b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm

c) NA = Not Available

d) U = The compound was not detected at this concentration.

e) J = The reported value is an estimated concentration

f) UJ = The compound may have been present above this concentration, but was not detected due to problems with th

g) R = The data was rejected during the data validation process

TABLE K-2
GROUND WATER ANALYSIS RESULTS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

						SEAD		SEAD-58	SEAD-58	SEAD-58	SEAD-58
						LOCATION ID		MW58-1	MW58-2	MW58-3	MW58-4
						MATRIX		GRND WTR	GRND WTR	GRND WTR	GRND WTR
						SAMPLE NUMBER		MW58-1-1	MW58-2-1	MW58-3-1	MW58-4-1
						SAMP_DEPTH_TOP		0	0	0	0
						SAMP_DEPTH_BOT		0	0	0	0
						SAMP_DATE		07/11/94	07/11/94	07/12/94	07/11/94
						SAMPLE TYPE		SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)
METALS											
Aluminum	ug/L	7160	100%	50 (a)	4	4	4	440	262	7160 J	2650
Arsenic	ug/L	2.1	25%	3 (b)	0	1	4	2 U	2 U	2 U	2.1 J
Barium	ug/L	235	100%	1000 (b)	0	4	4	71.9 J	208	235	111 J
Beryllium	ug/L	0.41	50%	4 (c)	0	2	4	0.1 U	0.1 U	0.41 J	0.2 J
Calcium	ug/L	171000	100%	NA	0	4	4	113000	104000	171000	162000
Chromium	ug/L	12.3	100%	50 (b)	0	4	4	0.82 J	0.85 J	12.3	4 J
Cobalt	ug/L	9.2	75%	NA	0	3	4	0.64 J	0.5 U	9.2 J	2.9 J
Copper	ug/L	9	100%	200 (b)	0	4	4	1.5 J	1.9 J	9 J	4.3 J
Iron	ug/L	14500	100%	300 (b)	4	4	4	678	560	14500	5310
Lead	ug/L	4.4	75%	25 (b)	0	3	4	0.89 U	4.4	3	1.2 J
Magnesium	ug/L	29800	100%	NA	0	4	4	17300	21400	29800	22000
Manganese	ug/L	677	100%	50 (a)	4	4	4	84	86.2	677	406
Mercury	ug/L	0.04	25%	0.7 (b)	0	1	4	0.04 U	0.04 U	0.04 J	0.04 U
Nickel	ug/L	20.5	100%	100 (b)	0	4	4	1.6 J	2.2 J	20.5 J	8.1 J
Potassium	ug/L	6150	100%	NA	0	4	4	1460 J	2980 J	6150 J	2080 J
Sodium	ug/L	7180	100%	20000 (b)	0	4	4	4180 J	5550	7180	4610 J
Vanadium	ug/L	10.8	100%	NA	0	4	4	0.81 J	0.77 J	10.8 J	4.1 J
Zinc	ug/L	37.2	100%	5000 (a)	0	4	4	7.1 J	18.8 J	37.2	14.6 J

NOTES:
a) Secondary Drinking Water Regulations
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE K-3
SURFACE WATER ANALYSIS RESULTS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58
LOCATION								SW58-1	SW58-2	SW58-3	SW58-4	SW58-5	SW58-6
MATRIX								SUR WTR	SUR WTR	SUR WTR	SUR WTR	SUR WTR	SUR WTR
SAMPLE ID								SW58-1-1	SW58-2-1	SW58-3-1	SW58-4-1	SW58-5-1	SW58-6-1
SAMP DEPTH								0	0	0	0	0	0
LAB_ID								N/A	N/A	N/A	N/A	N/A	N/A
SAMP DATE								4/17	4/17	4/17	4/17	4/17	4/17
SAMP TYPE								SA	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a)(b)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
METALS													
Aluminum	ug/L	421	100.00%	100	5	6	6	73.5 J	102 J	135 J	421	127 J	138 J
Barium	ug/L	36.5	100.00%		0	6	6	35.2 J	35 J	36.5 J	28.1 J	26.5 J	25.6 J
Calcium	ug/L	82000	100.00%		0	6	6	82000	80800	74800	55600	53500	49800
Chromium	ug/L	0.75	66.67%	140	0	4	6	0.4 U	0.51 J	0.4 U	0.75 J	0.66 J	0.42 J
Copper	ug/L	3.8	100.00%	17.36	0	6	6	0.83 J	0.92 J	1.3 J	3.8 J	1.9 J	2.1 J
Iron	ug/L	598	100 00%	300	1	6	6	74.5 J	127	196	598	168	193
Lead	ug/L	1.1	16.67%	8 7	0	1	6	0.8 U	0.79 U	0.8 U	1.1 J	0.79 U	0.8 U
Magnesium	ug/L	11700	100.00%		0	6	6	11700	11500	11100	8500	8260	7640
Manganese	ug/L	74.4	100.00%		0	6	6	1.8 J	2.5 J	52.8	74.4	7.3 J	5.2 J
Mercury	ug/L	0.06	66 67%	0.77	0	4	6	0.04 J	0.04 J	0.05 J	0.06 J	0.03 U	0.03 U
Nickel	ug/L	2.6	66.67%	100 16	0	4	6	1 1 J	0 59 U	0 6 U	2.6 J	1 5 J	1.8 J
Potassium	ug/L	2610	100.00%		0	6	6	1380 J	1440 J	1520 J	2090 J	2610 J	2500 J
Sodium	ug/L	13400	100.00%		0	6	6	4970 J	4880 J	13400	3070 J	1900 J	1750 J
Thallium	ug/L	2.7	33.33%	0.08	2	2	6	1.6 U	1.6 U	1.9 J	2.7 J	1.6 U	1.6 U
Vanadium	ug/L	0.9	16.67%	14	0	1	6	0.7 U	0.69 U	0.7 U	0.9 J	0.69 U	0.7 U
Zinc	ug/L	10.6	100.00%	159.6	0	6	6	3 J	2.5 J	2.2 J	10.6 J	4.8 J	6.3 J

NOTES:
a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.

TABLE K-4
SEDIMENT ANALYSIS RESULTS - SEAD-58
Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC LEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES						
SEAD								SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58	SEAD-58
LOCATION ID								SD58-1	SD58-2	SD58-3	SD58-4	SD58-5	SD58-6
MATRIX								SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
SAMPLE NUMBER								SD58-1-1	SD58-2-1	SD58-3-1	SD58-4-1	SD58-5-1	SD58-6-1
SAMP_DEPTH_TOP								0	0	0	0	0	0
SAMP_DEPTH_BOT								0.2	0.2	0.2	0.2	0.2	0.2
SAMP_DATE								04/17/94	04/17/94	04/17/94	04/17/94	04/17/94	04/17/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEMIVOLATILE ORGANICS													
4-Methylphenol	ug/Kg	120	17%	NA	0	1	6	590 U	770 U	120 J	670 U	610 U	650 U
Anthracene	ug/Kg	30	17%	NA	0	1	6	30 J	770 U	630 U	670 U	610 U	650 U
Benzo(a)anthracene	ug/Kg	92	50%	NA	0	3	6	92 J	770 U	630 U	670 U	64 J	72 J
Benzo(a)pyrene	ug/Kg	110	67%	NA	0	4	6	110 J	71 J	95 J	62 J	610 U	650 U
Benzo(b)fluoranthene	ug/Kg	130	67%	NA	0	4	6	110 J	92 J	130 J	69 J	610 U	650 U
Benzo(ghi)perylene	ug/Kg	110	50%	NA	0	3	6	110 J	770 U	630 U	670 U	80 J	86 J
Benzo(k)fluoranthene	ug/Kg	100	67%	NA	0	4	6	100 J	55 J	70 J	58 J	610 U	650 U
Bis(2-Ethylhexyl)phthalate	ug/Kg	100	67%	NA	0	4	6	590 U	770 U	38 J	61 J	52 J	100 J
Chrysene	ug/Kg	110	67%	NA	0	4	6	110 J	76 J	96 J	68 J	610 U	650 U
Di-n-butylphthalate	ug/Kg	130	50%	NA	0	3	6	130 J	120 J	80 J	670 U	610 U	650 U
Dibenz(a,h)anthracene	ug/Kg	63	33%	NA	0	2	6	590 U	770 U	630 U	670 U	53 J	63 J
Fluoranthene	ug/Kg	180	100%	NA	0	6	6	180 J	100 J	130 J	100 J	110 J	130 J
Indeno(1,2,3-cd)pyrene	ug/Kg	110	67%	NA	0	4	6	110 J	770 U	87 J	670 U	76 J	84 J
Phenanthrene	ug/Kg	120	100%	NA	0	6	6	120 J	63 J	71 J	80 J	66 J	72 J
Phenol	ug/Kg	36	17%	NA	0	1	6	590 U	770 U	36 J	670 U	610 U	650 U
Pyrene	ug/Kg	210	100%	NA	0	6	6	210 J	92 J	160 J	100 J	74 J	85 J
METALS													
Aluminum	mg/Kg	20100	100%	NA	0	6	6	18200	17800	14900	20100	16000	18200
Antimony	mg/Kg	0.37	50%	2	0	3	6	0.31 J	0.36 UJ	0.22 UJ	0.35 UJ	0.36 J	0.37 J
Arsenic	mg/Kg	5.9	100%	6	0	6	6	5.5	5.7	4.9	5.9	5.6	5.7
Barium	mg/Kg	142	100%	NA	0	6	6	139	142	86.9	130	114	130
Beryllium	mg/Kg	0.98	100%	NA	0	6	6	0.83 J	0.9 J	0.71 J	0.98 J	0.81 J	0.86 J
Cadmium	mg/Kg	0.7	100%	0.6	1	6	6	0.42 J	0.58 J	0.5 J	0.7 J	0.52 J	0.53 J
Calcium	mg/Kg	70500	100%	NA	0	6	6	10900	15600	70500	6970	7960	8300
Chromium	mg/Kg	28.2	100%	26	1	6	6	24.8	25.2	23.7	28.2	23.2	25.3
Cobalt	mg/Kg	11.6	100%	NA	0	6	6	9 J	10.1 J	11.6	10.5 J	8.9 J	8.8 J
Copper	mg/Kg	37	100%	16	6	6	6	24	24.7	23.1	37	30.6	24.8
Iron	mg/Kg	29300	100%	20000	6	6	6	26100	28900	27600	29300	25700	26300
Lead	mg/Kg	28.8	100%	31	0	6	6	20.9	23.5	20	28.8	27.8	25.6
Magnesium	mg/Kg	12100	100%	NA	0	6	6	6030	6040	12100	5520	4730	4980
Manganese	mg/Kg	735	100%	460	3	6	6	564	632	735	447	382	373
Mercury	mg/Kg	0.12	100%	0.15	0	6	6	0.1 J	0.06 J	0.05 J	0.11 J	0.12 J	0.11 J
Nickel	mg/Kg	33.5	100%	16	6	6	6	29.3	29.9	32.2	33.5	29.9	28.9
Potassium	mg/Kg	3170	100%	NA	0	6	6	2400	2430	2340	3170	2400	2940
Selenium	mg/Kg	0.89	83%	NA	0	5	6	0.79 J	0.89 J	0.37 U	0.7 J	0.68 J	0.66 J
Sodium	mg/Kg	134	17%	NA	0	1	6	44.6 U	57.3 U	134 J	55.9 U	47.5 U	55.7 U
Thallium	mg/Kg	0.55	33%	NA	0	2	6	0.55 J	0.58 U	0.35 U	0.56 U	0.51 J	0.56 U
Vanadium	mg/Kg	33.7	100%	NA	0	6	6	27.9	29.6	24.5	33.7	27.2	29.8
Zinc	mg/Kg	131	100%	120	1	6	6	106	131	86.6	119	119	109

NOTES:
a) NA = Not Available.
b) U = The compound was not detected below this concentration.
c) J = The reported value is an estimated concentration.
d) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
e) R = The data was rejected during the data validation process.

TABLE K-5
INORGANICS ANALYSIS OF SOIL - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-58 Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	11883.33	No
Antimony	3.56	7.12	0.31	No
Arsenic	5.08	10.15	4.87	No
Barium	78.43	156.86	71.23	No
Beryllium	0.67	1.33	0.54	No
Cadmium	0.97	1.94	0.52	No
Calcium	45449.65	90899.30	68863.89	No
Chromium	20.32	40.64	18.67	No
Cobalt	11.39	22.79	10.83	No
Copper	20.99	41.97	23.87	No
Iron	24704.74	49409.47	23361.11	No
Lead	16.47	32.95	12.23	No
Magnesium	10290.18	20580.35	13261.11	No
Manganese	576.14	1152.28	556.67	No
Mercury	0.04	0.09	0.03	No
Nickel	30.39	60.79	31.54	No
Potassium	1487.25	2974.49	1885.00	No
Selenium	0.63	1.26	0.67	No
Sodium	99.42	198.85	105.61	No
Vanadium	21.41	42.82	19.75	No
Zinc	67.80	135.60	81.21	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE K-6
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-58 Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	2628.00	No
Arsenic	5.63	11.25	2.10	No
Barium	81.20	162.40	156.48	No
Beryllium	0.90	1.79	0.31	No
Calcium	115619.35	231238.71	137500.00	No
Chromium	8.67	17.35	4.49	No
Cobalt	6.84	13.68	4.25	No
Copper	5.39	10.79	4.18	No
Iron	4476.26	8952.53	5262.00	No
Lead	6.59	13.18	2.87	No
Magnesium	28567.74	57135.48	22625.00	No
Manganese	231.41	462.82	313.30	No
Mercury	0.05	0.10	0.04	No
Nickel	10.57	21.14	8.10	No
Potassium	4065.59	8131.17	3167.50	No
Sodium	15020.67	30041.33	5380.00	No
Vanadium	8.23	16.47	4.12	No
Zinc	25.37	50.74	19.425	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE K-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-58
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Sediment mg/kg
Volatile Organics				
Methylene chloride	6.40E-02	6.40E-02		
Semivolatile Organics				
4-Methylphenol				1.20E-01
Anthracene				3.00E-02
Benzo(a)anthracene				9.20E-02
Benzo(a)pyrene				1.10E-01
Benzo(b)fluoranthene				1.30E-01
Benzo(g,h,i)perylene				1.10E-01
Benzo(k)fluoranthene				1.00E-01
bis(2-Ethylhexyl)phthalate	2.60E-01	2.60E-01		1.00E-01
Chrysene	1.80E-02	1.80E-02		1.10E-01
Dibenz(a,h)anthracene				6.30E-02
Di-n-butylphthalate				1.30E-01
Di-n-octylphthalate	8.10E-02			
Fluoranthene	2.60E-02	2.60E-02		1.80E-01
Indeno(1,2,3-cd)pyrene				1.10E-01
Phenanthrene				1.20E-01
Phenol				3.60E-02
Pyrene	2.20E-02	2.20E-02		2.10E-01
Pesticides/PCBs				
Endosulfan I	1.30E-03	1.30E-03		
Metals				
Aluminum			4.21E-01	2.01E+04
Antimony				3.70E-01
Arsenic				5.90E+00
Barium			3.65E-02	1.42E+02
Beryllium				9.80E-01
Cadmium				7.00E-01
Calcium			8.20E+01	7.05E+04
Chromium			7.50E-04	2.82E+01
Cobalt				1.16E+01
Copper			3.80E-03	3.70E+01
Iron			5.98E-01	2.93E+04
Lead			1.10E-03	2.88E+01
Magnesium			1.17E+01	1.21E+04
Manganese			7.44E-02	7.35E+02
Mercury			6.00E-05	1.20E-01
Nickel			2.60E-03	3.35E+01
Potassium			2.61E+00	3.17E+03
Selenium				8.90E-01
Sodium			1.34E+01	1.34E+02
Thallium			2.70E-03	5.50E-01
Vanadium			9.00E-04	3.37E+01
Zinc			1.06E-02	1.31E+02

TABLE K-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Methylene chloride	6.40E-02	6.40E-02	1.09E-09	9.47E-09
Semivolatile Organics				
Bis(2-Ethylhexyl)phthalate	2.60E-01	2.60E-01	4.42E-09	3.85E-08
Chrysene	1.80E-02	1.80E-02	3.06E-10	2.66E-09
Di-n-octylphthalate		8.10E-02		1.20E-08
Fluoranthene	2.60E-02	2.60E-02	4.42E-10	3.85E-09
Pyrene	2.20E-02	2.20E-02	3.74E-10	3.26E-09
Pesticides/PCBs				
Endosulfan I	1.30E-03	1.30E-03	2.21E-11	1.92E-10

ND = Compound was not detected.

TABLE K-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Methylene chloride	8.57E-01	1.65E-03	1.09E-09	9.47E-09	5.96E-11	2.13E-11	7E-11	4E-14	2.42E-11	1.73E-12	3E-11	3E-15	9.64E-10	1.38E-11	1E-09	2E-14
Semivolatile Organics																
bis(2-Ethylhexyl)phthalate	NA	NA	4.42E-09	3.85E-08												
Chrysene	NA	NA	3.06E-10	2.66E-09												
Di-n-octylphthalate	NA	NA		1.20E-08												
Fluoranthene	NA	NA	4.42E-10	3.85E-09												
Pyrene	NA	NA	3.74E-10	3.26E-09												
Pesticides/PCBs																
Endosulfan I	NA	NA	2.21E-11	1.92E-10												
Total Hazard Quotient and Cancer Risk:							**7E-11**	**4E-14**			**3E-11**	**3E-15**			**1E-09**	**2E-14**

Assumptions for Park Worker

CA =	EPC Surface Only	
BW =	70	kg
IR =	8	m3/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CA =	EPC Surface and Sub-Surface	
BW =	70	kg
IR =	10.4	m3/day
EF =	250	days/year
ED =	1	year
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE K-8 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3

TABLE K-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Methylene chloride	6.00E-02	7.50E-03	6.40E-02	6.40E-02	4.38E-08	1.57E-08	7E-07	1E-10	3.27E-08	2.34E-09	5E-07	2E-11	3.01E-07	4.29E-09	5E-06	3E-11
Semivolatile Organics																
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	2.60E-01	2.60E-01	1.78E-07	6.36E-08	9E-06	9E-10	1.33E-07	9.50E-09	7E-06	1E-10	1.22E-06	1.74E-08	6E-05	2E-10
Chrysene	NA	7.30E-03	1.80E-02	1.80E-02		4.40E-09		3E-11		6.58E-10		5E-12		1.21E-09		9E-12
Di-n-octylphthalate	2.00E-02	NA		8.10E-02									3.80E-07		2E-05	
Fluoranthene	4.00E-02	NA	2.60E-02	2.60E-02	1.78E-08		4E-07		1.33E-08		3E-07		1.22E-07		3E-06	
Pyrene	3.00E-02	NA	2.20E-02	2.20E-02	1.51E-08		5E-07		1.13E-08		4E-07		1.03E-07		3E-06	
Pesticides/PCBs																
Endosulfan I	6.00E-03	NA	1.30E-03	1.30E-03	8.90E-10		1E-07		6.65E-10		1E-07		6.11E-09		1E-06	
Total Hazard Quotient and Cancer Risk:							**1E-05**	**9E-10**			**7E-06**	**1E-10**			**9E-05**	**3E-10**

Assumptions for Park Worker

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CF =	1E-06	kg/mg
CS =	EPC Surface and Subsurface	
BW =	70	kg
IR =	480	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3 3-3.

TABLE K-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE K-12
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics: $$DA = 2 Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$$

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Surface Water
ET = Exposure Time
Tau = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient *Kp* (cm/hr)	Tau (hours)	EPC Surface Water (mg/L)	Absorbed Dose/Event (mg-cm²/event)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Metals															Dermal Contact to Surface Water Not Applicable for Construction Worker			
Aluminum	NA	NA	1.00E-03	NA	4.21E-01	4.21E-07												
Barium	3.50E-02	NA	1.00E-03	NA	3.65E-02	3.65E-08	5.09E-08		1E-06		2.16E-07		6E-06					
Calcium	NA	NA	1.00E-03	NA	8.20E+01	8.20E-05												
Chromium	6.00E-05	NA	2.00E-03	NA	7.50E-04	1.50E-09	2.09E-09		3E-05		8.87E-09		1E-04					
Copper	2.40E-02	NA	1.00E-03	NA	3.80E-03	3.80E-09	5.30E-09		2E-07		2.25E-08		9E-07					
Iron	6.00E-02	NA	1.00E-03	NA	5.98E-01	5.98E-07	8.34E-07		1E-05		3.54E-06		6E-05					
Lead	NA	NA	4.00E-06	NA	1.10E-03	4.40E-12												
Magnesium	NA	NA	1.00E-03	NA	1.17E+01	1.17E-05												
Manganese	1.50E-03	NA	1.00E-03	NA	7.44E-02	7.44E-08	1.04E-07		7E-05		4.40E-07		3E-04					
Mercury	3.00E-06	NA	1.00E-03	NA	6.00E-05	6.00E-11	8.37E-11		3E-05		3.55E-10		1E-04					
Nickel	8.00E-04	NA	1.00E-03	NA	2.60E-03	2.60E-09	3.63E-09		5E-06		1.54E-08		2E-05					
Potassium	NA	NA	1.00E-03	NA	2.61E+00	2.61E-06												
Sodium	NA	NA	1.00E-03	NA	1.34E+01	1.34E-05												
Thallium	8.00E-05	NA	1.00E-03	NA	2.70E-03	2.70E-09	3.77E-09		5E-05		1.60E-08		2E-04					
Vanadium	7.00E-05	NA	1.00E-03	NA	9.00E-04	9.00E-10	1.26E-09		2E-05		5.32E-09		8E-05					
Zinc	7.50E-02	NA	6.00E-04	NA	1.06E-02	6.36E-09	8.87E-09		1E-07		3.76E-08		5E-07					
Total Hazard Quotient and Cancer Risk:									**2E-04**				**9E-04**					

Assumptions for Park Worker

CF =	1E-03 liter/cm3
BW =	70 kg
SA =	1,980 cm2
ET =	1 hour/day
EF =	18 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Recreational Visitor (Child)

CF =	1E-03 liter/cm3
BW =	15 kg
SA =	4,625 cm2
ET =	1 hour/day
EF =	7 days/year
ED =	5 years
AT (Nc) =	1,825 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA= Information not available
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3-3

TABLE K-13
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SEDIMENT
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Sediment, from Sediment EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Sediment	Park Worker				Recreational Visitor (Child)				Construction Worker			
					Absorbed Dose (mg/kg-day)		Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day)		Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day)		Hazard Quotient	Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Semivolatile Organics													Dermal Contact to Sediment Not Applicable for Construction Worker			
4-Methylphenol	NA	NA	NA	1.20E-01												
Anthracene	3.00E-01	NA	NA	3.00E-02												
Benzo(a)anthracene	NA	7.30E-01	NA	9.20E-02												
Benzo(a)pyrene	NA	1.46E+01	NA	1.10E-01												
Benzo(b)fluoranthene	NA	7.30E-01	NA	1.30E-01												
Benzo(ghi)perylene	NA	NA	NA	1.10E-01												
Benzo(k)fluoranthene	NA	7.30E-02	NA	1.00E-01												
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	1.00E-01												
Chrysene	NA	7.30E-03	NA	1.10E-01												
Di-n-butylphthalate	9.00E-02	NA	NA	1.30E-01												
Dibenz(a,h)anthracene	NA	7.30E+00	NA	6.30E-02												
Fluoranthene	4.00E-02	NA	NA	1.80E-01												
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	1.10E-01												
Phenanthrene	NA	NA	NA	1.20E-01												
Phenol	5.40E-01	NA	NA	3.60E-02												
Pyrene	3.00E-02	NA	NA	2.10E-01												
Metals																
Aluminum	NA	NA	NA	2.01E+04												
Antimony	4.00E-04	NA	NA	3.70E-01												
Arsenic	2.40E-04	1.88E+00	1.00E-02	5.90E+00	8.23E-08	2.94E-08	3E-04	6E-08	3.49E-07	2.49E-08	1E-03	5E-08				
Barium	3.50E-02	NA	NA	1.42E+02												
Beryllium	2.00E-05	NA	NA	9.80E-01												
Cadmium	5.00E-05	NA	1.00E-02	7.00E-01	9.76E-09		2E-04		4.14E-08		8E-04					
Calcium	NA	NA	NA	7.05E+04												
Chromium	6.00E-05	NA	NA	2.82E+01												
Cobalt	NA	NA	NA	1.16E+01												
Copper	2.40E-02	NA	NA	3.70E+01												
Iron	6.00E-02	NA	NA	2.93E+04												
Lead	NA	NA	NA	2.88E+01												
Magnesium	NA	NA	NA	1.21E+04												
Manganese	1.50E-03	NA	NA	7.35E+02												
Mercury	3.00E-06	NA	NA	1.20E-01												
Nickel	8.00E-04	NA	NA	3.35E+01												
Potassium	NA	NA	NA	3.17E+03												
Selenium	4.50E-03	NA	NA	8.90E-01												
Sodium	NA	NA	NA	1.34E+02												
Thallium	8.00E-05	NA	NA	5.50E-01												
Vanadium	7.00E-05	NA	NA	3.37E+01												
Zinc	7.50E-02	NA	NA	1.31E+02												
Total Hazard Quotient and Cancer Risk:							5E-04	6E-08			2E-03	5E-08				

Assumptions for Park Worker		Assumptions for Recreational Visitor (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
BW =	70 kg	BW =	15 kg
SA =	1,980 cm2	SA =	4,625 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	18 days/year	EF =	7 days/year
ED =	25 years	ED =	5 years
AT (Nc) =	9,125 days	AT (Nc) =	1,825 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3-3

TABLE K-14
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day)[3]	Short-tailed Shrew Exposure (mg/kg/day)[3]	American Robin Exposure (mg/kg/day)[3]
Volatile Organics						
Methylene chloride	6.40E-02	6.86E+00	5.25E+00	8.40E-02	2.06E-01	2.45E-01
Semivolatile Organics						
Bis(2-Ethylhexyl)phthalate	2.60E-01	5.10E-03	1.20E+01	3.38E-01	1.78E+00	1.12E+00
Chrysene	1.80E-02	2.22E-02	1.75E-01	4.62E-04	2.04E-03	2.54E-03
Fluoranthene	2.60E-02	3.72E-02	7.92E-01	2.44E-03	1.21E-02	9.43E-03
Pyrene	2.20E-02	4.43E-02	9.20E-02	4.21E-04	1.47E-03	2.59E-03
Pesticides/PCBs						
Endosulfan I	1.30E-03	3.44E-01	2.50E-01	8.91E-05	2.16E-04	3.33E-04

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as

$$ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW$$

Where, ED = exposure dose
- Cs = RME conc in soil (mg/kg)
- CF = plant dry-to-wet-weight conversion factor (0.2 for inorganics only, 1 for organics)
- SP = soil-to-plant uptake factor
- Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
- BAF = bioaccumulation factor (unitless)
- Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
- Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
- SFF = Site foraging factor (1 for mouse and shrew; 0.583 for robin)
- BW = body weight (0.02 kg for mouse, 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE K-15
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-58 - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Methylene chloride	8.40E-02	2.06E-01	5.85E+00	1.4E-02	3.5E-02
Semivolatile Organics					
Bis(2-Ethylhexyl)phthalate	3.38E-01	1.78E+00	1.83E+01	1.8E-02	9.7E-02
Chrysene	4.62E-04	2.04E-03	1.00E+00	4.6E-04	2.0E-03
Fluoranthene	2.44E-03	1.21E-02	1.25E+00	2.0E-03	9.7E-03
Pyrene	4.21E-04	1.47E-03	1.00E+00	4.2E-04	1.5E-03
Pesticides/PCBs					
Endosulfan I	8.91E-05	2.16E-04	none available	--	--

(1) Receptor exposure from Table K-14
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

TABLE K-16
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-58 - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) 1	Toxicity Reference Value (mg/kg/day)2	American Robin Hazard Quotient3
Volatile Organics			
Methylene chloride	2.45E-01	none available	--
Semivolatile Organics			
Bis(2-Ethylhexyl)phthalate	1.12E+00	1.10E+00	1.0E+00
Chrysene	2.54E-03	4.00E+01	6.3E-05
Fluoranthene	9.43E-03	4.00E+01	2.4E-04
Pyrene	2.59E-03	4.00E+01	6.5E-05
Pesticides/PCBs			
Endosulfan I	3.33E-04	1.00E+00	3.3E-04

(1) Receptor exposure from Table K-14
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1. no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

APPENDIX L

SEAD-62: Nicotine Sulfate Disposal Area near Buildings 606 and 612

Table L-1: Soil Analysis Results

Table L-2: Groundwater Analysis Results

Table L-3: Inorganics Statistical Analysis - Soil

Table L-4: Inorganics Statistical Analysis – Groundwater

Table L-5: Exposure Point Concentrations for Chemicals of Potential Concern

Table L-6: Ambient Air Exposure Point Concentrations

Table L-7: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air

Table L-8: Calculation of Intake and Risk from the Ingestion of Soil

Table L-9: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil

Table L-10: Calculation of Intake and Risk from the Ingestion of Groundwater

Table L-11: Calculation of Air Concentration in Shower from Volatilization of Groundwater

Table L-12: Calculation of Intake and Risk from Dermal Contact to Groundwater (while Showering)

Table L-13: Calculation of Intake and Risk from Inhalation of Groundwater (while Showering)

Table L-14: Ecological Risk Assessment

TABLE L-1
SOIL ANALYSIS RESULTS - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SOIL	SOIL	SOIL
								SEAD-62	SEAD-62	SEAD-62
								0	3	2
								0.5	3	2
								06/12/94	06/12/94	06/12/94
								TP62-1-1	TP62-2-1	TP62-3-1
								224086	224088	224089
								44748	44748	44748
								TP62-1	TP62-2	TP62-3
COMPOUNDS	UNIT	MAXIMUM	FREQUENCY OF DETECTIO	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SA Value (Q)	SA Value (Q)	SA Value (Q)
SEMIVOLATILE ORGANICS										
Fluoranthene	ug/Kg	46	33%	50000	0	1	3	46 J	370 U	410 U
Pyrene	ug/Kg	47	33%	50000	0	1	3	47 J	370 U	410 U
HERBICIDES										
2,4,5-T	ug/Kg	10	67%	1900	0	2	3	10 J	5.6 U	6.3 J
Dicamba	ug/Kg	9.3	33%		0	1	3	7.3 U	5.6 U	9.3 J
METALS										
Aluminum	mg/Kg	16100	100%	19300	0	3	3	14800	11000	16100
Antimony	mg/Kg	0.21	33%	5.9	0	1	3	0.35 UJ	0.21 J	0.2 UJ
Arsenic	mg/Kg	8.4	100%	8.2	1	3	3	4.9	5.3	8.4
Barium	mg/Kg	202	100%	300	0	3	3	147	85.4	202
Beryllium	mg/Kg	0.74	100%	1.1	0	3	3	0.74 J	0.56 J	0.72 J
Cadmium	mg/Kg	0.68	100%	2.3	0	3	3	0.43 J	0.56 J	0.68 J
Calcium	mg/Kg	67900	100%	121000	0	3	3	10900	67900	17400
Chromium	mg/Kg	28.8	100%	29.6	0	3	3	28.8 J	17.3 J	23.6 J
Cobalt	mg/Kg	12.6	100%	30	0	3	3	9.4 J	12.6	12.6
Copper	mg/Kg	28.7	100%	33	0	3	3	22.8	22	28.7
Iron	mg/Kg	30300	100%	36500	0	3	3	27500	23200	30300
Magnesium	mg/Kg	20500	100%	21500	0	3	3	4530	20500	5340
Manganese	mg/Kg	778	100%	1060	0	3	3	323	495	778
Mercury	mg/Kg	0.11	100%	0.1	1	3	3	0.1 J	0.03 J	0.11
Nickel	mg/Kg	29.6	100%	49	0	3	3	26.2	29.6	26.5
Potassium	mg/Kg	2970	100%	2380	1	3	3	1630 J	2210 J	2970 J
Selenium	mg/Kg	1.3	67%	2	0	2	3	1.3 J	0.37 U	0.99
Sodium	mg/Kg	164	100%	172	0	3	3	37.8 J	88.8 J	164 J
Vanadium	mg/Kg	33.1	100%	150	0	3	3	25.3	20.3	33.1
Zinc	mg/Kg	218	100%	110	2	3	3	218	67.5	172
PCT_SOLID	%W/W							68.5	89.5	79.6

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm. and individual SVOs <50 ppm.

b) NA = Not Available.

c) U = The compound was not detected below this concentration.

d) J = The reported value is an estimated concentration.

e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

f) R = The data was rejected during the data validation process

TABLE L-2
GROUNDWATER ANALYSIS RESULTS - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

CHEM_CLASS/PARAM	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE STANDARD	NUMBER OF DETECTS	NUMBER OF ANALYSES	WATER SEAD-62 07/21/94 MW62-1-1 227728 45448 MW62-1-1 SA Value (Q)	WATER SEAD-62 07/21/94 MW62-2-1 227729 45448 MW62-2 SA Value (Q)	WATER SEAD-62 07/20/94 MW62-3-1 227611 45448 MW62-3 SA Value (Q)
Benzene	ug/L	2	67%	1 (b)	2	2	3	10 U	$\boxed{2}$ J	$\boxed{2}$ J
HERBICIDES										
2,4,5-T	ug/L	0.12	33%	35 (b)	0	1	3	0.11 U	0.12	0.11 U
METALS										
Aluminum	ug/L	499	100%	50 (a)	3	3	3	$\boxed{499}$	$\boxed{430}$	$\boxed{173}$ J
Barium	ug/L	68.1	100%	1000 (b)	0	3	3	68.1 J	66 J	64.8 J
Beryllium	ug/L	0	0%	4 (c)	0	0	3	0.1 U	0.1 U	0.1 U
Calcium	ug/L	104000	100%	NA	0	3	3	91700	85600	104000
Chromium	ug/L	1.4	67%	50 (b)	0	2	3	1.4 J	1.2 J	0.4 U
Cobalt	ug/L	2.5	100%	NA	0	3	3	2.5 J	1.1 J	0.56 J
Copper	ug/L	0.54	33%	200 (b)	0	1	3	0.54 J	0.5 U	0.5 U
Iron	ug/L	1160	100%	300 (b)	3	3	3	$\boxed{797}$ J	$\boxed{870}$ J	$\boxed{1160}$ J
Magnesium	ug/L	58200	100%	NA	0	3	3	58200	44200	33100
Manganese	ug/L	271	100%	50 (a)	3	3	3	$\boxed{271}$	$\boxed{134}$	$\boxed{86.5}$
Mercury	ug/L	0.05	100%	0.7 (b)	0	3	3	0.05 J	0.05 J	0.05 J
Nickel	ug/L	3.9	67%	100 (b)	0	2	3	3.9 J	2.3 J	0.69 U
Potassium	ug/L	7470	100%	NA	0	3	3	7470 J	6240 J	3150 J
Sodium	ug/L	18100	100%	20000 (b)	0	3	3	18100	8750	5820
Thallium	ug/L	2.4	33%	2 (c)	1	1	3	1.9 U	$\boxed{2.4}$ J	1.9 U
Vanadium	ug/L	1.8	100%	NA	0	3	3	1.8 J	1.5 J	0.85 J
Zinc	ug/L	6.2	100%	5000 (a)	0	3	3	4.2 J	6.2 J	3 J
OTHER ANALYSES										
pH	SU	7.8						7.8	7.3	7.2
Conductivity	umhos/cm	750						750	655	525
Temperature	°C	20.3						20.3	19.1	14
Turbidity	NTU	86						86	28	31

NOTES:
a) Secondary Drinking Water Regulations
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.

TABLE L-3
INORGANICS ANALYSIS - SOIL
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B.
See Appendix G, Table G-5 for the results.

TABLE L-4
INORGANICS ANALYSIS - GROUNDWATER
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-6 for the results.

TABLE L-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-62
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Ground Water mg/L
Volatile Organics			
Benzene			2.00E-03
Semivolatile Organics			
Fluoranthene	4.60E-02	4.60E-02	
Pyrene	4.70E-02	4.70E-02	
Metals			
Cadmium	6.80E-01	4.30E-01	
Copper	2.87E+01	2.28E+01	
Magnesium			5.82E+01
Potassium	2.97E+03	1.63E+03	
Selenium	1.30E+00	1.30E+00	
Zinc	2.18E+02		
Herbicides			
2,4,5-T	1.00E-02	1.00E-02	1.20E-04
Dicamba	9.30E-03		

TABLE L-6
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 340 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Semivolatile Organics				
Fluoranthene	4.60E-02	4.60E-02	7.82E-10	1.56E-08
Pyrene	4.70E-02	4.70E-02	7.99E-10	1.60E-08
Metals				
Cadmium	4.30E-01	6.80E-01	7.31E-09	2.31E-07
Copper	2.28E+01	2.87E+01	3.88E-07	9.76E-06
Potassium	1.63E+03	2.97E+03	2.77E-05	1.01E-03
Selenium	1.30E+00	1.30E+00	2.21E-08	4.42E-07
Zinc	2.18E+02	2.18E+02	3.71E-06	7.41E-05
Herbicides				
2,4,5-T	1.00E-02	1.00E-02	1.70E-10	3.40E-09
Dicamba		9.30E-03		3.16E-09

ND = Compound was not detected above the detection limit shown

TABLE L-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Air EPC* from Total Soils	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)												
Semivolatile Organics																
Fluoranthene	NA	NA	7.82E-10	1.56E-08												
Pyrene	NA	NA	7.99E-10	1.60E-08												
Metals																
Cadmium	NA	6.3E+00	7.31E-09	2.31E-07		5.44E-10		3E-09		2.04E-10		1E-09		2.37E-10		1E-09
Copper	NA	NA	3.88E-07	9.76E-06												
Potassium	NA	NA	2.77E-05	1.01E-03												
Selenium	NA	NA	2.21E-08	4.42E-07												
Zinc	NA	NA	3.71E-06	7.41E-05												
Herbicides																
2,4,5-T	NA	NA	1.70E-10	3.40E-09												
Dicamba	NA	NA		3.16E-09												
Total Hazard Quotient and Cancer Risk:								**3E-09**				**1E-09**				**1E-09**

Assumptions for Prison Inmate			Assumptions for Prison Worker			Assumptions for Construction Worker		
CA =	EPC Surface Only		CA =	EPC Surface Only		CA =	EPC Surface and Sub-Surface	
IR =	15.2	m3/day	IR =	8	m3/day	IR =	10.4	m3/day
EF =	365	days/year	EF =	250	days/year	EF =	176.5	days/year
ED =	24	years	ED =	25	years	ED =	1	years
BW =	70	kg	BW =	70	kg	BW =	70	kg
AT (Nc) =	8760	days	AT (Nc) =	9125	days	AT (Nc) =	365	days
AT (Car) =	25550	days	AT (Car) =	25550	days	AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE L-6 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom)
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* fro Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Semivolatile Organics												
Fluoranthene	NA	NA	7.82E-10	1.56E-08								
Pyrene	NA	NA	7.99E-10	1.60E-08								
Metals												
Cadmium	NA	6.3E+00	7.31E-09	2.31E-07		1.14E-10		7E-10		2.04E-10		1E-09
Copper	NA	NA	3.88E-07	9.76E-06								
Potassium	NA	NA	2.77E-05	1.01E-03								
Selenium	NA	NA	2.21E-08	4.42E-07								
Zinc	NA	NA	3.71E-06	7.41E-05								
Herbicides												
2,4,5-T	NA	NA	1.70E-10	3.40E-09								
Dicamba	NA	NA		3.16E-09								
Total Hazard Quotient and Cancer Risk:								**7E-10**				**1E-09**

Assumptions for Day Care Center Child

CA =	EPC Surface Only	
IR =	4	m3/day
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CA =	EPC Surface Only	
IR =	8	m3/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE L-6 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE L-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\dfrac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Prison Inmate Intake (mg/kg-day)		Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day)		Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Semivolatile Organics																
Fluoranthene	4.0E-02	NA	4.60E-02	4.60E-02	6.57E-08		2E-06		4.50E-08		1E-06		1.53E-07		4E-06	
Pyrene	3.0E-02	NA	4.70E-02	4.70E-02	6.71E-08		2E-06		4.60E-08		2E-06		1.56E-07		5E-06	
Metals																
Cadmium	5.0E-04	NA	4.30E-01	6.80E-01	6.14E-07		1E-03		4.21E-07		8E-04		2.25E-06		5E-03	
Copper	4.0E-02	NA	2.28E+01	2.87E+01	3.26E-05		8E-04		2.23E-05		6E-04		9.52E-05		2E-03	
Potassium	NA	NA	1.63E+03	2.97E+03												
Selenium	5.0E-03	NA	1.30E+00	1.30E+00	1.86E-06		4E-04		1.27E-06		3E-04		4.31E-06		9E-04	
Zinc	3.0E-01	NA	2.18E+02	2.18E+02	3.11E-04		1E-03		2.13E-04		7E-04		7.23E-04		2E-03	
Herbicides																
2,4,5-T	1.0E-02	NA	1.00E-02	1.00E-02	1.43E-08		1E-06		9.78E-09		1E-06		3.32E-08		3E-06	
Dicamba	3.0E-02	NA		9.30E-03									3.08E-08		1E-06	
Total Hazard Quotient and Cancer Risk:							**3E-03**				**2E-03**				**1E-02**	

Assumptions for Prison Inmate		
CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker		
CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Assumptions for Construction Worker		
CS =	EPC Total Soils	
IR =	480	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	176.5	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Semivolatile Organics												
Fluoranthene	4.0E-02	NA	4.60E-02	4.60E-02	4.20E-07		1E-05		4.50E-08		1E-06	
Pyrene	3.0E-02	NA	4.70E-02	4.70E-02	4.29E-07		1E-05		4.60E-08		2E-06	
Metals												
Cadmium	5.0E-04	NA	4.30E-01	6.80E-01	3.93E-06		8E-03		4.21E-07		8E-04	
Copper	4.0E-02	NA	2.28E+01	2.87E+01	2.08E-04		5E-03		2.23E-05		6E-04	
Potassium	NA	NA	1.63E+03	2.97E+03								
Selenium	5.0E-03	NA	1.30E+00	1.30E+00	1.19E-05		2E-03		1.27E-06		3E-04	
Zinc	3.0E-01	NA	2.18E+02	2.18E+02	1.99E-03		7E-03		2.13E-04		7E-04	
Herbicides												
2,4,5-T	1.0E-02	NA	1.00E-02	1.00E-02	9.13E-08		9E-06		9.78E-09		1E-06	
Dicamba	3.0E-02	NA		9.30E-03								
Total Hazard Quotient and Cancer Risk:							**2E-02**				**2E-03**	

Assumptions for Day Care Center Child

CS =	EPC Surface Only	
IR =	200	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
Total Soils include surface and subsurface soils.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Absorbed Dose (mg/kg-day) (Nc)	Prison Inmate Absorbed Dose (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Absorbed Dose (mg/kg-day) (Nc)	Prison Worker Absorbed Dose (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Semivolatile Organics																	
Fluoranthene	4.0E-02	NA	NA	4.60E-02	4.60E-02												
Pyrene	3.0E-02	NA	NA	4.70E-02	4.70E-02												
Metals																	
Cadmium	5.0E-05	NA	0.01	4.30E-01	6.80E-01	3.56E-07		7E-03		2.44E-07		5E-03		2.72E-07		5E-03	
Copper	2.4E-02	NA	NA	2.28E+01	2.87E+01												
Potassium	NA	NA	NA	1.63E+03	2.97E+03												
Selenium	4.5E-03	NA	NA	1.30E+00	1.30E+00												
Zinc	7.5E-02	NA	NA	2.18E+02	2.18E+02												
Herbicides																	
2,4,5-T	1.0E-02	NA	NA	1.00E-02	1.00E-02												
Dicamba	3.0E-02	NA	NA		9.30E-03												
Total Hazard Quotient and Cancer Risk:								**7E-03**				**5E-03**				**5E-03**	

Assumptions for Prison Inmate		Assumptions for Prison Worker		Assumptions for Construction Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only	CS =	EPC Total Soils
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	5800 cm2	SA =	5800 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	365 days/year	EF =	250 days/year	EF =	176.5 days/year
ED =	24 years	ED =	25 years	ED =	1 years
BW =	70 kg	BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days	AT (Nc) =	365 days
AT (Car) =	25550 days	AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Child Absorbed Dose (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Adult Absorbed Dose (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Semivolatile Organics													
Fluoranthene	4.0E-02	NA	NA	4.60E-02	4.60E-02								
Pyrene	3.0E-02	NA	NA	4.70E-02	4.70E-02								
Metals													
Cadmium	5.0E-05	NA	0.01	4.30E-01	6.80E-01	4.30E-07		9E-03		2.44E-07		5E-03	
Copper	2.4E-02	NA	NA	2.28E+01	2.87E+01								
Potassium	NA	NA	NA	1.63E+03	2.97E+03								
Selenium	4.5E-03	NA	NA	1.30E+00	1.30E+00								
Zinc	7.5E-02	NA	NA	2.18E+02	2.18E+02								
Herbicides													
2,4,5-T	1.0E-02	NA	NA	1.00E-02	1.00E-02								
Dicamba	3.0E-02	NA	NA		9.30E-03								
Total Hazard Quotient and Cancer Risk:								**9E-03**				**5E-03**	

Assumptions for Day Care Center Child		Assumptions for Day Care Center Adult	
CS =	EPC Surface Only	CS =	EPC Surface Only
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	2190 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	250 days/year	EF =	250 days/year
ED =	6 years	ED =	25 years
BW =	15 kg	BW =	70 kg
AT (Nc) =	2190 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
Total Soils include surface and subsurface soils.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

TABLE L-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics															
Benzene	3.0E-03	2.9E-02	2.00E-03	5.71E-05	1.96E-05	2E-02	6E-07	1.96E-05	6.99E-06	7E-03	2E-07		Ingestion of Groundwater Not Applicable for Construction Worker		
Herbicides															
2,4,5-T	1.0E-02	NA	1.20E-04	3.43E-06		3E-04		1.17E-06		1E-04					
Metals															
Magnesium	NA	NA	5.82E+01												
Total Hazard Quotient and Cancer Risk:						**2E-02**	**6E-07**			**7E-03**	**2E-07**				

Assumptions for Prison Inmate

IR =	2	liters/day
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

IR =	1	liters/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics											
Benzene	3.0E-03	2.9E-02	2.00E-03	9.13E-05	7.83E-06	3E-02	2E-07	1.96E-05	6.99E-06	7E-03	2E-07
Herbicides											
2,4,5-T	1.0E-02	NA	1.20E-04	5.48E-06		5E-04		1.17E-06		1E-04	
Metals											
Magnesium	NA	NA	5.82E+01								
Total Hazard Quotient and Cancer Risk:						**3E-02**	**2E-07**			**7E-03**	**2E-07**

Assumptions for Day Care Center Child		
IR =	1	liters/day
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult		
IR =	1	liters/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-11
CALCULATION OF AIR CONCENTRATION IN SHOWER
FROM VOLATILIZATION OF GROUNDWATER (daily)
RESIDENTIAL EXPOSURE (FUTURE LAND USE)
REASONABLE MAXIMUM EXPOSURE (RME)
SENECA ARMY DEPOT, ROMULUS, NEW YORK - SEAD-62

Analyte	EPC Air All-Site Wells (mg/m^3)	Time of Shower -Ts (min)	Flow Rate of Shower - Fw (L/min)	EPC - RME Groundwater (mg/l)	Flow Rate of Air in Shower-Fa (m^3/min)	Volume of athroom-V (m^3)	Henry Laws Constant-H (m^3-atm/mol)	Asymptotic Air Conc.-Cinf (mg/m^3)	Rate Constant-K (1/min)	Efficiency of Release-E (unitless)	Efficiency of Release for TCE E-TCE	Henry Laws Constant-TCE (m^3-atm/mol)	Fraction Emitted* (percent)	Cderm** (Water) (mg/l)
USE TABLE IN DERMGW.WK4 FOR PRINTING														
Volatile Organics														
Benzene	3.92E-03	15	19	2.00E-03	2.4	12	5.50E-03	5.74E-03	0.20	3.63E-01	0.6	0.0091	24.78%	1.50E-03
Herbicides														
2,4,5-T	3.71E-10	15	19	1.20E-04	2.4	12	8.68E-09	5.44E-10	0.20	5.72E-07	0.6	0.0091	0.00%	1.20E-04

Concentration in Air (mg/m^3) = Cinf[1+(1/(kTs)(exp(-kTs)-1)]

Asymptotic Air Conc. - Cinf (mg/m^3) = [(E)(Fw)(Ct)]/Fa

Rate Constant - k (L/min) = Fa/Vb

Efficiency of Release - E (unitless) = (E-tce)(H)/(H-tce)

* Fraction Emitted (fe) = (EPCair x Fa) / (EPCgw x Fw)

** Cderm = EPCgw x (1 - fe)

Variables:

CA = Chemical Concentration in Air (mg/m^3)
Ts = Time of Shower (minutes)
Fw = Flow Rate of Shower (L/min)
Fa = Flow Rate of Air in Shower (m^3/min)
Vb = Volume of Bathroom (m^3)

Assumptions:

EPC - Groundwater Data - RME
15 (RME default)
19 (Estimated RME)
2.4 (Average Air Flow)
12 (Average Bathroom Volume)

TABLE L-12

CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):

DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA).

For organics: $$DA = 2Kp \times CW \times \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																		
Benzene	2.9E-03	3.1E-02	2.1E-02	2.6E-01	1.50E-03	2.23E-08	7.31E-06	2.51E-06	3E-03	8E-08	5.01E-06	1.79E-06	2E-03	5E-08	Dermal Contact to Groundwater Not Applicable for Construction Worker			
Herbicides																		
2,4,5-T	1.0E-02	NA	8.8E-03	3.2E+00	1.20E-04	2.59E-09	8.51E-07		9E-05		5.83E-07		6E-05					
Metals																		
Magnesium	NA	NA	1.0E-03	NA	5.82E+01	1.46E-05												
Total Hazard Quotient and Cancer Risk:									3E-03	8E-08			2E-03	5E-08				

Assumptions for Prison Inmate		
SA =	23000	cm2
CF =	0.001	l/cm3
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days
ET =	0.25	hours/day

Assumptions for Prison Worker		
SA =	23000	cm2
CF =	0.001	l/cm3
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days
ET =	0.25	hours/day

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* Cderm is the concentration of chmeical available for dermal absorption after accounoting for partitioning between the air and water in the shower. The calculation of Cderm is shown in Table L-11
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-12
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom).
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics $DA = 2 Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	0.0E+00 Dermal 0.0E+00	Permeability Coefficient *Kp* (cm/hr)	Tau	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event mg-cm²/event	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics								Dermal Contact to Groundwater Not Applicable for Day Care Center Child				Dermal Contact to Groundwater Not Applicable for Day Care Center Adult		
Benzene	2.9E-03	3.1E-02	2.1E-02	2.6E-01	1.50E-03	2.23E-08								
Herbicides														
2,4,5-T	1.0E-02	NA	8.8E-03	3.2E+00	1.20E-04	2.59E-09								
Metals														
Magnesium	NA	NA	1.0E-03	NA	5.82E+01	1.46E-05								
Total Hazard Quotient and Cancer Risk:														

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* Cderm is the concentration of chmeical available for dermal absorption after accounoting for partitioning between the air and water in the shower The calculation of Cderm is shown in Table L-11.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-13
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA =Chemical Concentration in Air
IR = Inhalation Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	EPC* Air (mg/m³)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics													Inhalation of Groundwater Not Applicable for Construction Worker		
Benzene	1.7E-03	2.7E-02	3.92E-03	2.80E-05	9.61E-06	2E-02	3E-07	1.92E-05	6.85E-06	1E-02	2E-07				
Herbicides															
2,4,5-T	NA	NA	3.71E-10												
Total Hazard Quotient and Cancer Risk:						**2E-02**	**3E-07**			**1E-02**	**2E-07**				

Assumptions for Prison Inmate

IR =	0.50	m3/day
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

IR =	0.50	m3/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* EPC air is the concentration of chemical available for inhalation after accounting for partitioning between the air and water in the shower. The calculation of the EPC air is shown in Table L-6.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE L-13
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (while Showering)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-62
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA =Chemical Concentration in Air
IR = Inhalation Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation 0.0E+00	EPC * Air (mg/liter)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Volatile Organics					Inhalation of Groundwater Not Applicable for Day Care Center Child				Inhalation of Groundwater Not Applicable for Day Care Center Adult		
Benzene	1.7E-03	2.7E-02	3.92E-03								
Herbicides											
2,4,5-T	NA	NA	3.71E-10								
Total Hazard Quotient and Cancer Risk:											

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* EPC air is the concentration of chemical available for inhalation after accounting for partitioning between the air and water in the shower. The calculation of the EPC air is shown in Table L-6.

TABLE L-14
ECOLOGICAL RISK ASSESSMENT
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One ecological risk assessment was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Tables G-16 through G-19 for the results.

APPENDIX M

SEAD-64A: Garbage Disposal Area

Table M-1:	Soil Analysis Results
Table M-2:	Groundwater Analysis Results
Table M-3:	Inorganics Analysis of Soil
Table M-4:	Inorganics Analysis of Groundwater
Table M-5:	Exposure Point Concentrations for Chemicals of Potential Concern
Table M-6:	Ambient Air Exposure Point Concentrations
Table M-7:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table M-8:	Calculation of Intake and Risk from the Ingestion of Soil
Table M-9:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table M-10:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table M-11:	Calculated Soil Receptor Exposure
Table M-12:	Calculation of Soil Hazard Quotients - Mammals
Table M-13:	Calculation of Soil Hazard Quotients - Bird

TABLE M-1
SOIL ANALYSIS RESULTS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES						
SEAD								SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A
LOCATION ID								MW64A-1	MW64A-1	MW64A-1	SB64A-1	SB64A-1	SB64A-1
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								MW64A-1-00	MW64A-1-02	MW64A-1-03	SB64A-1-00	SB64A-1-02	SB64A-1-04
SAMP_DEPTH_TOP								0	2	4	0	2	6
SAMP_DEPTH_BOT								0.2	4	6	0.2	4	8
SAMP_DATE								04/02/94	04/02/94	04/02/94	05/27/94	05/27/94	05/27/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS													
Benzene	UG/KG	2	8.33%	60	0	1	12	13 U	12 U	12 U	12 U	12 U	11 U
Toluene	UG/KG	2	8.33%	1500	0	1	12	13 U	12 U	12 U	12 U	12 U	11 U
Trichloroethene	UG/KG	1	8.33%	700	0	1	12	13 U	12 U	12 U	12 U	12 U	11 U
SEMIVOLATILE ORGANICS													
2-Methylnaphthalene	UG/KG	2900	33.33%	36400	0	4	12	450 U	390 U	370 U	54 J	400 U	360 U
Acenaphthene	UG/KG	1300	33.33%	50000	0	4	12	450 U	390 U	370 U	140 J	400 U	360 U
Acenaphthylene	UG/KG	400	33.33%	41000	0	4	12	450 U	390 U	370 U	250 J	400 U	360 U
Anthracene	UG/KG	1900	41.67%	50000	0	5	12	450 U	390 U	370 U	540 J	58 J	360 U
Benzo(a)anthracene	UG/KG	5600	41.67%	224	4	5	12	450 U	390 U	370 U	3600	180 J	360 U
Benzo(a)pyrene	UG/KG	5400	58.33%	61	5	7	12	450 U	390 U	370 U	3000	180 J	360 U
Benzo(b)fluoranthene	UG/KG	9600	41.67%	1100	3	5	12	450 U	390 U	370 U	6600 J	320 J	360 U
Benzo(ghi)perylene	UG/KG	4000	58 33%	50000	0	7	12	450 U	390 U	370 U	1100	140 J	24 J
Benzo(k)fluoranthene	UG/KG	5900	33.33%	1100	1	4	12	450 U	390 U	370 U	1000 UJ	400 UJ	360 U
Bis(2-Ethylhexyl)phthalate	UG/KG	13000	75.00%	50000	0	9	12	750	280 J	320 J	1000 U	41 J	40 J
Carbazole	UG/KG	780	41.67%	NA	0	5	12	450 U	390 U	370 U	720 J	39 J	360 U
Chrysene	UG/KG	4800	50.00%	400	4	6	12	450 U	390 U	370 U	3400	180 J	360 U
Di-n-butylphthalate	UG/KG	290	8.33%	8100	0	1	12	290 J	390 U	370 U	1000 U	400 U	360 U
Dibenz(a,h)anthracene	UG/KG	1500	50.00%	14	6	6	12	450 U	390 U	370 U	1200	70 J	360 U
Dibenzofuran	UG/KG	1400	25.00%	6200	0	3	12	450 U	390 U	370 U	90 J	400 U	360 U
Fluoranthene	UG/KG	11000	50.00%	50000	0	6	12	450 U	390 U	370 U	5700	470	360 U
Fluorene	UG/KG	4100	41.67%	50000	0	5	12	450 U	390 U	370 U	260 J	36 J	360 U
Indeno(1,2,3-cd)pyrene	UG/KG	3500	50.00%	3200	1	6	12	450 U	390 U	370 U	1900	92 J	360 U
Naphthalene	UG/KG	3800	25.00%	13000	0	3	12	450 U	390 U	370 U	1000 U	400 U	360 U
Phenanthrene	UG/KG	15000	50.00%	50000	0	6	12	450 U	390 U	370 U	2300	290 J	360 U
Phenol	UG/KG	44	8.33%	30	1	1	12	450 U	390 U	370 U	1000 U	400 U	360 U
Pyrene	UG/KG	8700	50.00%	50000	0	6	12	450 U	390 U	370 U	4400	340 J	360 U
PESTICIDES/PCBs													
4,4'-DDD	UG/KG	3.7	8.33%	2900	0	1	12	4.5 U	3.9 U	3.7 U	8 UJ	4 UJ	3.6 UJ
4,4'-DDE	UG/KG	9	25.00%	2100	0	3	12	4.5 U	3.9 U	3.7 U	4.5 J	4 UJ	3.6 UJ
4,4'-DDT	UG/KG	24	33.33%	2100	0	4	12	4.5 U	3.9 U	3.7 U	4.6 J	4 UJ	3.6 UJ
Alpha-Chlordane	UG/KG	6.3	25.00%	NA	0	3	12	2.3 U	2 U	1.9 U	4.2 J	2.1 UJ	1.8 UJ
Dieldrin	UG/KG	7.5	16.67%	44	0	2	12	4.5 U	3.9 U	3.7 U	5.9 J	4 UJ	3.6 UJ
Endosulfan I	UG/KG	33	41.67%	900	0	5	12	2.3 U	2 U	1.9 U	22 J	5.1 J	1.8 UJ
Endosulfan sulfate	UG/KG	5	16.67%	1000	0	2	12	4.5 U	3.9 U	3.7 U	8 UJ	4 UJ	3.6 UJ
Heptachlor epoxide	UG/KG	1.9	8.33%	20	0	1	12	2.3 U	2 U	1.9 U	4.1 UJ	2.1 UJ	1.8 UJ
METALS													
Aluminum	MG/KG	19800	100.00%	19300	1	12	12	16100	19800	12600	11800	17100	12800
Antimony	MG/KG	4.3	25.00%	5.9	0	3	12	0.23 J	0.2 UJ	0.2 UJ	0.36 J	0.26 UJ	0.26 UJ
Arsenic	MG/KG	8.4	100.00%	8.2	1	12	12	7.1	8.2	5	4.7	6	8.4
Barium	MG/KG	133	100.00%	300	0	12	12	83 7	91 2	62 3	59.3	133	53.7

See Last Page for Notes.

TABLE M-1
SOIL ANALYSIS RESULTS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A
LOCATION ID								MW64A-1	MW64A-1	MW64A-1	SB64A-1	SB64A-1	SB64A-1
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								MW64A-1-00	MW64A-1-02	MW64A-1-03	SB64A-1-00	SB64A-1-02	SB64A-1-04
SAMP_DEPTH_TOP								0	2	4	0	2	6
SAMP_DEPTH_BOT								0.2	4	6	0.2	4	8
SAMP_DATE								04/02/94	04/02/94	04/02/94	05/27/94	05/27/94	05/27/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Beryllium	MG/KG	0.8	100.00%	1.1	0	12	12	0.68 J	0.74 J	0.53 J	0.54 J	0.8 J	0.55 J
Cadmium	MG/KG	1	91.67%	2.3	0	11	12	0.11 J	0.02 U	0.12 J	0.45 J	0.48 J	0.33 J
Calcium	MG/KG	72400	100.00%	121000	0	12	12	7210	4300	72400	36300	4450	4580
Chromium	MG/KG	35.5	100.00%	29.6	1	12	12	23	25	19	19.7	23.9	21.4
Cobalt	MG/KG	14	100.00%	30	0	12	12	11.8	11.3	9.1 J	10.6	10.3	14
Copper	MG/KG	56.3	100.00%	33	1	12	12	25.5	21	23.7	23.3	20.1	24.6
Iron	MG/KG	35900	100.00%	36500	0	12	12	28500	28000	22600	25500	28600	35900
Lead	MG/KG	391	83.33%	24.8	1	10	12	21.6	13.6	15.4	18.5	14.5	11.1
Magnesium	MG/KG	14800	100.00%	21500	0	12	12	5480	5010	14800	6940	4510	5420
Manganese	MG/KG	968	100.00%	1060	0	12	12	558	604	402	528	968	619
Mercury	MG/KG	0.1	100.00%	0.1	0	12	12	0.05 J	0.03 J	0.02 J	0.04 J	0.06 J	0.03 J
Nickel	MG/KG	36.1	100.00%	49	0	12	12	32.2	28.6	26.7	33.3	29.2	36.1
Potassium	MG/KG	2820	100.00%	2380	4	12	12	**2590** J	2260 J	**2700** J	1530 J	2070 J	1150 J
Selenium	MG/KG	1.7	83.33%	2	0	10	12	0.96	1.7	0.34 U	0.98	0.94 J	0.82 J
Sodium	MG/KG	92.1	75.00%	172	0	9	12	27.5 U	31.8 U	92.1 J	50.9 J	22.1 J	39.2 J
Thallium	MG/KG	0.42	8.33%	0.7	0	1	12	0.42 J	0.32 U	0.32 U	0.26 U	0.38 U	0.39 U
Vanadium	MG/KG	33.5	100.00%	150	0	12	12	27.6	32.2	22.8	20	29.3	19.1
Zinc	MG/KG	167	100.00%	110	1	12	12	104	87.1	64.9	83	87	106

NOTES:

a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)

b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.

c) NA = Not Available

d) U = The compound was not detected at this concentration.

e) J = The reported value is an estimated concentration.

f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

g) R = The data was rejected during the data validation process.

See Last Page for Notes.

TABLE M-1
SOIL ANALYSIS RESULTS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEAD								SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A
LOCATION ID								SB64A-2	SB64A-2	SB64A-2	SB64A-3	SB64A-3	SB64A-3
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB64A-2-00	SB64A-2-02	SB64A-2-03	SB64A-3-00	SB64A-3-01	SB64A-3-02
SAMP_DEPTH_TOP								0	2	4	0	0	2
SAMP_DEPTH_BOT								0.2	4	7	0.2	2	3
SAMP_DATE								06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
VOLATILE ORGANICS													
Benzene	UG/KG	2	8.33%	60	0	1	12	11 U	11 U	12 U	12 U	2 J	12 U
Toluene	UG/KG	2	8.33%	1500	0	1	12	11 U	11 U	12 U	12 U	2 J	12 U
Trichloroethene	UG/KG	1	8.33%	700	0	1	12	11 U	11 U	12 U	1 J	11 U	12 U
SEMIVOLATILE ORGANICS													
2-Methylnaphthalene	UG/KG	2900	33.33%	36400	0	4	12	150 J	2900 J	370 U	52 J	370 U	370 U
Acenaphthene	UG/KG	1300	33.33%	50000	0	4	12	250 J	1300 J	370 U	50 J	370 U	370 U
Acenaphthylene	UG/KG	400	33.33%	41000	0	4	12	400 J	310 J	370 U	170 J	370 U	370 U
Anthracene	UG/KG	1900	41.67%	50000	0	5	12	1100 J	1900 J	370 U	230 J	370 U	370 U
Benzo(a)anthracene	UG/KG	5600	41.67%	224	4	5	12	5600	4000	370 U	1200	370 U	370 U
Benzo(a)pyrene	UG/KG	5400	58.33%	61	5	7	12	5400	3100 J	21 J	1200	35 J	370 U
Benzo(b)fluoranthene	UG/KG	9600	41.67%	1100	3	5	12	9600 J	3700 UJ	370 UJ	1500	29 J	370 U
Benzo(ghi)perylene	UG/KG	4000	58.33%	50000	0	7	12	4000	1500 J	370 U	1000	27 J	370 U
Benzo(k)fluoranthene	UG/KG	5900	33.33%	1100	1	4	12	2300 UJ	5900 J	37 J	550	25 J	370 U
Bis(2-Ethylhexyl)phthalate	UG/KG	13000	75.00%	50000	0	9	12	13000	3700 U	52 J	140 J	21 J	370 U
Carbazole	UG/KG	780	41.67%	NA	0	5	12	420 J	780 J	370 U	110 J	370 U	370 U
Chrysene	UG/KG	4800	50.00%	400	4	6	12	4800	4500	22 J	970	370 U	370 U
Di-n-butylphthalate	UG/KG	290	8.33%	8100	0	1	12	2300 U	3700 U	370 U	390 U	370 U	370 U
Dibenz(a,h)anthracene	UG/KG	1500	50.00%	14	6	6	12	1500 J	820 J	370 U	390 J	19 J	370 U
Dibenzofuran	UG/KG	1400	25.00%	6200	0	3	12	120 J	1400 J	370 U	390 U	370 U	370 U
Fluoranthene	UG/KG	11000	50.00%	50000	0	6	12	6900	11000	26 J	1500	370 U	370 U
Fluorene	UG/KG	4100	41.67%	50000	0	5	12	350 J	4100	370 U	120 J	370 U	370 U
Indeno(1,2,3-cd)pyrene	UG/KG	3500	50.00%	3200	1	6	12	3500	1500 J	370 U	930	27 J	370 U
Naphthalene	UG/KG	3800	25.00%	13000	0	3	12	340 J	3800	370 U	51 J	370 U	370 U
Phenanthrene	UG/KG	15000	50.00%	50000	0	6	12	2700	15000	23 J	680	370 U	370 U
Phenol	UG/KG	44	8.33%	30	1	1	12	2300 U	3700 U	370 U	44 J	370 U	370 U
Pyrene	UG/KG	8700	50.00%	50000	0	6	12	5400	8700	50 J	1200	370 U	370 U
PESTICIDES/PCBs													
4,4'-DDD	UG/KG	3.7	8.33%	2900	0	1	12	3.7 J	3.7 U	3.7 U	3.9 U	3.7 U	3.7 UJ
4,4'-DDE	UG/KG	9	25.00%	2100	0	3	12	9 J	3.7 U	3.7 U	3 J	3.7 U	3.7 UJ
4,4'-DDT	UG/KG	24	33.33%	2100	0	4	12	24 J	4.4 J	3.7 U	5	3.7 U	3.7 UJ
Alpha-Chlordane	UG/KG	6.3	25.00%	NA	0	3	12	6.3 J	1.9 U	1.9 U	2.9 J	1.9 U	1.9 UJ
Dieldrin	UG/KG	7.5	16.67%	44	0	2	12	7.5 J	3.7 U	3.7 U	3.9 U	3.7 U	3.7 UJ
Endosulfan I	UG/KG	33	41.67%	900	0	5	12	33 J	7.8 J	1.9 U	23 J	1.9 U	1.9 UJ
Endosulfan sulfate	UG/KG	5	16.67%	1000	0	2	12	5 J	3.7 U	3.7 U	3.7 J	3.7 U	3.7 UJ
Heptachlor epoxide	UG/KG	1.9	8.33%	20	0	1	12	3.6 U	1.9 U	1.9 U	1.9 J	1.9 U	1.9 UJ
METALS													
Aluminum	MG/KG	19800	100.00%	19300	1	12	12	11800	18400	12400	16500	14500	15000
Antimony	MG/KG	4.3	25.00%	5.9	0	3	12	4.3 J	0.2 UJ	0.19 UJ	0.24 UJ	0.25 UJ	0.21 UJ
Arsenic	MG/KG	8.4	100.00%	8.2	1	12	12	5.8	7.1	4.8	5.7	6.1	5.9
Barium	MG/KG	133	100.00%	300	0	12	12	96.3	90.9	68.7	109	103	86.1

See Last Page for Notes
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TABLE M-1
SOIL ANALYSIS RESULTS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES						
SEAD								SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A	SEAD-64A
LOCATION ID								SB64A-2	SB64A-2	SB64A-2	SB64A-3	SB64A-3	SB64A-3
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB64A-2-00	SB64A-2-02	SB64A-2-03	SB64A-3-00	SB64A-3-01	SB64A-3-02
SAMP_DEPTH_TOP								0	2	4	0	0	2
SAMP_DEPTH_BOT								0.2	4	7	0.2	2	3
SAMP_DATE								06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Beryllium	MG/KG	0.8	100.00%	1.1	0	12	12	0.55 J	0.78 J	0.54 J	0.74 J	0.72 J	0.65 J
Cadmium	MG/KG	1	91.67%	2.3	0	11	12	1	0.72 J	0.7 J	0.83 J	0.4 J	0.32 J
Calcium	MG/KG	72400	100.00%	121000	0	12	12	62800	4040	64900	27600	3560	3130
Chromium	MG/KG	35.5	100.00%	29.6	1	12	12	35.5	27	17.5	23.7	20.8 J	22.1 J
Cobalt	MG/KG	14	100.00%	30	0	12	12	10.3	9.5	8.9	9.1 J	11.3	11
Copper	MG/KG	56.3	100.00%	33	1	12	12	56.3	23.5	24.3	21	23.4	25.8
Iron	MG/KG	35900	100.00%	36500	0	12	12	23000	30000	21200	24600	26700	26800
Lead	MG/KG	391	83.33%	24.8	1	10	12	391	10.1	10.7	24.4	13.6 R	10.8 R
Magnesium	MG/KG	14800	100.00%	21500	0	12	12	8000	5610	11900	5870	4410	5190
Manganese	MG/KG	968	100.00%	1060	0	12	12	517	310	405	664	753	556
Mercury	MG/KG	0.1	100.00%	0.1	0	12	12	0.1	0.09 J	0.02 J	0.05 J	0.05 J	0.04 J
Nickel	MG/KG	36.1	100.00%	49	0	12	12	31.1	31.5	26.5	26.5	29	33.9
Potassium	MG/KG	2820	100.00%	2380	4	12	12	2060 J	2820 J	2170 J	2430 J	1630 J	2210 J
Selenium	MG/KG	1.7	83.33%	2	0	10	12	0.49 J	0.72 J	0.39 U	0.73 J	0.91 J	0.83
Sodium	MG/KG	92.1	75.00%	172	0	9	12	78.4 J	39.4 J	85.5 J	42.8 J	21.9 J	16.4 U
Thallium	MG/KG	0.42	8.33%	0.7	0	1	12	0.33 U	0.3 U	0.27 U	0.35 U	0.37 U	0.31 U
Vanadium	MG/KG	33.5	100.00%	150	0	12	12	25.4	31.1	20.8	33.5	25.6	25
Zinc	MG/KG	167	100.00%	110	1	12	12	167	76.7	61.2	92.7	77.4	82.8

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with th
g) R = The data was rejected during the data validation process.

TABLE M-2
GROUND WATER ANALYSIS RESULTS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-64A	SEAD-64A	SEAD-64A
							LOCATION ID	MW64A-1	MW64A-2	MW64A-3
							MATRIX	GRND WTR	GRND WTR	GRND WTR
							SAMPLE NUMBER	MW64A-1	MW64A-2	MW64A-3
							SAMP_DEPTH_TOP	4	3.7	3.6
							SAMP_DEPTH_BOT	9.6	7.1	7.6
							SAMP_DATE	07/19/94	07/21/94	07/07/94
							SAMPLE TYPE	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVELS	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
METALS										
Aluminum	UG/L	1710	100.00%	50 (a)	3	3	3	**398**	**1710**	**379**
Barium	UG/L	74.5	100.00%	1000 (b)	0	3	3	42 J	74.5 J	53.4 J
Calcium	UG/L	148000	100.00%	NA	0	3	3	109000	148000	143000
Chromium	UG/L	3.8	100.00%	50 (b)	0	3	3	0.49 J	3.8 J	0.46 J
Cobalt	UG/L	4.7	33.33%	NA	0	1	3	0.5 U	4.7 J	0.5 U
Copper	UG/L	1.4	100.00%	200 (b)	0	3	3	0.61 J	1.4 J	0.97 J
Iron	UG/L	3340	100.00%	300 (b)	3	3	3	**773** J	**3340** J	**539**
Magnesium	UG/L	23400	100.00%	NA	0	3	3	16800	23400	20700
Manganese	UG/L	2040	100.00%	50 (a)	1	3	3	28.3	**2040**	40.6
Mercury	UG/L	0.06	100.00%	0.7 (b)	0	3	3	0.04 J	0.06 J	0.04 J
Nickel	UG/L	9.6	100.00%	100 (b)	0	3	3	1 J	9.6 J	1.9 J
Potassium	UG/L	15000	100.00%	NA	0	3	3	1790 J	15000 J	2010 J
Sodium	UG/L	13000	100.00%	20000 (b)	0	3	3	2180 J	13000	10000
Thallium	UG/L	3.3	33.33%	2 (c)	1	1	3	1.9 U	**3.3** J	1.9 U
Vanadium	UG/L	3	100.00%	NA	0	3	3	1.3 J	3 J	0.65 J
Zinc	UG/L	16	100.00%	5000 (a)	0	3	3	3.9 J	16 J	5.8 J
OTHER ANALYSES										
pH	Standard Units							7.4	7.4	7
Conductivity	umhos/cm							500	950	620
Temperature	°C							15	21.6	13.6
Turbidity	NTU							15	80	120

NOTES:

a) Secondary Drinking Water Regulations
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE M-3
INORGANICS ANALYSIS OF SOIL - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-64A Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	14900.00	No
Antimony	3.56	7.12	1.63	No
Arsenic	5.08	10.15	6.23	No
Barium	78.43	156.86	86.43	No
Beryllium	0.67	1.33	0.65	No
Cadmium	0.97	1.94	0.50	No
Calcium	45449.65	90899.30	24605.83	No
Chromium	20.32	40.64	23.22	No
Cobalt	11.39	22.79	10.60	No
Copper	20.99	41.97	26.04	No
Iron	24704.74	49409.47	26783.33	No
Lead	16.47	32.95	53.09	Yes
Magnesium	10290.18	20580.35	6928.33	No
Manganese	576.14	1152.28	573.67	No
Mercury	0.04	0.09	0.05	No
Nickel	30.39	60.79	30.38	No
Potassium	1487.25	2974.49	2135.00	No
Selenium	0.63	1.26	0.91	No
Sodium	99.42	198.85	52.48	No
Thallium	0.43	0.86	0.42	No
Vanadium	21.41	42.82	26.03	No
Zinc	67.80	135.60	90.82	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE M-4
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-64A Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	829.00	No
Barium	81.20	162.40	56.63	No
Calcium	115619.35	231238.71	133333.33	No
Chromium	8.67	17.35	1.58	No
Cobalt	6.84	13.68	4.70	No
Copper	5.39	10.79	0.99	No
Iron	4476.26	8952.53	1550.67	No
Magnesium	28567.74	57135.48	20300.00	No
Manganese	231.41	462.82	702.97	Yes
Mercury	0.05	0.10	0.05	No
Nickel	10.57	21.14	4.17	No
Potassium	4065.59	8131.17	6266.67	No
Sodium	15020.67	30041.33	8393.33	No
Thallium	3.90	7.80	3.30	No
Vanadium	8.23	16.47	1.65	No
Zinc	25.37	50.74	8.57	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE M-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-64A
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Ground Water mg/L
Volatile Organics			
Benzene	2.00E-03	2.00E-03	
Toluene	2.00E-03	2.00E-03	
Trichloroethene	1.00E-03	1.00E-03	
Semivolatile Organics			
2-Methylnaphthalene	2.90E+00	1.50E-01	
Acenaphthene	1.30E+00	2.50E-01	
Acenaphthylene	4.00E-01	4.00E-01	
Anthracene	1.90E+00	1.10E+00	
Benzo(a)anthracene	5.60E+00	5.60E+00	
Benzo(a)pyrene	5.40E+00	5.40E+00	
Benzo(b)fluoranthene	9.60E+00	9.60E+00	
Benzo(ghi)perylene	4.00E+00	4.00E+00	
Benzo(k)fluoranthene	5.90E+00	5.50E-01	
Bis(2-Ethylhexyl)phthalate	1.30E+01	1.30E+01	
Carbazole	7.80E-01	7.20E-01	
Chrysene	4.80E+00	4.80E+00	
Di-n-butylphthalate	2.90E-01	2.90E-01	
Dibenz(a,h)anthracene	1.50E+00	1.50E+00	
Dibenzofuran	1.40E+00	1.20E-01	
Fluoranthene	1.10E+01	6.90E+00	
Fluorene	4.10E+00	3.50E-01	
Indeno(1,2,3-cd)pyrene	3.50E+00	3.50E+00	
Naphthalene	3.80E+00	3.40E-01	
Phenanthrene	1.50E+01	2.70E+00	
Phenol	4.40E-02	4.40E-02	
Pyrene	8.70E+00	5.40E+00	
Pesticides/PCBs			
4,4'-DDD	3.70E-03	3.70E-03	
4,4'-DDE	9.00E-03	9.00E-03	
4,4'-DDT	2.40E-02	2.40E-02	
Alpha-Chlordane	6.30E-03	6.30E-03	
Dieldrin	7.50E-03	7.50E-03	
Endosulfan I	3.30E-02	3.30E-02	
Endosulfan sulfate	5.00E-03	5.00E-03	
Heptachlor epoxide	1.90E-03	1.90E-03	
Metals			
Lead	3.91E+02	3.91E+02	
Manganese			2.04E+00

TABLE M-6
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Benzene	2.00E-03	2.00E-03	3.40E-11	2.96E-10
Toluene	2.00E-03	2.00E-03	3.40E-11	2.96E-10
Trichloroethene	1.00E-03	1.00E-03	1.70E-11	1.48E-10
Semivolatile Organics				
2-Methylnaphthalene	1.50E-01	2.90E+00	2.55E-09	4.29E-07
Acenaphthene	2.50E-01	1.30E+00	4.25E-09	1.92E-07
Acenaphthylene	4.00E-01	4.00E-01	6.80E-09	5.92E-08
Anthracene	1.10E+00	1.90E+00	1.87E-08	2.81E-07
Benzo(a)anthracene	5.60E+00	5.60E+00	9.52E-08	8.29E-07
Benzo(a)pyrene	5.40E+00	5.40E+00	9.18E-08	7.99E-07
Benzo(b)fluoranthene	9.60E+00	9.60E+00	1.63E-07	1.42E-06
Benzo(ghi)perylene	4.00E+00	4.00E+00	6.80E-08	5.92E-07
Benzo(k)fluoranthene	5.50E-01	5.90E+00	9.35E-09	8.73E-07
Bis(2-Ethylhexyl)phthalate	1.30E+01	1.30E+01	2.21E-07	1.92E-06
Carbazole	7.20E-01	7.80E-01	1.22E-08	1.15E-07
Chrysene	4.80E+00	4.80E+00	8.16E-08	7.10E-07
Di-n-butylphthalate	2.90E-01	2.90E-01	4.93E-09	4.29E-08
Dibenz(a,h)anthracene	1.50E+00	1.50E+00	2.55E-08	2.22E-07
Dibenzofuran	1.20E-01	1.40E+00	2.04E-09	2.07E-07
Fluoranthene	6.90E+00	1.10E+01	1.17E-07	1.63E-06
Fluorene	3.50E-01	4.10E+00	5.95E-09	6.07E-07
Indeno(1,2,3-cd)pyrene	3.50E+00	3.50E+00	5.95E-08	5.18E-07
Naphthalene	3.40E-01	3.80E+00	5.78E-09	5.62E-07
Phenanthrene	2.70E+00	1.50E+01	4.59E-08	2.22E-06
Phenol	4.40E-02	4.40E-02	7.48E-10	6.51E-09
Pyrene	5.40E+00	8.70E+00	9.18E-08	1.29E-06
Pesticides				
4,4'-DDD	3.70E-03	3.70E-03	6.29E-11	5.48E-10
4,4'-DDE	9.00E-03	9.00E-03	1.53E-10	1.33E-09
4,4'-DDT	2.40E-02	2.40E-02	4.08E-10	3.55E-09
Alpha-Chlordane	6.30E-03	6.30E-03	1.07E-10	9.32E-10
Dieldrin	7.50E-03	7.50E-03	1.28E-10	1.11E-09
Endosulfan I	3.30E-02	3.30E-02	5.61E-10	4.88E-09
Endosulfan sulfate	5.00E-03	5.00E-03	8.50E-11	7.40E-10
Heptachlor epoxide	1.90E-03	1.90E-03	3.23E-11	2.81E-10
Metals				
Lead	3.91E+02	3.91E+02	6.65E-06	5.79E-05

TABLE M-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Warehouse Worker Intake (mg/kg-day) (Nc)	Warehouse Worker Intake (mg/kg-day) (Car)	Warehouse Worker Hazard Quotient	Warehouse Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Trespasser (Child) Intake (mg/kg-day) (Nc)	Trespasser (Child) Intake (mg/kg-day) (Car)	Trespasser (Child) Hazard Quotient	Trespasser (Child) Cancer Risk
Volatile Organics																
Benzene	1.71E-03	2.73E-02	3.40E-11	2.96E-10	2.66E-12	9.51E-13	2E-09	3E-14	3.01E-11	4.30E-13	2E-08	1E-14	1.12E-13	7.98E-15	7E-11	2E-16
Toluene	1.14E-01	NA	3.40E-11	2.96E-10	2.66E-12		2E-11		3.01E-11		3E-10		1.12E-13		1E-12	
Trichloroethene	NA	6.00E-03	1.70E-11	1.48E-10		4.75E-13		3E-15		2.15E-13		1E-15		3.99E-15		2E-17
Semivolatile Organics																
2-Methylnaphthalene	NA	NA	2.55E-09	4.29E-07												
Acenaphthene	NA	NA	4.25E-09	1.92E-07												
Acenaphthylene	NA	NA	6.80E-09	5.92E-08												
Anthracene	NA	NA	1.87E-08	2.81E-07												
Benzo(a)anthracene	NA	NA	9.52E-08	8.29E-07												
Benzo(a)pyrene	NA	NA	9.18E-08	7.99E-07												
Benzo(b)fluoranthene	NA	NA	1.63E-07	1.42E-06												
Benzo(ghi)perylene	NA	NA	6.80E-08	5.92E-07												
Benzo(k)fluoranthene	NA	NA	9.35E-09	8.73E-07												
bis(2-Ethylhexyl)phthalate	NA	NA	2.21E-07	1.92E-06												
Carbazole	NA	NA	1.22E-08	1.15E-07												
Chrysene	NA	NA	8.16E-08	7.10E-07												
Di-n-butylphthalate	NA	NA	4.93E-09	4.29E-08												
Dibenz(a,h)anthracene	NA	NA	2.55E-08	2.22E-07												
Dibenzofuran	NA	NA	2.04E-09	2.07E-07												
Fluoranthene	NA	NA	1.17E-07	1.63E-06												
Fluorene	NA	NA	5.95E-09	6.07E-07												
Indeno(1,2,3-cd)pyrene	NA	NA	5.95E-08	5.18E-07												
Naphthalene	8.60E-04	NA	5.78E-09	5.62E-07	4.52E-10		5E-07		5.72E-08		7E-05		1.90E-11		2E-08	
Phenanthrene	NA	NA	4.59E-08	2.22E-06												
Phenol	NA	NA	7.48E-10	6.51E-09												
Pyrene	NA	NA	9.18E-08	1.29E-06												
Pesticides																
4,4'-DDD	NA	NA	6.29E-11	5.48E-10												
4,4'-DDE	NA	NA	1.53E-10	1.33E-09												
4,4'-DDT	NA	3.40E-01	4.08E-10	3.55E-09		1.14E-11		4E-12		5.16E-12		2E-12		9.58E-14		3E-14
alpha-Chlordane	2.00E-04	3.50E-01	1.07E-10	9.32E-10	8.38E-12	2.99E-12	4E-08	1E-12	9.49E-11	1.36E-12	5E-07	5E-13	3.52E-13	2.52E-14	2E-09	9E-15
Dieldrin	NA	1.61E+01	1.28E-10	1.11E-09		3.56E-12		6E-11		1.61E-12		3E-11		2.99E-14		5E-13
Endosulfan I	NA	NA	5.61E-10	4.88E-09												
Endosulfan sulfate	NA	NA	8.50E-11	7.40E-10												
Heptachlor epoxide	NA	9.10E+00	3.23E-11	2.81E-10		9.03E-13		8E-12		4.09E-13		4E-12		7.59E-15		7E-14
Metals																
Lead	NA	NA	6.65E-06	5.79E-05												
Total Hazard Quotient and Cancer Risk:							**6E-07**	**7E-11**			**7E-05**	**3E-11**			**2E-08**	**6E-13**

Assumptions for Warehouse Worker		Assumptions for Construction Worker		Assumptions for Trespasser (Child)	
CA =	EPC Surface Only	CA =	EPC Surface and Sub-Surface	CA =	EPC Surface Only
BW =	70 kg	BW =	70 kg	BW =	50 kg
IR =	8 m3/day	IR =	10.4 m3/day	IR =	1.2 m3/day
EF =	250 days/year	EF =	250 days/year	EF =	50 days/year
ED =	25 years	ED =	1 year	ED =	5 years
AT (Nc) =	9,125 days	AT (Nc) =	365 days	AT (Nc) =	1,825 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE M-6 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Warehouse Land provided in Table 3.3-4.

TABLE M-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Warehouse Worker Intake (mg/kg-day) (Nc)	Warehouse Worker Intake (mg/kg-day) (Car)	Warehouse Worker Hazard Quotient	Warehouse Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Trespasser (Child) Intake (mg/kg-day) (Nc)	Trespasser (Child) Intake (mg/kg-day) (Car)	Trespasser (Child) Hazard Quotient	Trespasser (Child) Cancer Risk
Volatile Organics																
Benzene	3.00E-03	2.90E-02	2.00E-03	2.00E-03	1.96E-09	6.99E-10	7E-07	2E-11	9.39E-09	1.34E-10	3E-06	4E-12	1.10E-09	7.83E-11	4E-07	2E-12
Toluene	2.00E-01	NA	2.00E-03	2.00E-03	1.96E-09		1E-08		9.39E-09		5E-08		1.10E-09		5E-09	
Trichloroethene	NA	1.10E-02	1.00E-03	1.00E-03		3.49E-10		4E-12		6.71E-11		7E-13		3.91E-11		4E-13
Semivolatile Organics																
2-Methylnaphthalene	4.00E-02	NA	1.50E-01	2.90E+00	1.47E-07		4E-06		1.36E-05		3E-04		8.22E-08		2E-06	
Acenaphthene	6.00E-02	NA	2.50E-01	1.30E+00	2.45E-07		4E-06		6.11E-06		1E-04		1.37E-07		2E-06	
Acenaphthylene	NA	NA	4.00E-01	4.00E-01												
Anthracene	3.00E-01	NA	1.10E+00	1.90E+00	1.08E-06		4E-06		8.92E-06		3E-05		6.03E-07		2E-06	
Benzo(a)anthracene	NA	7.30E-01	5.60E+00	5.60E+00		1.96E-06		1E-06		3.76E-07		3E-07		2.19E-07		2E-07
Benzo(a)pyrene	NA	7.30E+00	5.40E+00	5.40E+00		1.89E-06		1E-05		3.62E-07		3E-06		2.11E-07		2E-06
Benzo(b)fluoranthene	NA	7.30E-01	9.60E+00	9.60E+00		3.35E-06		2E-06		6.44E-07		5E-07		3.76E-07		3E-07
Benzo(ghi)perylene	NA	NA	4.00E+00	4.00E+00												
Benzo(k)fluoranthene	NA	7.30E-02	5.50E-01	5.90E+00		1.92E-07		1E-08		3.96E-07		3E-08		2.15E-08		2E-09
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.30E+01	1.30E+01	1.27E-05	4.54E-06	6E-04	6E-08	6.11E-05	8.72E-07	3E-03	1E-08	7.12E-06	5.09E-07	4E-04	7E-09
Carbazole	NA	2.00E-02	7.20E-01	7.80E-01		2.52E-07		5E-09		5.23E-08		1E-09		2.82E-08		6E-10
Chrysene	NA	7.30E-03	4.80E+00	4.80E+00		1.68E-06		1E-08		3.22E-07		2E-09		1.88E-07		1E-09
Di-n-butylphthalate	1.00E-01	NA	2.90E-01	2.90E-01	2.84E-07		3E-06		1.36E-06		1E-05		1.59E-07		2E-06	
Dibenz(a,h)anthracene	NA	7.30E+00	1.50E+00	1.50E+00		5.24E-07		4E-06		1.01E-07		7E-07		5.87E-08		4E-07
Dibenzofuran	NA	NA	1.20E-01	1.40E+00												
Fluoranthene	4.00E-02	NA	6.90E+00	1.10E+01	6.75E-06		2E-04		5.17E-05		1E-03		3.78E-06		9E-05	
Fluorene	4.00E-02	NA	3.50E-01	4.10E+00	3.42E-07		9E-06		1.93E-05		5E-04		1.92E-07		5E-06	
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	3.50E+00	3.50E+00		1.22E-06		9E-07		2.35E-07		2E-07		1.37E-07		1E-07
Naphthalene	2.00E-02	NA	3.40E-01	3.80E+00	3.33E-07		2E-05		1.78E-05		9E-04		1.86E-07		9E-06	
Phenanthrene	NA	NA	2.70E+00	1.50E+01												
Phenol	6.00E-01	NA	4.40E-02	4.40E-02	4.31E-08		7E-08		2.07E-07		3E-07		2.41E-08		4E-08	
Pyrene	3.00E-02	NA	5.40E+00	8.70E+00	5.28E-06		2E-04		4.09E-05		1E-03		2.96E-06		1E-04	
Pesticides/PCBs																
4,4'-DDD	NA	2.40E-01	3.70E-03	3.70E-03		1.29E-09		3E-10		2.48E-10		6E-11		1.45E-10		3E-11
4,4'-DDE	NA	3.40E-01	9.00E-03	9.00E-03		3.15E-09		1E-09		6.04E-10		2E-10		3.52E-10		1E-10
4,4'-DDT	5.00E-04	3.40E-01	2.40E-02	2.40E-02	2.35E-08	8.39E-09	5E-05	3E-09	1.13E-07	1.61E-09	2E-04	5E-10	1.32E-08	9.39E-10	3E-05	3E-10
alpha-Chlordane	5.00E-04	3.50E-01	6.30E-03	6.30E-03	6.16E-09	2.20E-09	1E-05	8E-10	2.96E-08	4.23E-10	6E-05	1E-10	3.45E-09	2.47E-10	7E-06	9E-11
Dieldrin	5.00E-05	1.60E+01	7.50E-03	7.50E-03	7.34E-09	2.62E-09	1E-04	4E-08	3.52E-08	5.03E-10	7E-04	8E-09	4.11E-09	2.94E-10	8E-05	5E-09
Endosulfan I	6.00E-03	NA	3.30E-02	3.30E-02	3.23E-08		5E-06		1.55E-07		3E-05		1.81E-08		3E-06	
Endosulfan sulfate	6.00E-03	NA	5.00E-03	5.00E-03	4.89E-09		8E-07		2.35E-08		4E-06		2.74E-09		5E-07	
Heptachlor epoxide	1.30E-05	9.10E+00	1.90E-03	1.90E-03	1.86E-09	6.64E-10	1E-04	6E-09	8.92E-09	1.27E-10	7E-04	1E-09	1.04E-09	7.44E-11	8E-05	7E-10
Metals																
Lead	NA	NA	3.91E+02	3.91E+02												
Total Hazard Quotient and Cancer Risk:							**1E-03**	**2E-05**			**9E-03**	**4E-06**			**8E-04**	**3E-06**

Assumptions for Warehouse Worker		Assumptions for Construction Worker		Assumptions for Trespasser (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface and Subsurface	CS =	EPC Surface Only
BW =	70 kg	BW =	70 kg	BW =	50 kg
IR =	100 mg soil/day	IR =	480 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless	FI =	1 unitless
EF =	250 days/year	EF =	250 days/year	EF =	50 days/year
ED =	25 years	ED =	1 year	ED =	5 years
AT (Nc) =	9,125 days	AT (Nc) =	365 days	AT (Nc) =	1,825 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA= Information not available.
Exposure Factor Assumptions used for Planned Warehouse Land provided in Table 3.3-4

TABLE M-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE M-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom).
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Warehouse Worker Intake (mg/kg-day) (Nc)	Warehouse Worker Intake (mg/kg-day) (Car)	Warehouse Worker Hazard Quotient	Warehouse Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Trespasser (Child) Intake (mg/kg-day) (Nc)	Trespasser (Child) Intake (mg/kg-day) (Car)	Trespasser (Child) Hazard Quotient	Trespasser (Child) Cancer Risk
Metals								Ingestion of Groundwater Not Applicable for Construction Worker				Ingestion of Groundwater Not Applicable for Trespasser (Child)			
Manganese	5.00E-02	NA	2.04E+00	2.00E-02		4E-01									
Total Hazard Quotient and Cancer Risk:						**4E-01**									

Assumptions for Warehouse Worker

BW =	70	kg
IR =	1	liter/day
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Warehouse Land provided in Table 3.3-4

TABLE M-11
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day)[3]	Short-tailed Shrew Exposure (mg/kg/day)[3]	American Robin Exposure (mg/kg/day)[3]
Volatile Organics						
Benzene	2.00E-03	2.34E+00	2.45E+01	5.80E-03	2.80E-02	1.87E-02
Toluene	2.00E-03	1.39E+00	7.24E+01	1.60E-02	8.24E-02	5.20E-02
Trichloroethene	1.00E-03	1.22E+00	6.76E+01	7.43E-03	3.84E-02	2.42E-02
Semivolatile Organics						
2-Methylnaphthalene	1.50E-01	1.63E-01	3.42E-01	8.84E-03	3.19E-02	3.58E-02
Acenaphthene	2.50E-01	2.10E-01	3.42E-01	1.60E-02	5.36E-02	6.29E-02
Acenaphthylene	4.00E-01	1.72E-01	1.00E+00	5.24E-02	2.35E-01	1.89E-01
Anthracene	1.10E+00	1.04E-01	5.10E-02	2.32E-02	5.02E-02	1.32E-01
Benzo(a)anthracene	5.60E+00	1.51E-02	1.25E-01	1.09E-01	4.75E-01	6.79E-01
Benzo(a)pyrene	5.40E+00	1.02E+00	4.50E+00	3.24E+00	1.41E+01	1.05E+01
Benzo(b)fluoranthene	9.60E+00	6.17E-03	3.20E-01	3.80E-01	1.87E+00	1.80E+00
Benzo(ghi)perylene	4.00E+00	3.05E-03	2.40E-01	1.23E-01	5.99E-01	6.34E-01
Benzo(k)fluoranthene	5.50E-01	4.25E-03	2.53E-01	1.77E-02	8.64E-02	8.99E-02
Bis(2-Ethylhexyl)phthalate	1.30E+01	5.10E-03	1.20E+01	1.69E+01	8.88E+01	5.60E+01
Carbazole	7.20E-01	1.00E+00	1.15E+02	9.02E+00	4.71E+01	2.94E+01
Chrysene	4.80E+00	2.22E-02	1.75E-01	1.23E-01	5.45E-01	6.76E-01
Di-n-butylphthalate	2.90E-01	8.84E-02	1.25E-01	7.96E-03	2.53E-02	4.11E-02
Dibenz(a,h)anthracene	1.50E+00	8.16E-03	1.75E-01	3.63E-02	1.69E-01	2.06E-01
Dibenzofuran	1.20E-01	1.51E-01	1.00E+00	1.54E-02	7.03E-02	5.61E-02
Fluoranthene	6.90E+00	3.72E-02	7.92E-01	6.48E-01	3.20E+00	2.50E+00
Fluorene	3.50E-01	1.49E-01	3.42E-01	2.01E-02	7.43E-02	8.22E-02
Indeno(1,2,3-cd)pyrene	3.50E+00	1.37E-03	4.19E-01	1.74E-01	8.80E-01	7.74E-01
Naphthalene	3.40E-01	4.43E-01	3.42E-01	3.03E-02	7.54E-02	1.08E-01
Phenanthrene	2.70E+00	1.02E-01	1.22E-01	7.73E-02	2.32E-01	3.90E-01
Phenol	4.40E-02	5.40E+00	1.00E+00	3.06E-02	3.32E-02	8.46E-02
Pyrene	5.40E+00	4.43E-02	9.20E-02	1.03E-01	3.62E-01	6.36E-01
Pesticides/PCBs						
4,4'-DDD	3.70E-03	1.34E-02	1.00E-01	6.16E-05	2.61E-04	4.14E-04
4,4'-DDE	9.00E-03	1.79E-02	2.50E-02	8.13E-05	2.53E-04	7.82E-04
4,4'-DDT	2.40E-02	1.00E-02	1.00E-01	3.91E-04	1.69E-03	2.67E-03
Alpha-Chlordane	6.30E-03	1.45E-02	2.40E-01	2.01E-04	9.46E-04	1.02E-03
Dieldrin	7.50E-03	1.20E-01	4.70E-02	1.68E-04	3.29E-04	9.22E-04
Endosulfan I	3.30E-02	3.44E-01	2.50E-01	2.26E-03	5.49E-03	8.46E-03
Endosulfan sulfate	5.00E-03	2.97E-01	2.50E-01	3.17E-04	8.24E-04	1.22E-03
Heptachlor epoxide	1.90E-03	7.00E-02	1.30E-01	4.94E-05	1.70E-04	2.63E-04
Metals						
Lead	3.91E+02	5.80E-03	2.10E+00	9.04E+01	4.72E+02	3.18E+02

(1) SP: soil-to-plant uptake factor.
(2) BAF bioaccumulation factor.
(3) Receptor exposure calculated as

ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW

Where, ED = exposure dose
- Cs = RME conc in soil (mg/kg)
- CF = plant dry-to-wet-weight conversion factor (0.2 for inorganics only, 1 for organics)
- SP = soil-to-plant uptake factor
- Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kd/day for robin)
- BAF = bioaccumulation factor (unitless)
- Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kd/day for shrew; 0.04656 kd/day for robin)
- Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew: 0.00965 kg/day for robin)
- SFF = Site foraging factor (1 for mouse and shrew; 0.583 for robin)
- BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE M-12
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64A - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Benzene	5.80E-03	2.80E-02	2.64E+01	2.2E-04	1.1E-03
Toluene	1.60E-02	8.24E-02	2.60E+01	6.1E-04	3.2E-03
Trichloroethene	7.43E-03	3.84E-02	none available	--	--
Semivolatile Organics					
2-Methylnaphthalene	8.84E-03	3.19E-02	7.16E+00	1.2E-03	4.5E-03
Acenaphthene	1.60E-02	5.36E-02	1.75E+00	9.1E-03	3.1E-02
Acenaphthylene	5.24E-02	2.35E-01	1.00E+00	5.2E-02	2.3E-01
Anthracene	2.32E-02	5.02E-02	1.00E+02	2.3E-04	5.0E-04
Benzo(a)anthracene	1.09E-01	4.75E-01	1.00E+00	1.1E-01	4.7E-01
Benzo(a)pyrene	3.24E+00	1.41E+01	1.00E+00	3.2E+00	1.4E+01
Benzo(b)fluoranthene	3.80E-01	1.87E+00	1.00E+00	3.8E-01	1.9E+00
Benzo(ghi)perylene	1.23E-01	5.99E-01	1.00E+00	1.2E-01	6.0E-01
Benzo(k)fluoranthene	1.77E-02	8.64E-02	1.00E+00	1.8E-02	8.6E-02
Bis(2-Ethylhexyl)phthalate	1.69E+01	8.88E+01	1.83E+01	9.2E-01	4.8E+00
Carbazole	9.02E+00	4.71E+01	none available	--	--
Chrysene	1.23E-01	5.45E-01	1.00E+00	1.2E-01	5.4E-01
Di-n-butylphthalate	7.96E-03	2.53E-02	5.50E+02	1.4E-05	4.6E-05
Dibenz(a,h)anthracene	3.63E-02	1.69E-01	1.00E+00	3.6E-02	1.7E-01
Dibenzofuran	1.54E-02	7.03E-02	no data	--	--
Fluoranthene	6.48E-01	3.20E+00	1.25E+00	5.2E-01	2.6E+00
Fluorene	2.01E-02	7.43E-02	1.25E+00	1.6E-02	5.9E-02
Indeno(1,2,3-cd)pyrene	1.74E-01	8.80E-01	1.00E+00	1.7E-01	8.8E-01
Naphthalene	3.03E-02	7.54E-02	7.16E+00	4.2E-03	1.1E-02
Phenanthrene	7.73E-02	2.32E-01	1.00E+00	7.7E-02	2.3E-01
Phenol	3.06E-02	3.32E-02	none available	--	--
Pyrene	1.03E-01	3.62E-01	1.00E+00	1.0E-01	3.6E-01
Pesticides/PCBs					
4,4'-DDD	6.16E-05	2.61E-04	8.00E-01	7.7E-05	3.3E-04
4,4'-DDE	8.13E-05	2.53E-04	8.00E-01	1.0E-04	3.2E-04
4,4'-DDT	3.91E-04	1.69E-03	8.00E-01	4.9E-04	2.1E-03
Alpha-Chlordane	2.01E-04	9.46E-04	none available	--	--
Dieldrin	1.68E-04	3.29E-04	2.00E-02	8.4E-03	1.6E-02
Endosulfan I	2.26E-03	5.49E-03	none available	--	--
Endosulfan sulfate	3.17E-04	8.24E-04	none available	--	--
Heptachlor epoxide	4.94E-05	1.70E-04	1.00E-01	4.9E-04	1.7E-03
Metals					
Lead	9.04E+01	4.72E+02	8.00E+00	1.1E+01	5.9E+01

(1) Receptor exposure from Table M-11.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE M-13
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64A - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Volatile Organics			
Benzene	1.87E-02	none available	--
Toluene	5.20E-02	none available	--
Trichloroethene	2.42E-02	none available	--
Semivolatile Organics			
2-Methylnaphthalene	3.58E-02	2.85E+01	1.3E-03
Acenaphthene	6.29E-02	1.00E+03	6.3E-05
Acenaphthylene	1.89E-01	1.00E+03	1.9E-04
Anthracene	1.32E-01	1.00E+03	1.3E-04
Benzo(a)anthracene	6.79E-01	4.00E+01	1.7E-02
Benzo(a)pyrene	1.05E+01	4.00E+01	2.6E-01
Benzo(b)fluoranthene	1.80E+00	4.00E+01	4.5E-02
Benzo(ghi)perylene	6.34E-01	4.00E+01	1.6E-02
Benzo(k)fluoranthene	8.99E-02	4.00E+01	2.2E-03
Bis(2-Ethylhexyl)phthalate	5.60E+01	1.10E+00	5.1E+01
Carbazole	2.94E+01	none available	--
Chrysene	6.76E-01	4.00E+01	1.7E-02
Di-n-butylphthalate	4.11E-02	1.10E-01	3.7E-01
Dibenz(a,h)anthracene	2.06E-01	4.00E+01	5.1E-03
Dibenzofuran	5.61E-02	2.18E-01	2.6E-01
Fluoranthene	2.50E+00	4.00E+01	6.3E-02
Fluorene	8.22E-02	2.85E+01	2.9E-03
Indeno(1,2,3-cd)pyrene	7.74E-01	4.00E+01	1.9E-02
Naphthalene	1.08E-01	2.85E+01	3.8E-03
Phenanthrene	3.90E-01	2.85E+01	1.4E-02
Phenol	8.46E-02	none available	--
Pyrene	6.36E-01	4.00E+01	1.6E-02
Pesticides/PCBs			
4,4'-DDD	4.14E-04	5.60E-02	7.4E-03
4,4'-DDE	7.82E-04	5.60E-02	1.4E-02
4,4'-DDT	2.67E-03	5.60E-02	4.8E-02
Alpha-Chlordane	1.02E-03	2.14E+00	4.8E-04
Dieldrin	9.22E-04	7.70E-02	1.2E-02
Endosulfan I	8.46E-03	1.00E+00	8.5E-03
Endosulfan sulfate	1.22E-03	1.00E+00	1.2E-03
Heptachlor epoxide	2.63E-04	4.80E+00	5.5E-05
Metals			
Lead	3.18E+02	3.85E+00	8.3E+01

(1) Receptor exposure from Table M-11.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX N
SEAD-64B: Garbage Disposal Area

Table N-1: Soil Analysis Results
Table N-2: Groundwater Analysis Results
Table N-3: Surface Water Analysis Results
Table N-4: Sediment Analysis Results
Table N-5: Inorganics Analysis of Soil
Table N-6: Inorganics Analysis of Groundwater
Table N-7: Exposure Point Concentrations for Chemicals of Potential Concern
Table N-8: Ambient Air Exposure Point Concentrations
Table N-9: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table N-10: Calculation of Intake and Risk from the Ingestion of Soil
Table N-11: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table N-12: Calculation of Absorbed Dose and Risk from Dermal Contact to Surface Water
Table N-13: Calculation of Absorbed Dose and Risk from Dermal Contact to Sediment
Table N-14: Calculated Soil Receptor Exposure
Table N-15: Calculation of Soil Hazard Quotients - Mammals
Table N-16: Calculation of Soil Hazard Quotients - Bird

TABLE N-1
SOIL ANALYSIS RESULTS - SEAD64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

						SEAD		SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B
						LOCATION ID		MW64B-1	MW64B-1	MW64B-1	SB64B-1	SB64B-1	SB64B-1	SB64B-2
						MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						SAMPLE NUMBER		MW64B-1-1	MW64B-1-2	MW64B-1-3	SB64B-1-00	SB64B-1-05	SB64B-1-06	SB64B-2-00
						SAMP_DEPTH_TOP		0	4	6	0	8	10	0
						SAMP_DEPTH_BOT		0.2	6	8	0.2	10	12	0.2
						SAMP_DATE		5/13/94	5/13/94	5/13/94	6/8/94	6/8/94	6/8/94	6/8/94
						SAMPLE TYPE		SA	SA	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS														
Acetone	UG/KG	57	17%	200	0	2	12	57	11 U	11 U	13 U	11 U	7 J	12 U
Carbon disulfide	UG/KG	1	8%	2700	0	1	12	15 U	11 U	11 U	13 U	11 U	11 U	12 U
Methyl ethyl ketone	UG/KG	22	8%	300	0	1	12	22	11 U	11 U	13 U	11 U	11 U	12 U
Methylene chloride	UG/KG	1	8%	100	0	1	12	15 U	11 U	11 U	13 U	11 U	11 U	12 U
SEMIVOLATILE ORGANICS														
Benzo(a)anthracene	UG/KG	38	17%	224	0	2	12	38 J	36 J	360 U	400 U	370 U	350 U	400 U
Benzo(a)pyrene	UG/KG	39	25%	61	0	3	12	34 J	39 J	360 U	400 U	370 U	350 U	22 J
Benzo(b)fluoranthene	UG/KG	29	25%	1100	0	3	12	28 J	29 J	360 U	400 U	370 U	350 U	24 J
Benzo(ghi)perylene	UG/KG	110	17%	50000	0	2	12	520 U	110 J	360 U	400 U	370 U	350 U	20 J
Benzo(k)fluoranthene	UG/KG	36	25%	1100	0	3	12	36 J	31 J	360 U	400 U	370 U	350 U	23 J
Bis(2-Ethylhexyl)phthalate	UG/KG	390	42%	50000	0	5	12	520 U	360 U	360 U	400 U	110 J	350 U	96 J
Chrysene	UG/KG	40	25%	400	0	3	12	40 J	34 J	360 U	400 U	370 U	350 U	23 J
Di-n-butylphthalate	UG/KG	120	58%	8100	0	7	12	520 U	360 U	360 U	85 J	38 J	31 J	120 J
Fluoranthene	UG/KG	46	42%	50000	0	5	12	28 J	46 J	360 U	26 J	370 U	350 U	35 J
Indeno(1,2,3-cd)pyrene	UG/KG	29	8%	3200	0	1	12	520 U	29 J	360 U	400 U	370 U	350 U	400 U
Phenanthrene	UG/KG	30	17%	50000	0	2	12	30 J	26 J	360 U	400 U	370 U	350 U	400 U
Pyrene	UG/KG	64	25%	50000	0	3	12	36 J	64 J	360 U	400 U	370 U	350 U	23 J
PESTICIDES														
4,4'-DDE	UG/KG	2.6	8%	2100	0	1	12	5.2 U	3.6 U	3.6 U	2.6 J	3.7 U	3.5 U	4 U
4,4'-DDT	UG/KG	2.6	8%	2100	0	1	12	5.2 U	3.6 U	3.6 U	2.6 J	3.7 U	3.5 U	4 U
Aldrin	UG/KG	1.6	8%	41	0	1	12	2.7 U	1.9 U	1.6 J	2 U	1.9 U	1.8 U	2 U
Heptachlor epoxide	UG/KG	1.4	8%	20	0	1	12	1.4 J	1.9 U	1.9 U	2 U	1.9 U	1.8 U	2 U
METALS														
Aluminum	MG/KG	13400	100%	19300	0	12	12	13400	8870	7620	10600	10600	9250	10400
Antimony	MG/KG	0.3	25%	5.9	0	3	12	0.3 J	0.15 UJ	0.15 UJ	0.28 UJ	0.2 UJ	0.24 UJ	0.23 UJ
Arsenic	MG/KG	5.8	100%	8.2	0	12	12	5.5	4.3	5.5	4.9	4.7	4.3	4.6
Barium	MG/KG	105	100%	300	0	12	12	75.5	70.8	76.7	73.3	105	71	75.9
Beryllium	MG/KG	0.56	100%	1.1	0	12	12	0.56 J	0.43 J	0.37 J	0.49 J	0.5 J	0.43 J	0.49 J
Cadmium	MG/KG	0.64	100%	2.3	0	12	12	0.63 J	0.64 J	0.54 J	0.41 J	0.51 J	0.46 J	0.5 J
Calcium	MG/KG	90700	100%	121000	0	12	12	5530	70000	75900	53400 J	90700 J	74700 J	54400 J
Chromium	MG/KG	22.3	100%	29.6	0	12	12	17.5	14.1	13.5	15.9	17.1	15.9	15.4
Cobalt	MG/KG	11.8	100%	30	0	12	12	7.2 J	10	7.4 J	8.9 J	9.7	9.2	8.7
Copper	MG/KG	23.8	100%	33	0	12	12	18.9	20.2	17.6	21.5	23.2	21.1	20.6
Iron	MG/KG	21700	100%	36500	0	12	12	20900	18400	17100	19500	21700	20100	19400
Lead	MG/KG	21.4	100%	24.8	0	12	12	21.4	8.8	8.3	15.9	10.6	10.7	17
Magnesium	MG/KG	22100	100%	21500	1	12	12	3720	18900	21500	14400	16500	20400	$\boxed{22100}$
Manganese	MG/KG	492	100%	1060	0	12	12	207	434	389	394	377	418	414
Mercury	MG/KG	0.05	75%	0.1	0	9	12	0.05 J	0.02 J	0.01 U	0.03 J	0.02 J	0.01 J	0.04 J
Nickel	MG/KG	32.4	100%	49	0	12	12	19.8	28.2	22.6	26.2	31	26.5	25.9
Potassium	MG/KG	2320	100%	2380	0	12	12	1700	1630	1650	2160 J	2090 J	1860 J	2000 J
Selenium	MG/KG	0.99	42%	2	0	5	12	0.99 J	0.26 U	0.57 J	0.58 U	0.41 U	0.49 U	0.74 J

See even numbered pages for Notes:

TABLE N-1
SOIL ANALYSIS RESULTS - SEAD64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES							
						SEAD		SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B
						LOCATION ID		MW64B-1	MW64B-1	MW64B-1	SB64B-1	SB64B-1	SB64B-1	SB64B-2
						MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						SAMPLE NUMBER		MW64B-1-1	MW64B-1-2	MW64B-1-3	SB64B-1-00	SB64B-1-05	SB64B-1-06	SB64B-2-00
						SAMP_DEPTH_TOP		0	4	6	0	8	10	0
						SAMP_DEPTH_BOT		0.2	6	8	0.2	10	12	0.2
						SAMP_DATE		5/13/94	5/13/94	5/13/94	6/8/94	6/8/94	6/8/94	6/8/94
						SAMPLE TYPE		SA	SA	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Sodium	MG/KG	106	92%	172	0	11	12	35.9 U	96.8 J	79.6 J	51.9 J	106 J	94.4 J	65.7 J
Thallium	MG/KG	0.42	17%	0.7	0	2	12	0.41 J	0.24 U	0.24 U	0.41 U	0.29 U	0.35 U	0.33 U
Vanadium	MG/KG	23.3	100%	150	0	12	12	23.3	14.8	14.2	19.5	18.2	16.2	19
Zinc	MG/KG	85.1	100%	110	0	12	12	72.2	59	45.6	72.4	73.7	71.8	70.7

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm
c) NA = Not Available
d) U = The compound was not detected at this concentration
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
g) R = The data was rejected during the data validation process.

TABLE N-1
SOIL ANALYSIS RESULTS - SEAD64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEAD								SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B
LOCATION ID								SB64B-2	SB64B-2	SB64B-3	SB64B-3	SB64B-3
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB64B-2-06	SB64B-2-07	SB64B-3-00	SB64B-3-05	SB64B-3-08
SAMP_DEPTH_TOP								10	12	0	8	14
SAMP_DEPTH_BOT								12	14	0.2	10	16
SAMP_DATE								6/8/94	6/8/94	6/8/94	6/8/94	6/8/94
SAMPLE TYPE								SA	SA	SA	SA	SA
VOLATILE ORGANICS												
Acetone	UG/KG	57	17%	200	0	2	12	11 U	11 U	12 U	11 U	11 U
Carbon disulfide	UG/KG	1	8%	2700	0	1	12	11 U	1 J	12 U	11 U	11 U
Methyl ethyl ketone	UG/KG	22	8%	300	0	1	12	11 U	11 U	12 U	11 U	11 U
Methylene chloride	UG/KG	1	8%	100	0	1	12	1 J	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS												
Benzo(a)anthracene	UG/KG	38	17%	224	0	2	12	370 U	350 U	400 U	380 U	360 U
Benzo(a)pyrene	UG/KG	39	25%	61	0	3	12	370 U	350 U	400 U	380 U	360 U
Benzo(b)fluoranthene	UG/KG	29	25%	1100	0	3	12	370 U	350 U	400 U	380 U	360 U
Benzo(ghi)perylene	UG/KG	110	17%	50000	0	2	12	370 U	350 U	400 U	380 U	360 U
Benzo(k)fluoranthene	UG/KG	36	25%	1100	0	3	12	370 U	350 U	400 U	380 U	360 U
Bis(2-Ethylhexyl)phthalate	UG/KG	390	42%	50000	0	5	12	390	350 U	25 J	53 J	360 U
Chrysene	UG/KG	40	25%	400	0	3	12	370 U	350 U	400 U	380 U	360 U
Di-n-butylphthalate	UG/KG	120	58%	8100	0	7	12	42 J	30 J	41 J	380 U	360 U
Fluoranthene	UG/KG	46	42%	50000	0	5	12	370 U	350 U	25 J	380 U	360 U
Indeno(1,2,3-cd)pyrene	UG/KG	29	8%	3200	0	1	12	370 U	350 U	400 U	380 U	360 U
Phenanthrene	UG/KG	30	17%	50000	0	2	12	370 U	350 U	400 U	380 U	360 U
Pyrene	UG/KG	64	25%	50000	0	3	12	370 U	350 U	400 U	380 U	360 U
PESTICIDES												
4,4'-DDE	UG/KG	2.6	8%	2100	0	1	12	3.7 U	3.5 U	4 U	3.7 U	3.6 U
4,4'-DDT	UG/KG	2.6	8%	2100	0	1	12	3.7 U	3.5 U	4 U	3.7 U	3.6 U
Aldrin	UG/KG	1.6	8%	41	0	1	12	1.9 U	1.8 U	2 U	1.9 U	1.8 U
Heptachlor epoxide	UG/KG	1.4	8%	20	0	1	12	1.9 U	1.8 U	2 U	1.9 U	1.8 U
METALS												
Aluminum	MG/KG	13400	100%	19300	0	12	12	10600	8730	8800	10700 J	9140 J
Antimony	MG/KG	0.3	25%	5.9	0	3	12	0.19 UJ	0.22 UJ	0.26 UJ	0.27 J	0.25 J
Arsenic	MG/KG	5.8	100%	8.2	0	12	12	4	4.8	5.8	4.9	4.4
Barium	MG/KG	105	100%	300	0	12	12	73.1	79.3	58.4	72.5 J	64 J
Beryllium	MG/KG	0.56	100%	1.1	0	12	12	0.49 J	0.43 J	0.42 J	0.4 J	0.35 J
Cadmium	MG/KG	0.64	100%	2.3	0	12	12	0.42 J	0.46 J	0.48 J	0.45 J	0.44 J
Calcium	MG/KG	90700	100%	121000	0	12	12	64100 J	64600 J	54800 J	52300 J	81300 J
Chromium	MG/KG	22.3	100%	29.6	0	12	12	16.6	15.2	14.2	15.6 J	22.3 J
Cobalt	MG/KG	11.8	100%	30	0	12	12	10.4	11.8	8.3 J	8.7 J	8.3 J
Copper	MG/KG	23.8	100%	33	0	12	12	23.8	23.3	19.6	18.4 J	21.4 J
Iron	MG/KG	21700	100%	36500	0	12	12	19500	20600	17100	21300 J	18200 J
Lead	MG/KG	21.4	100%	24.8	0	12	12	9.5	11.1	12.1	12.4	8.5
Magnesium	MG/KG	22100	100%	21500	1	12	12	16800	16500	12200	13800 J	19100 J
Manganese	MG/KG	492	100%	1060	0	12	12	388	492	354	336 J	391 J
Mercury	MG/KG	0.05	75%	0.1	0	9	12	0.02 U	0.02 J	0.03 J	0.04 JR	0.02 J
Nickel	MG/KG	32.4	100%	49	0	12	12	32.4	29.6	24	24.3 J	24 J
Potassium	MG/KG	2320	100%	2380	0	12	12	2320 J	1700 J	1840 J	1560	2090
Selenium	MG/KG	0.99	42%	2	0	5	12	0.4 U	0.46 U	0.55 J	0.48 J	0.52 U

See even numbered pages for Notes:
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TABLE N-1
SOIL ANALYSIS RESULTS - SEAD64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

								SEAD	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B	SEAD-64B
								LOCATION ID	SB64B-2	SB64B-2	SB64B-3	SB64B-3	SB64B-3
								MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
								SAMPLE NUMBER	SB64B-2-06	SB64B-2-07	SB64B-3-00	SB64B-3-05	SB64B-3-08
								SAMP_DEPTH_TOP	10	12	0	8	14
								SAMP_DEPTH_BOT	12	14	0.2	10	16
								SAMP_DATE	6/8/94	6/8/94	6/8/94	6/8/94	6/8/94
								SAMPLE TYPE	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Sodium	MG/KG	106	92%	172	0	11	12		93 J	103 J	65.8 J	72.6 J	93.4 J
Thallium	MG/KG	0.42	17%	0.7	0	2	12		0.42 J	0.32 U	0.38 U	0.33 U	0.37 U
Vanadium	MG/KG	23.3	100%	150	0	12	12		17.6	15.2	16.2	19.6 J	17.1 J
Zinc	MG/KG	85.1	100%	110	0	12	12		60.4	85.1	78.8	64.3 J	64.9 J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration
e) J = The reported value is an estimated concentration
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with t e analysis.
g) R = The data was rejected during the data validation process.

TABLE N-2
GROUND WATER ANALYSIS RESULTS - SEAD-64B
Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
SEAD								SEAD-64B	SEAD-64B	SEAD-64B
LOCATION ID								MW64B-1	MW64B-2	MW64B-3
MATRIX								GRND WTR	GRND WTR	GRND WTR
SAMPLE NUMBER								MW64B-1	MW64B-2	MW64B-3
SAMP_DEPTH_TOP								4.1	3.9	8.6
SAMP_DEPTH_BOT								14.8	12.9	25.4
SAMP_DATE								07/10/94	07/10/94	07/10/94
SAMPLE TYPE								SA	SA	SA
METALS										
Aluminum	UG/L	1530	100%	50 (a)	3	3	3	198 J	51.9 J	1530
Arsenic	UG/L	2.2	33%	3 (b)	0	1	3	2 U	2 U	2.2 J
Barium	UG/L	124	100%	1000 (b)	0	3	3	104 J	124 J	84.4 J
Calcium	UG/L	200000	100%	NA	0	3	3	138000	131000	200000
Chromium	UG/L	3.1	67%	50 (b)	0	2	3	0.41 J	0.4 U	3.1 J
Cobalt	UG/L	4.4	100%	NA	0	3	3	1.1 J	0.51 J	4.4 J
Copper	UG/L	3.1	100%	200 (b)	0	3	3	1 J	0.56 J	3.1 J
Iron	UG/L	5090	100%	300 (b)	2	3	3	400	108	5090
Magnesium	UG/L	76000	100%	NA	0	3	3	45600	39600	76000
Manganese	UG/L	559	100%	50 (a)	3	3	3	98.9	54	559
Nickel	UG/L	7	100%	100 (b)	0	3	3	1.4 J	0.74 J	7 J
Potassium	UG/L	4780	100%	NA	0	3	3	4780 J	4570 J	4480 J
Selenium	UG/L	2.7	33%	10 (b)	0	1	3	2.7 U	2.7 U	2.7 J
Sodium	UG/L	17800	100%	20000 (b)	0	3	3	8140	9190	17800
Vanadium	UG/L	2.9	100%	NA	0	3	3	0.73 J	0.61 J	2.9 J
Zinc	UG/L	16.6	100%	5000 (a)	0	3	3	3.9 J	2.8 J	16.6 J

NOTES:
a) Secondary Drinking Water Regulation
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE N-3
SURAFCE WATER ANALYSIS RESULTS-SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a)(b)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
MATRIX								WATER	WATER	WATER
LOCATION								SEAD-64	SEAD-64	SEAD-64
SAMPLE DATE								04/18/94	04/18/94	04/18/94
ES ID								SW64B-1	SW64B-2	SW64B-3
LAB ID								218294	218295	218296
SDG NUMBER								43626	43626	43626
VOLATILE ORGANICS										
Carbon Disulfide	ug/L	2	33%		0	1	3	10 U	2 J	10 U
METALS										
Aluminum	ug/L	141	67%	100	1	2	3	23.5 J	141 J	12.7 U
Barium	ug/L	37.8	100%		0	3	3	34 J	37.8 J	28.2 J
Calcium	ug/L	61200	100%		0	3	3	61100	61200	54000
Chromium	ug/L	0.42	67%	140	0	2	3	0.4 U	0.41 J	0.42 J
Copper	ug/L	1.5	100%	17.36	0	3	3	1 J	1.5 J	1.3 J
Iron	ug/L	331	100%	300	1	3	3	36.6 J	331	30.2 J
Magnesium	ug/L	10900	100%		0	3	3	10900	10800	9250
Manganese	ug/L	39.2	100%		0	3	3	4.7 J	39.2	1.8 J
Nickel	ug/L	1.2	67%	100.16	0	2	3	0.59 U	1.2 J	1.1 J
Potassium	ug/L	1180	100%		0	3	3	1150 J	1180 J	1070 J
Sodium	ug/L	3050	100%		0	3	3	3050 J	2990 J	2960 J
Zinc	ug/L	7.7	100%	159.6	0	3	3	3.5 J	7.7 J	1.5 J
OTHER ANALYSES										
pH	Standard Units	7.9	100%		0	3	3	7.9	7.8	7.6
Conductivity	umhos/cm	293	100%		0	3	3	293	280	255
Temperature	°C	16	100%		0	3	3	16	16	15.9
Turbidity	NTU	0.6	100%		0	3	3	0.6	0.5	0.6

NOTES:
a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.

TABLE N-4
SEDIMENT ANALYSIS RESULTS - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD	SEAD-64B	SEAD-64B	SEAD-64B
LOCATION ID	SWSD64B-1	SWSD64B-2	SWSD64B-3
MATRIX	SEDIMENT	SEDIMENT	SEDIMENT
SAMPLE NUMBER	SD64B-1	SD64B-2	SD64B-3
SAMP_DEPTH_TOP	0	0	0
SAMP_DEPTH_BOT	0.2	0.2	0.2
SAMP_DATE	04/18/94	04/18/94	04/18/94
SAMPLE TYPE	SA	SA	SA

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC Sediment Criteria	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS										
Methylene chloride	UG/KG	6	100%	NA	0	3	3	3 J	6 J	2 J
SEMIVOLATILE ORGANICS										
Benzo(a)pyrene	UG/KG	29	33%	50.8	0	1	3	460 U	460 U	29 J
Benzo(b)fluoranthene	UG/KG	39	33%	50.8	0	1	3	460 U	460 U	39 J
Benzo(k)fluoranthene	UG/KG	30	33%	50.8	0	1	3	460 U	460 U	30 J
Bis(2-Ethylhexyl)phthalate	UG/KG	79	67%	7801	0	2	3	460 U	79 J	23 J
Fluoranthene	UG/KG	55	33%	39887	0	1	3	460 U	460 U	55 J
Phenanthrene	UG/KG	31	33%	4692	0	1	3	460 U	460 U	31 J
Pyrene	UG/KG	32	33%	37580	0	1	3	460 U	460 U	32 J
PESTICIDES/PCBs										
4,4'-DDE	UG/KG	3.3	33%	0.39	1	1	3	4.6 U	4.6 U	3.3 J
Endosulfan I	UG/KG	2.4	33%	1.17	1	1	3	2.4 U	2.4 U	2.4
Heptachlor	UG/KG	1.1	33%	0.031	1	1	3	2.4 U	2.4 U	1.1 J
METALS										
Aluminum	MG/KG	12800	100%	NA	0	3	3	7730	8730	12800
Antimony	MG/KG	0.25	33%	2	0	1	3	0.19 UJ	0.22 UJ	0.25 J
Arsenic	MG/KG	7.5	100%	6	1	3	3	5	4.5	7.5
Barium	MG/KG	102	100%	NA	0	3	3	71.7	60.7	102
Beryllium	MG/KG	0.67	100%	NA	0	3	3	0.42 J	0.44 J	0.67 J
Cadmium	MG/KG	0.45	100%	0.6	0	3	3	0.35 J	0.25 J	0.45 J
Calcium	MG/KG	75900	100%	NA	0	3	3	75900	63000	54200
Chromium	MG/KG	19.3	100%	26	0	3	3	11.9	13.2	19.3
Cobalt	MG/KG	11.8	100%	NA	0	3	3	8.5 J	8.2 J	11.8
Copper	MG/KG	27	100%	16	2	3	3	17.6	15.7	27
Iron	MG/KG	28100	100%	20000	1	3	3	17000	16500	28100
Lead	MG/KG	16.5	100%	31	0	3	3	10.7	9.1	16.5
Magnesium	MG/KG	14100	100%	NA	0	3	3	11800	13200	14100
Manganese	MG/KG	684	100%	460	1	3	3	447	351	684
Mercury	MG/KG	0.19	100%	0.15	1	3	3	0.03 J	0.03 J	0.19 J
Nickel	MG/KG	32	100%	16	3	3	3	20.5	20.3	32
Potassium	MG/KG	2190	100%	NA	0	3	3	1330	1950	2190
Sodium	MG/KG	35.5	33%	NA	0	1	3	30.3 U	35.5 J	33.6 U
Vanadium	MG/KG	25.9	100%	NA	0	3	3	15.7	17.1	25.9
Zinc	MG/KG	82.2	100%	120	0	3	3	66.1	52.2	82.2

NOTES:
a) NA = Not Available.
b) U = The compound was not detected below this concentration.
c) J = The reported value is an estimated concentration.
d) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
e) R = The data was rejected during the data validation process.

TABLE N-5
INORGANICS ANALYSIS OF SOIL - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-64B Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	9906.67	No
Antimony	3.56	7.12	0.28	No
Arsenic	5.08	10.15	4.87	No
Barium	78.43	156.86	74.57	No
Beryllium	0.67	1.33	0.45	No
Cadmium	0.97	1.94	0.52	No
Calcium	45449.65	90899.30	59544.00	No
Chromium	20.32	40.64	15.89	No
Cobalt	11.39	22.79	8.88	No
Copper	20.99	41.97	20.42	No
Iron	24704.74	49409.47	19346.67	No
Lead	16.47	32.95	12.32	No
Magnesium	10290.18	20580.35	16002.67	No
Manganese	576.14	1152.28	374.93	No
Mercury	0.04	0.09	0.03	No
Nickel	30.39	60.79	25.67	No
Potassium	1487.25	2974.49	1838.67	No
Selenium	0.63	1.26	0.70	No
Sodium	99.42	198.85	84.51	No
Thallium	0.43	0.86	0.41	No
Vanadium	21.41	42.82	17.55	No
Zinc	67.80	135.60	66.38	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE N-6
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-64B Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	593.30	No
Barium	81.20	162.40	104.13	No
Calcium	115619.35	231238.71	156333.33	No
Chromium	8.67	17.35	1.76	No
Cobalt	6.84	13.68	2.00	No
Copper	5.39	10.79	1.55	No
Iron	4476.26	8952.53	1866.00	No
Magnesium	28567.74	57135.48	53733.33	No
Manganese	231.41	462.82	237.30	No
Nickel	10.57	21.14	3.05	No
Potassium	4065.59	8131.17	4610.00	No
Selenium	2.13	4.27	2.70	No
Sodium	15020.67	30041.33	11710.00	No
Vanadium	8.23	16.47	1.41	No
Zinc	25.37	50.74	7.77	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE N-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Sediment mg/kg
Volatile Organics				
Acetone	5.70E-02	5.70E-02		
Carbon disulfide	1.00E-03		2.00E-03	
Methyl ethyl ketone	2.20E-02	2.20E-02		
Methylene chloride	1.00E-03			6.00E-03
Semivolatile Organics				
Benzo(a)anthracene	3.80E-02	3.80E-02		
Benzo(a)pyrene	3.90E-02	3.40E-02		2.90E-02
Benzo(b)fluoranthene	2.90E-02	2.80E-02		3.90E-02
Benzo(ghi)perylene	1.10E-01	2.00E-02		
Benzo(k)fluoranthene	3.60E-02	3.60E-02		3.00E-02
Bis(2-Ethylhexyl)phthalate	3.90E-01	9.60E-02		7.90E-02
Chrysene	4.00E-02	4.00E-02		
Di-n-butylphthalate	1.20E-01	1.20E-01		
Fluoranthene	4.60E-02	3.50E-02		5.50E-02
Indeno(1,2,3-cd)pyrene	2.90E-02			
Phenanthrene	3.00E-02	3.00E-02		3.10E-02
Pyrene	6.40E-02	3.60E-02		3.20E-02
Pesticides/PCBs				
4,4'-DDE	2.60E-03	2.60E-03		3.30E-03
4,4'-DDT	2.60E-03	2.60E-03		
Aldrin	1.60E-03			
Endosulfan I				2.40E-03
Heptachlor				1.10E-03
Heptachlor epoxide	1.40E-03	1.40E-03		
Metals				
Aluminum			1.41E-01	1.28E+04
Antimony				2.50E-01
Arsenic				7.50E+00
Barium			3.78E-02	1.02E+02
Beryllium				6.70E-01
Cadmium				4.50E-01
Calcium			6.12E+01	7.59E+04
Chromium			4.20E-04	1.93E+01
Cobalt				1.18E+01
Copper			1.50E-03	2.70E+01
Iron			3.31E-01	2.81E+04
Lead				1.65E+01
Magnesium			1.09E+01	1.41E+04
Manganese			3.92E-02	6.84E+02
Mercury				1.90E-01
Nickel			1.20E-03	3.20E+01
Potassium			1.18E+00	2.19E+03
Sodium			3.05E+00	3.55E+01
Vanadium				2.59E+01
Zinc			7.70E-03	8.22E+01

TABLE N-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m^3) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)	Calculated Air EPC Total Soils (mg/m^3)
Volatile Organics				
Acetone	5.70E-02	5.70E-02	9.69E-10	8.44E-09
Carbon disulfide	ND	1.00E-03	ND	1.48E-10
Methyl ethyl ketone	2.20E-02	2.20E-02	3.74E-10	3.26E-09
Methylene chloride	ND	1.00E-03	ND	1.48E-10
Semivolatile Organics				
Benzo(a)anthracene	3.80E-02	3.80E-02	6.46E-10	5.62E-09
Benzo(a)pyrene	3.40E-02	3.90E-02	5.78E-10	5.77E-09
Benzo(b)fluoranthene	2.80E-02	2.90E-02	4.76E-10	4.29E-09
Benzo(ghi)perylene	2.00E-02	1.10E-01	3.40E-10	1.63E-08
Benzo(k)fluoranthene	3.60E-02	3.60E-02	6.12E-10	5.33E-09
Bis(2-Ethylhexyl)phthalate	9.60E-02	3.90E-01	1.63E-09	5.77E-08
Chrysene	4.00E-02	4.00E-02	6.80E-10	5.92E-09
Di-n-butylphthalate	1.20E-01	1.20E-01	2.04E-09	1.78E-08
Fluoranthene	3.50E-02	4.60E-02	5.95E-10	6.81E-09
Indeno(1,2,3-cd)pyrene	ND	2.90E-02	ND	4.29E-09
Phenanthrene	3.00E-02	3.00E-02	5.10E-10	4.44E-09
Pyrene	3.60E-02	6.40E-02	6.12E-10	9.47E-09
Pesticides				
4,4'-DDE	2.60E-03	2.60E-03	4.42E-11	3.85E-10
4,4'-DDT	2.60E-03	2.60E-03	4.42E-11	3.85E-10
Aldrin	ND	1.60E-03	ND	2.37E-10
Heptachlor epoxide	1.40E-03	1.40E-03	2.38E-11	2.07E-10

ND = Compound was not detected.

TABLE N-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Acetone	NA	NA	9.69E-10	8.44E-09												
Carbon disulfide	2.00E-01	NA	ND	1.48E-10									1.51E-11		8E-11	
Methyl ethyl ketone	2.86E-01	NA	3.74E-10	3.26E-09	2.05E-11		7E-11		8.32E-12		3E-11		3.31E-10		1E-09	
Methylene chloride	8.57E-01	1.65E-03	ND	1.48E-10									1.51E-11	2.15E-13	2E-11	4E-16
Semivolatile Organics																
Benzo(a)anthracene	NA	NA	6.46E-10	5.62E-09												
Benzo(a)pyrene	NA	NA	5.78E-10	5.77E-09												
Benzo(b)fluoranthene	NA	NA	4.76E-10	4.29E-09												
Benzo(ghi)perylene	NA	NA	3.40E-10	1.63E-08												
Benzo(k)fluoranthene	NA	NA	6.12E-10	5.33E-09												
bis(2-Ethylhexyl)phthalate	NA	NA	1.63E-09	5.77E-08												
Chrysene	NA	NA	6.80E-10	5.92E-09												
Di-n-butylphthalate	NA	NA	2.04E-09	1.78E-08												
Fluoranthene	NA	NA	5.95E-10	6.81E-09												
Indeno(1,2,3-cd)pyrene	NA	NA	ND	4.29E-09												
Phenanthrene	NA	NA	5.10E-10	4.44E-09												
Pyrene	NA	NA	6.12E-10	9.47E-09												
Pesticides																
4,4'-DDE	NA	NA	4.42E-11	3.85E-10												
4,4'-DDT	NA	3.40E-01	4.42E-11	3.85E-10		8.65E-13		3E-13		7.02E-14		2E-14		5.59E-13		2E-13
Aldrin	NA	1.72E+01	ND	2.37E-10										3.44E-13		6E-12
Heptachlor epoxide	NA	9.10E+00	2.38E-11	2.07E-10		4.66E-13		4E-12		3.78E-14		3E-13		3.01E-13		3E-12
Total Hazard Quotient and Cancer Risk:							**7E-11**	**5E-12**			**3E-11**	**4E-13**			**1E-09**	**9E-12**

Assumptions for Park Worker		
CA =	EPC Surface Only	
BW =	70	kg
IR =	8	m3/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)		
CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker		
CA =	EPC Surface and Sub-Surface	
BW =	70	kg
IR =	10.4	m3/day
EF =	250	days/year
ED =	1	year
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE N-8 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE N-10

CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Acetone	1.00E-01	NA	5.70E-02	5.70E-02	3.90E-08		4E-07		2.92E-08		3E-07		2.68E-07		3E-06	
Carbon disulfide	1.00E-01	NA		1.00E-03									4.70E-09		5E-08	
Methyl ethyl ketone	6.00E-01	NA	2.20E-02	2.20E-02	1.51E-08		3E-08		1.13E-08		2E-08		1.03E-07		2E-07	
Methylene chloride	6.00E-02	7.50E-03		1.00E-03									4.70E-09	6.71E-11	8E-08	5E-13
Semivolatile Organics																
Benzo(a)anthracene	NA	7.30E-01	3.80E-02	3.80E-02		9.30E-09		7E-09		1.39E-09		1E-09		2.55E-09		2E-09
Benzo(a)pyrene	NA	7.30E+00	3.40E-02	3.90E-02		8.32E-09		6E-08		1.24E-09		9E-09		2.62E-09		2E-08
Benzo(b)fluoranthene	NA	7.30E-01	2.80E-02	2.90E-02		6.85E-09		5E-09		1.02E-09		7E-10		1.95E-09		1E-09
Benzo(ghi)perylene	NA	NA	2.00E-02	1.10E-01												
Benzo(k)fluoranthene	NA	7.30E-02	3.60E-02	3.60E-02		8.81E-09		6E-10		1.32E-09		1E-10		2.42E-09		2E-10
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	9.60E-02	3.90E-01	6.58E-08	2.35E-08	3E-06	3E-10	4.91E-08	3.51E-09	2E-06	5E-11	1.83E-06	2.62E-08	9E-05	4E-10
Chrysene	NA	7.30E-03	4.00E-02	4.00E-02		9.78E-09		7E-11		1.46E-09		1E-11		2.68E-09		2E-11
Di-n-butylphthalate	1.00E-01	NA	1.20E-01	1.20E-01	8.22E-08		8E-07		6.14E-08		6E-07		5.64E-07		6E-06	
Fluoranthene	4.00E-02	NA	3.50E-02	4.60E-02	2.40E-08		6E-07		1.79E-08		4E-07		2.16E-07		5E-06	
Indeno(1,2,3-cd)pyrene	NA	7.30E-01		2.90E-02										1.95E-09		1E-09
Phenanthrene	NA	NA	3.00E-02	3.00E-02												
Pyrene	3.00E-02	NA	3.60E-02	6.40E-02	2.47E-08		8E-07		1.84E-08		6E-07		3.01E-07		1E-05	
Pesticides/PCBs																
4,4'-DDE	NA	3.40E-01	2.60E-03	2.60E-03		6.36E-10		2E-10		9.50E-11		3E-11		1.74E-10		6E-11
4,4'-DDT	5.00E-04	3.40E-01	2.60E-03	2.60E-03	1.78E-09	6.36E-10	4E-06	2E-10	1.33E-09	9.50E-11	3E-06	3E-11	1.22E-08	1.74E-10	2E-05	6E-11
Aldrin	3.00E-05	1.70E+01		1.60E-03									7.51E-09	1.07E-10	3E-04	2E-09
Heptachlor epoxide	1.30E-05	9.10E+00	1.40E-03	1.40E-03	9.59E-10	3.42E-10	7E-05	3E-09	7.16E-10	5.11E-11	6E-05	5E-10	6.58E-09	9.39E-11	5E-04	9E-10
Total Hazard Quotient and Cancer Risk:							**8E-05**	**8E-08**			**6E-05**	**1E-08**			**9E-04**	**3E-08**

Assumptions for Park Worker		Assumptions for Recreational Visitor (Child)		Assumptions for Construction Worker	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface Only	CS =	EPC Surface and Subsurface
BW =	70 kg	BW =	15 kg	BW =	70 kg
IR =	100 mg soil/day	IR =	200 mg soil/day	IR =	480 mg soil/day
FI =	1 unitless	FI =	1 unitless	FI =	1 unitless
EF =	175 days/year	EF =	14 days/year	EF =	250 days/year
ED =	25 years	ED =	5 years	ED =	1 year
AT (Nc) =	9,125 days	AT (Nc) =	1,825 days	AT (Nc) =	365 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE N-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE N-12
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event ED = Exposure Duration
SA = Surface Area Contact BW = Bodyweight
EF = Exposure Frequency AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics: DA = Kp x CW x [ET/(1+B) + 2Tau(1+3B)/(1+B)] x CF

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability Coefficient Tau = Lag Time
CW = EPC Surface Water CF = Conversion Factor
ET = Exposure Time B = Bunge Model Value

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	B (unitless)	EPC Surface Water (mg/L)	Absorbed Dose/Event (mg-cm²/event)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																			
Carbon disulfide	6.30E-02	NA	2.40E-02	2.70E-01	1.70E-02	2.00E-03	7.40E-08	1.03E-07		2E-06		4.37E-07		7E-06		Dermal Contact to Surface Water Not Applicable for Construction Worker			
Metals																			
Aluminum	NA	NA	1.00E-03	NA		1.41E-01	1.41E-07												
Barium	3.50E-02	NA	1.00E-03	NA		3.78E-02	3.78E-08	5.27E-08		2E-06		2.24E-07		6E-06					
Calcium	NA	NA	1.00E-03	NA		6.12E+01	6.12E-05												
Chromium	6.00E-05	NA	2.00E-03	NA		4.20E-04	8.40E-10	1.17E-09		2E-05		4.97E-09		8E-05					
Copper	2.40E-02	NA	1.00E-03	NA		1.50E-03	1.50E-09	2.09E-09		9E-08		8.87E-09		4E-07					
Iron	6.00E-02	NA	1.00E-03	NA		3.31E-01	3.31E-07	4.62E-07		8E-06		1.96E-06		3E-05					
Magnesium	NA	NA	1.00E-03	NA		1.09E+01	1.09E-05												
Manganese	1.50E-03	NA	1.00E-03	NA		3.92E-02	3.92E-08	5.47E-08		4E-05		2.32E-07		2E-04					
Nickel	8.00E-04	NA	1.00E-03	NA		1.20E-03	1.20E-09	1.67E-09		2E-06		7.10E-09		9E-06					
Potassium	NA	NA	1.00E-03	NA		1.18E+00	1.18E-06												
Sodium	NA	NA	1.00E-03	NA		3.05E+00	3.05E-06												
Zinc	7.50E-02	NA	6.00E-04	NA		7.70E-03	4.62E-09	6.44E-09		9E-08		2.73E-08		4E-07					
Total Hazard Quotient and Cancer Risk:										7E-05				3E-04					

Assumptions for Park Worker

CF =	1E-03 liter/cm3
BW =	70 kg
SA =	1,980 cm2
ET =	1 hour/day
EF =	18 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Recreational Visitor (Child)

CF =	1E-03 liter/cm3
BW =	15 kg
SA =	4,625 cm2
ET =	1 hour/day
EF =	7 days/year
ED =	5 years
AT (Nc) =	1,825 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE N-13
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SEDIMENT
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = CS x CF x SA x AF x ABS x EF x ED / BW x AT

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Sediment, from Sediment EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Sediment (mg/kg)	Park Worker Absorbed Dose (mg/kg-day) (Nc)	Park Worker Absorbed Dose (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Nc)	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics													Dermal Contact to Sediment			
Methylene chloride	5.88E-02	7.65E-03	NA	6.00E-03									Not Applicable for Construction Worker			
Semivolatile Organics																
Benzo(a)pyrene	NA	1.46E+01	NA	2.90E-02												
Benzo(b)fluoranthene	NA	7.30E-01	NA	3.90E-02												
Benzo(k)fluoranthene	NA	7.30E-02	NA	3.00E-02												
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	7.90E-02												
Fluoranthene	4.00E-02	NA	NA	5.50E-02												
Phenanthrene	NA	NA	NA	3.10E-02												
Pyrene	3.00E-02	NA	NA	3.20E-02												
Pesticides/PCBs																
4,4'-DDE	NA	1.70E+00	NA	3.30E-03												
Endosulfan I	6.00E-03	NA	NA	2.40E-03												
Heptachlor	5.00E-04	4.50E+00	NA	1.10E-03												
Metals																
Aluminum	NA	NA	NA	1.28E+04												
Antimony	4.00E-04	NA	NA	2.50E-01												
Arsenic	2.40E-04	1.88E+00	1.00E-02	7.50E+00	1.05E-07	3.74E-08	4E-04	7E-08	4.43E-07	3.17E-08	2E-03	6E-08				
Barium	3.50E-02	NA	NA	1.02E+02												
Beryllium	2.00E-05	NA	NA	6.70E-01												
Cadmium	5.00E-05	NA	1.00E-02	4.50E-01	6.28E-09		1E-04		2.66E-08		5E-04					
Calcium	NA	NA	NA	7.59E+04												
Chromium	6.00E-05	NA	NA	1.93E+01												
Cobalt	NA	NA	NA	1.18E+01												
Copper	2.40E-02	NA	NA	2.70E+01												
Iron	6.00E-02	NA	NA	2.81E+04												
Lead	NA	NA	NA	1.65E+01												
Magnesium	NA	NA	NA	1.41E+04												
Manganese	1.50E-03	NA	NA	6.84E+02												
Mercury	3.00E-06	NA	NA	1.90E-01												
Nickel	8.00E-04	NA	NA	3.20E+01												
Potassium	NA	NA	NA	2.19E+03												
Sodium	NA	NA	NA	3.55E+01												
Vanadium	7.00E-05	NA	NA	2.59E+01												
Zinc	7.50E-02	NA	NA	8.22E+01												
Total Hazard Quotient and Cancer Risk:							6E-04	7E-08			2E-03	6E-08				

Assumptions for Park Worker		
CF	1E-06	kg/mg
BW	70	kg
SA	1,980	cm2
AF	1	mg/cm2
EF	18	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)		
CF =	1E-06	kg/mg
BW =	15	kg
SA =	4,625	cm2
AF =	1	mg/cm2
EF =	7	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA - Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3-3-5

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TABLE N-14
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day) [3]	Short-tailed Shrew Exposure (mg/kg/day) [3]	American Robin Exposure (mg/kg/day) [3]
Volatile Organics						
Acetone	5.70E-02	5.33E+01	3.90E-01	3.31E-01	1.11E-01	8.53E-01
Methyl ethyl ketone	2.20E-02	2.74E+01	9.60E-01	6.75E-02	3.16E-02	1.76E-01
Semivolatile Organics						
Benzo(a)anthracene	3.80E-02	1.51E-02	1.25E-01	7.42E-04	3.22E-03	4.61E-03
Benzo(a)pyrene	3.40E-02	1.02E+00	4.50E+00	2.04E-02	8.85E-02	6.60E-02
Benzo(b)fluoranthene	2.80E-02	6.17E-03	3.20E-01	1.11E-03	5.47E-03	5.25E-03
Benzo(ghi)perylene	2.00E-02	3.05E-03	2.40E-01	6.13E-04	3.00E-03	3.17E-03
Benzo(k)fluoranthene	3.60E-02	4.25E-03	2.53E-01	1.16E-03	5.66E-03	5.88E-03
Bis(2-Ethylhexyl)phthalate	9.60E-02	5.10E-03	1.20E+01	1.25E-01	6.56E-01	4.13E-01
Chrysene	4.00E-02	2.22E-02	1.75E-01	1.03E-03	4.54E-03	5.64E-03
Di-n-butylphthalate	1.20E-01	8.84E-02	1.25E-01	3.29E-03	1.05E-02	1.70E-02
Fluoranthene	3.50E-02	3.72E-02	7.92E-01	3.29E-03	1.63E-02	1.27E-02
Phenanthrene	3.00E-02	1.02E-01	1.22E-01	8.59E-04	2.58E-03	4.33E-03
Pyrene	3.60E-02	4.43E-02	9.20E-02	6.88E-04	2.41E-03	4.24E-03
Pesticides/PCBs						
4,4'-DDE	2.60E-03	1.79E-02	2.50E-02	2.35E-05	7.31E-05	2.26E-04
4,4'-DDT	2.60E-03	1.00E-02	1.00E-01	4.23E-05	1.83E-04	2.89E-04
Heptachlor epoxide	1.40E-03	7.00E-02	1.30E-01	3.64E-05	1.25E-04	1.94E-04

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as
ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW
Where, ED = exposure dose
Cs = RME conc in soil (mg/kg)
CF = plant dry-to-wet-weight conversion factor
(0.2 for inorganics only, 1 for organics)
SP = soil-to-plant uptake factor
Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 for robin)
BAF = bioaccumulation factor (unitless)
Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
SFF = Site foraging factor (1 for both mouse and shrew; 0.583 for robin)
BW = body weight (0.02 kg for mouse; 0.015 kg for shrew, 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE N-15
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64B - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Acetone	3.31E-01	1.11E-01	1.00E+01	3.3E-02	1.1E-02
Methyl ethyl ketone	6.75E-02	3.16E-02	1.77E+02	3.8E-04	1.8E-04
Semivolatile Organics					
Benzo(a)anthracene	7.42E-04	3.22E-03	1.00E+00	7.4E-04	3.2E-03
Benzo(a)pyrene	2.04E-02	8.85E-02	1.00E+00	2.0E-02	8.8E-02
Benzo(b)fluoranthene	1.11E-03	5.47E-03	1.00E+00	1.1E-03	5.5E-03
Benzo(ghi)perylene	6.13E-04	3.00E-03	1.00E+00	6.1E-04	3.0E-03
Benzo(k)fluoranthene	1.16E-03	5.66E-03	1.00E+00	1.2E-03	5.7E-03
Bis(2-Ethylhexyl)phthalate	1.25E-01	6.56E-01	1.83E+01	6.8E-03	3.6E-02
Chrysene	1.03E-03	4.54E-03	1.00E+00	1.0E-03	4.5E-03
Di-n-butylphthalate	3.29E-03	1.05E-02	5.50E+02	6.0E-06	1.9E-05
Fluoranthene	3.29E-03	1.63E-02	1.25E+00	2.6E-03	1.3E-02
Phenanthrene	8.59E-04	2.58E-03	1.00E+00	8.6E-04	2.6E-03
Pyrene	6.88E-04	2.41E-03	1.00E+00	6.9E-04	2.4E-03
Pesticides/PCBs					
4,4'-DDE	2.35E-05	7.31E-05	8.00E-01	2.9E-05	9.1E-05
4,4'-DDT	4.23E-05	1.83E-04	8.00E-01	5.3E-05	2.3E-04
Heptachlor epoxide	3.64E-05	1.25E-04	1.00E-01	3.6E-04	1.3E-03

(1) Receptor exposure from Table N-14.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE N-16
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64B - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Volatile Organics			
Acetone	8.53E-01	6.10E+02	1.4E-03
Methyl ethyl ketone	1.76E-01	none available	--
Semivolatile Organics			
Benzo(a)anthracene	4.61E-03	4.00E+01	1.2E-04
Benzo(a)pyrene	6.60E-02	4.00E+01	1.7E-03
Benzo(b)fluoranthene	5.25E-03	4.00E+01	1.3E-04
Benzo(ghi)perylene	3.17E-03	4.00E+01	7.9E-05
Benzo(k)fluoranthene	5.88E-03	4.00E+01	1.5E-04
Bis(2-Ethylhexyl)phthalate	4.13E-01	1.10E+00	3.8E-01
Chrysene	5.64E-03	4.00E+01	1.4E-04
Di-n-butylphthalate	1.70E-02	1.10E-01	1.5E-01
Fluoranthene	1.27E-02	4.00E+01	3.2E-04
Phenanthrene	4.33E-03	2.85E+01	1.5E-04
Pyrene	4.24E-03	4.00E+01	1.1E-04
Pesticides/PCBs			
4,4'-DDE	2.26E-04	5.60E-02	4.0E-03
4,4'-DDT	2.89E-04	5.60E-02	5.2E-03
Heptachlor epoxide	1.94E-04	4.80E+00	4.0E-05

(1) Receptor exposure from Table N-14.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX O

SEAD-64C: Garbage Disposal Area

Table O-1:	Soil Analysis Results
Table O-2:	Groundwater Analysis Results
Table O-3:	Inorganics Analysis of Soil
Table O-4:	Inorganics Analysis of Groundwater
Table O-5:	Exposure Point Concentrations for Chemicals of Potential Concern
Table O-6:	Ambient Air Exposure Point Concentrations
Table O-7:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table O-8:	Calculation of Intake and Risk from the Ingestion of Soil
Table O-9:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table O-10:	Calculation of Intake and Risk from Inhalation of Groundwater (while showering)
Table O-11:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table O-12:	Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering)
Table O-13:	Calculated Soil Receptor Exposure
Table O-14:	Calculation of Soil Hazard Quotients – Mammals
Table O-15:	Calculation of Soil Hazard Quotients - Bird

TABLE O-1
SOIL ANALYSIS RESULTS - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C
LOCATION ID								SS64C-1	SS64C-1	SS64C-2	SS64C-3	TP64C-1	TP64C-1
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SS64C-1	SS64C-20	SS64C-2	SS64C-3	TP64C-1-1	TP64C-1-2
SAMP_DEPTH_TOP								0	0	0	0	3	4
SAMP_DEPTH_BOT								0.2	0.2	0.2	0.2	3	4
SAMPLE_DATE								04/11/94	04/11/94	04/11/94	04/11/94	06/09/94	06/09/94
SAMPLE TYPE								SA	DU	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEMIVOLATILE ORGANICS													
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	80%	50000	0	8	10	850	920	510 U	1100	74 J	140 J
Di-n-butylphthalate	UG/KG	39	40%	8100	0	4	10	420 U	25 J	36 J	39 J	370 U	370 U
PESTICIDES/PCBs													
Dieldrin	UG/KG	4.7	10%	44	0	1	10	4.2 U	4.1 U	4.7 J	5.3 U	3.7 U	3.7 U
Heptachlor	UG/KG	2.6	10%	100	0	1	10	2.2 U	2.6 J	2.6 U	2.7 U	1.9 U	1.9 U
METALS													
Aluminum	MG/KG	18700	100%	19300	0	10	10	14200	12700	18700	15300	12400	4970
Antimony	MG/KG	0.43	20%	5.9	0	2	10	0.32 J	0.18 UJ	0.43 J	0.27 UJ	0.24 UJ	0.16 UJ
Arsenic	MG/KG	6.6	100%	8.2	0	10	10	5.1	5	6.1	6.5	4.7	3.2
Barium	MG/KG	243	100%	300	0	10	10	109	111	181	243	98	35.4
Beryllium	MG/KG	0.86	100%	1.1	0	10	10	0.61 J	0.59 J	0.86 J	0.82 J	0.62 J	0.26 J
Cadmium	MG/KG	1	100%	2.3	0	10	10	0.13 J	0.19 J	0.28 J	0.37 J	0.77 J	0.43 J
Calcium	MG/KG	129000	100%	121000	1	10	10	46800	29600	5840	6340	35900	81500
Chromium	MG/KG	25.9	100%	29.6	0	10	10	21	18.5	25.9	22.1	18.7	7.1
Cobalt	MG/KG	13.9	100%	30	0	10	10	9.6 J	8.5 J	9.3 J	12.9 J	9.7	4.9 J
Copper	MG/KG	28.7	100%	33	0	10	10	24	20.5	23.5	22.3	22.5	15.6
Iron	MG/KG	29000	100%	36500	0	10	10	25200	23300	28000	29000	22700	10500
Lead	MG/KG	23.3	100%	24.8	0	10	10	13.8	13.5	22.8	23.3	12.5	5.9
Magnesium	MG/KG	29700	100%	21500	2	10	10	10600	8780	5000	4480	9880	24600
Manganese	MG/KG	2220	100%	1060	2	10	10	434	417	417	1090	453	330
Mercury	MG/KG	0.05	100%	0.1	0	10	10	0.03 J	0.03 J	0.05 J	0.05 J	0.04 J	0.02 J
Nickel	MG/KG	41.1	100%	49	0	10	10	30.5	26.3	28.1	26.3	30.1	13.3
Potassium	MG/KG	2690	100%	2380	1	10	10	2190 J	1630 J	2690 J	1670 J	1840 J	1360 J
Selenium	MG/KG	1.9	50%	2	0	5	10	0.93 J	1	1.9	1.9	0.5 U	0.33 U
Sodium	MG/KG	93.8	80%	172	0	8	10	62 J	32.7 J	36.5 U	42.8 U	42.3 J	68.2 J
Vanadium	MG/KG	32.5	100%	150	0	10	10	24.3	22.2	32.5	28.9	21.3	9.6
Zinc	MG/KG	110	100%	110	0	10	10	88.1	81.4	110	109	83	43.4

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOz < 50 ppm.

b) NA = Not Available

c) U = The compound was not detected at this concentraion.

d) J = The reported value is an estimated concentration.

e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

f) R = The data was rejected during the data validation process.

TABLE O-1
SOIL ANALYSIS RESULTS - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SEAD	SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C
								LOCATION ID	TP64C-2	TP64C-2	TP64C-3	TP64C-3
								MATRIX	SOIL	SOIL	SOIL	SOIL
								SAMPLE NUMBER	TP64C-2-1	TP64C-2-2	TP64C-3-1	TP64C-3-2
								SAMP_DEPTH_TOP	2	2	2	2
								SAMP_DEPTH_BOT	2	2	2	2
								SAMPLE_DATE	06/09/94	06/09/94	06/09/94	06/09/94
								SAMPLE TYPE	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEMIVOLATILE ORGANICS				(a)								
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	80%	50000	0	8	10		69 J	25 J	69 J	390 U
Di-n-butylphthalate	UG/KG	39	40%	8100	0	4	10		38 J	390 U	410 U	390 U
PESTICIDES/PCBs												
Dieldrin	UG/KG	4.7	10%	44	0	1	10		3.7 U	3.9 U	4.1 U	3.8 U
Heptachlor	UG/KG	2.6	10%	100	0	1	10		1.9 U	2 U	2.1 U	2 U
METALS												
Aluminum	MG/KG	18700	100%	19300	0	10	10		11400	13400	9200	10600
Antimony	MG/KG	0.43	20%	5.9	0	2	10		0.21 UJ	0.17 UJ	0.24 UJ	0.23 UJ
Arsenic	MG/KG	6.6	100%	8.2	0	10	10		6.1	6.6	4.2	4.9
Barium	MG/KG	243	100%	300	0	10	10		92.6	165	61.1	75.1
Beryllium	MG/KG	0.86	100%	1.1	0	10	10		0.61 J	0.63 J	0.46 J	0.52 J
Cadmium	MG/KG	1	100%	2.3	0	10	10		1	0.73	0.87 J	0.75 J
Calcium	MG/KG	129000	100%	121000	1	10	10		65400	3300	129000	68200
Chromium	MG/KG	25.9	100%	29.6	0	10	10		17.4	18	13.8	16.1
Cobalt	MG/KG	13.9	100%	30	0	10	10		13	13.9	7.4 J	9.7
Copper	MG/KG	28.7	100%	33	0	10	10		28.7	28.7	17.6	23.2
Iron	MG/KG	29000	100%	36500	0	10	10		24100	21900	18500	20800
Lead	MG/KG	23.3	100%	24.8	0	10	10		12.9	9	8.4	11.1
Magnesium	MG/KG	29700	100%	21500	2	10	10		15900	4370	29700	16800
Manganese	MG/KG	2220	100%	1060	2	10	10		579	2220	352	409
Mercury	MG/KG	0.05	100%	0.1	0	10	10		0.03 J	0.04 J	0.03 J	0.02 J
Nickel	MG/KG	41.1	100%	49	0	10	10		35	41.1	22.4	29
Potassium	MG/KG	2690	100%	2380	1	10	10		1790 J	1900 J	1990 J	2180 J
Selenium	MG/KG	1.9	50%	2	0	5	10		0.44 U	0.62 J	0.49 U	0.47 U
Sodium	MG/KG	93.8	80%	172	0	8	10		93.8 J	19.8 J	93.6 J	89.1 J
Vanadium	MG/KG	32.5	100%	150	0	10	10		19.4	24.4	16.5	19
Zinc	MG/KG	110	100%	110	0	10	10		93.9	52.5	80.6	68.1

NOTES:
a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOz < 50 ppm
b) NA = Not Available
c) U = The compound was not detected at this concentraion.
d) J = The reported value is an estimated concentration.
e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
f) R = The data was rejected during the data validation process.

TABLE O-2
GROUND WATER ANALYSIS RESULTS - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
							SEAD	SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C	SEAD-64C
							LOCATION ID	MW64C-1	MW64C-6	MW64C-7	MW64C-8	MW64C-9
							MATRIX	GRND WTR	GRND WTR	GRND WTR	GRND WTR	GRND WTR
							SAMPLE NUMBER	MW64C-1	MW64C-6	MW64C-7	MW64C-8	MW64C-9
							SAMP_DEPTH_TOP	3.5	18.51	7	10	7
							SAMP_DEPTH_BOT	15.3	23.51	14.9	17	16.2
							SAMP_DATE	07/11/94	07/21/94	07/21/94	07/21/94	07/10/94
							SAMPLE TYPE	SA	SA	SA	SA	SA
SEMIVOLATILE ORGANICS												
Diethyl phthalate	UG/L	0.7	20%	NA (a)	0	1	5	10 U	11 U	11 U	10 U	0.7 J
Phenol	UG/L	2	40%	1 (b)	2	2	5	10 U	2 J	11 U	10 U	2 J
METALS												
Aluminum	UG/L	811	100%	50 (c)	3	5	5	811	29.3 J	174 J	211	38.2 J
Barium	UG/L	106	100%	1000 (b)	0	5	5	65.1 J	44 J	106 J	95.9 J	20.4 J
Calcium	UG/L	121000	100%	NA (a)	0	5	5	115000	92500	90900	119000	121000
Chromium	UG/L	2.5	60%	50 (b)	0	3	5	2.5 J	0.4 U	0.4 J	0.43 J	0.4 U
Cobalt	UG/L	5.5	60%	NA (a)	0	3	5	0.85 J	0.5 U	0.6 J	5.5 J	0.5 U
Copper	UG/L	1.7	100%	200 (b)	0	5	5	1.7 J	0.59 J	0.53 J	0.67 J	0.55 J
Iron	UG/L	2640	100%	300 (b)	4	5	5	2640	78.3 J	311 J	375 J	681
Lead	UG/L	6.4	20%	25 (b)	0	1	5	0.9 U	6.4	0.89 U	0.89 U	0.9 U
Magnesium	UG/L	49400	100%	NA (a)	0	5	5	44200	27900	22000	22100	49400
Manganese	UG/L	149	100%	50 (c)	3	5	5	149	69.9	18	17	96
Mercury	UG/L	0.14	60%	0.7 (b)	0	3	5	0.04 U	0.14 J	0.06 J	0.07 J	0.04 U
Nickel	UG/L	2.3	60%	100 (b)	0	3	5	2.3 J	0.7 U	1 J	0.7 U	1.2 J
Potassium	UG/L	3830	100%	NA (a)	0	5	5	3830 J	1140 J	942 J	794 J	1670 J
Sodium	UG/L	30400	100%	20000 (b)	1	5	5	5860	4240 J	2880 J	30400	6420
Thallium	UG/L	2.1	20%	2 (d)	1	1	5	1.9 U	1.9 U	1.9 U	2.1 J	1.9 U
Vanadium	UG/L	2	100%	NA	0	5	5	2 J	0.67 J	0.63 J	0.81 J	0.61 J
Zinc	UG/L	6	100%	5000 (c)	0	5	5	6 J	5.8 J	5.6 J	5.6 J	3.9 J

NOTES:
a) NA = Not Available
b) NY State Class GA Groundwater Regulations
c) Secondary Drinking Water Regulations
d) Maximum Contaminent Level

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE O-3
INORGANICS ANALYSIS OF SOIL - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-64C Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	12287.00	No
Antimony	3.56	7.12	0.38	No
Arsenic	5.08	10.15	5.24	No
Barium	78.43	156.86	117.12	No
Beryllium	0.67	1.33	0.60	No
Cadmium	0.97	1.94	0.55	No
Calcium	45449.65	90899.30	47188.00	No
Chromium	20.32	40.64	17.86	No
Cobalt	11.39	22.79	9.89	No
Copper	20.99	41.97	22.66	No
Iron	24704.74	49409.47	22400.00	No
Lead	16.47	32.95	13.32	No
Magnesium	10290.18	20580.35	13011.00	No
Manganese	576.14	1152.28	670.10	No
Mercury	0.04	0.09	0.03	No
Nickel	30.39	60.79	28.21	No
Potassium	1487.25	2974.49	1924.00	No
Selenium	0.63	1.26	1.27	Yes
Sodium	99.42	198.85	62.69	No
Vanadium	21.41	42.82	21.81	No
Zinc	67.80	135.60	81.00	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE O-4
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-64C Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	252.70	No
Barium	81.20	162.40	66.28	No
Calcium	115619.35	231238.71	107680.00	No
Chromium	8.67	17.35	1.11	No
Cobalt	6.84	13.68	2.32	No
Copper	5.39	10.79	0.81	No
Iron	4476.26	8952.53	817.06	No
Lead	6.59	13.18	6.40	No
Magnesium	28567.74	57135.48	33120.00	No
Manganese	231.41	462.82	69.98	No
Mercury	0.05	0.10	0.09	No
Nickel	10.57	21.14	1.50	No
Potassium	4065.59	8131.17	1675.20	No
Sodium	15020.67	30041.33	9960.00	No
Thallium	3.90	7.80	2.10	No
Vanadium	8.23	16.47	0.94	No
Zinc	25.37	50.74	5.38	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE O-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-64C
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg	Ground Water mg/L
Semivolatile Organics			
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.10E+00	
Diethyl phthalate			7.00E-04
Di-n-butylphthalate	3.90E-02	3.90E-02	
Phenol			2.00E-03
Pesticides/PCBs			
Dieldrin	4.70E-03	4.70E-03	
Heptachlor	2.60E-03	2.60E-03	
Metals			
Selenium	1.90E+00	1.90E+00	

TABLE O-6
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Semivolatile Organics				
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.10E+00	1.87E-08	1.63E-07
Di-n-butylphthalate	3.90E-02	3.90E-02	6.63E-10	5.77E-09
Pesticides/PCBs				
Dieldrin	4.70E-03	4.70E-03	7.99E-11	6.96E-10
Heptachlor	2.60E-03	2.60E-03	4.42E-11	3.85E-10
Metals				
Selenium	1.90E+00	1.90E+00	3.23E-08	2.81E-07

TABLE O-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	NA	NA	1.87E-08	1.63E-07								
Di-n-butylphthalate	NA	NA	6.63E-10	5.77E-09								
Pesticides/PCBs												
Dieldrin	NA	1.61E+01	7.99E-11	6.96E-10		5.95E-12		1E-10		2.23E-12		4E-11
Heptachlor	NA	4.55E+00	4.42E-11	3.85E-10		3.29E-12		1E-11		1.24E-12		6E-12
Metals												
Selenium	NA	NA	3.23E-08	2.81E-07								
Total Hazard Quotient and Cancer Risk:								**1E-10**				**4E-11**

Analyte	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate												
Di-n-butylphthalate												
Pesticides/PCBs												
Dieldrin		1.01E-12		2E-11		2.23E-12		4E-11		1.25E-12		2E-11
Heptachlor		5.59E-13		3E-12		1.24E-12		6E-12		6.92E-13		3E-12
Metals												
Selenium												
Total Hazard Quotient and Cancer Risk:				**2E-11**				**4E-11**				**2E-11**

	Assumptions for Prison Inmate	Assumptions for Prison Worker	Assumptions for Construction Worker	Assumptions for Worker at Day Care Center	Assumptions for Child at Day Care Center
CA =	EPC Surface Only	EPC Surface Only	EPC Surface and Sub-Surface	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	70 kg	15 kg
IR =	15.2 m3/day	8 m3/day	10.4 m3/day	8 m3/day	4 m3/day
EF =	365 days/year	250 days/year	250 days/year	250 days/year	250 days/year
ED =	24 years	25 years	1 years	25 years	6 years
AT (Nc) =	8,760 days	9,125 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE O-6 for calculation of Air EPCs
NA= Information not available
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE O-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CS	Chemical Concentration in Soil, Calculated from Soil EPC Data	EF	Exposure Frequency
IR	Ingestion Rate	ED	Exposure Duration
CF	Conversion Factor	BW	Bodyweight
FI	Fraction Ingested	AT	Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)
Semivolatile Organics				
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.10E+00	1.10E+00
Di-n-butylphthalate	1.00E-01	NA	3.90E-02	3.90E-02
Pesticides/PCBs				
Dieldrin	5.00E-05	1.60E+01	4.70E-03	4.70E-03
Heptachlor	5.00E-04	4.50E+00	2.60E-03	2.60E-03
Metals				
Selenium	5.00E-03	NA	1.90E+00	1.90E+00

Analyte	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk
Semivolatile Organics								
bis(2-Ethylhexyl)phthalate	1.57E-06	5.39E-07	8E-05	8E-09	1.08E-06	3.84E-07	5E-05	5E-09
Di-n-butylphthalate	5.57E-08		6E-07		3.82E-08		4E-07	
Pesticides/PCBs								
Dieldrin	6.71E-09	2.30E-09	1E-04	4E-08	4.60E-09	1.64E-09	9E-05	3E-08
Heptachlor	3.71E-09	1.27E-09	7E-06	6E-09	2.54E-09	9.09E-10	5E-06	4E-09
Metals								
Selenium	2.71E-06		5E-04		1.86E-06		4E-04	
Total Hazard Quotient and Cancer Risk:			**8E-04**	**5E-08**			**5E-04**	**4E-08**

Analyte	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Semivolatile Organics				
bis(2-Ethylhexyl)phthalate	5.17E-06	7.38E-08	3E-04	1E-09
Di-n-butylphthalate	1.83E-07		2E-06	
Pesticides/PCBs				
Dieldrin	2.21E-08	3.15E-10	4E-04	5E-09
Heptachlor	1.22E-08	1.74E-10	2E-05	8E-10
Metals				
Selenium	8.92E-06		2E-03	
Total Hazard Quotient and Cancer Risk:			**3E-03**	**7E-09**

Analyte	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Semivolatile Organics								
bis(2-Ethylhexyl)phthalate	1.08E-06	3.84E-07	5E-05	5E-09	1.00E-05	8.61E-07	5E-04	1E-08
Di-n-butylphthalate	3.82E-08		4E-07		3.56E-07		4E-06	
Pesticides/PCBs								
Dieldrin	4.60E-09	1.64E-09	9E-05	3E-08	4.29E-08	3.68E-09	9E-04	6E-08
Heptachlor	2.54E-09	9.09E-10	5E-06	4E-09	2.37E-08	2.04E-09	5E-05	9E-09
Metals								
Selenium	1.86E-06		4E-04		1.74E-05		3E-03	
Total Hazard Quotient and Cancer Risk:			**5E-04**	**4E-08**			**5E-03**	**8E-08**

	Assumptions for Prison Inmate	Assumptions for Prison Worker	Assumptions for Construction Worker	Assumptions for Worker at Day Care Center	Assumptions for Child at Day Care Center
CF	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg	1E-06 kg/mg
CS	EPC Surface Only	EPC Surface Only	EPC Surface and Subsurface	EPC Surface Only	EPC Surface Only
BW	70 kg	70 kg	70 kg	70 kg	15 kg
IR	100 mg soil/day	100 mg soil/day	480 mg soil/day	100 mg soil/day	200 mg soil/day
FI	1 unitless	1 unitless	1 unitless	1 unitless	1 unitless
EF	365 days/year	250 days/year	250 days/year	250 days/year	250 days/year
ED	24 years	25 years	1 years	25 years	6 years
AT (Nc)	8,760 days	9,125 days	365 days	9,125 days	2,190 days
AT (Car)	25,550 days	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE O-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE O-10
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE O-11
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk
Semivolatile Organics							
Diethyl phthalate	8.00E-01	NA	7.00E-04	2.00E-05		3E-05	
Phenol	6.00E-01	NA	2.00E-03	5.71E-05		1E-04	
Total Hazard Quotient and Cancer Risk:						1E-04	

Analyte	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Semivolatile Organics					Ingestion of Groundwater Not Applicable for Construction Worker			
Diethyl phthalate	6.85E-06		9E-06					
Phenol	1.96E-05		3E-05					
Total Hazard Quotient and Cancer Risk:			4E-05					

Analyte	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Semivolatile Organics								
Diethyl phthalate	6.85E-06		9E-06		3.20E-05		4E-05	
Phenol	1.96E-05		3E-05		9.13E-05		2E-04	
Total Hazard Quotient and Cancer Risk:			4E-05				2E-04	

Variable	Assumptions for Prison Inmate	Assumptions for Prison Worker	Assumptions for Worker at Day Care Center	Assumptions for Child at Day Care Center
BW =	70 kg	70 kg	70 kg	15 kg
IR =	2 liters/day	1 liter/day	1 liter/day	1 liter/day
EF =	365 days/year	250 days/year	250 days/year	250 days/year
ED =	24 years	25 years	25 years	6 years
AT (Nc) =	8,760 days	9,125 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days

Note. Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE O-12
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk
Semivolatile Organics														
Diethyl phthalate	8.00E-01	NA	4.80E-03	2.00E+00	7.00E-04	6.57E-09	2.16E-06		3E-06		1.48E-06		2E-06	
Phenol	5.40E-01	NA	5.50E-03	3.30E-01	2.00E-03	8.73E-09	2.87E-06		5E-06		1.97E-06		4E-06	
Total Hazard Quotient and Cancer Risk:									8E-06				5E-06	

Analyte	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Semivolatile Organics	Dermal Contact to Groundwater Not Applicable for Construction Worker				Dermal Contact to Groundwater Not Applicable for Worker at Day Care Center				Dermal Contact to Groundwater Not Applicable for Child at Day Care Center			
Diethyl phthalate												
Phenol												
Total Hazard Quotient and Cancer Risk:												

Assumptions for Prison Inmate

CF =	0.001	L/cm3
BW =	70	kg
SA =	23000	cm2
ET =	0.25	hours/day
EF =	365	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Prison Worker

CF =	0.001	L/cm3
BW =	70	kg
SA =	23000	cm2
ET =	0.25	hours/day
EF =	250	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE O-13
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day) [3]	Short-tailed Shrew Exposure (mg/kg/day) [3]	American Robin Exposure (mg/kg/day) [3]
Semivolatile Organics						
Bis(2-Ethylhexyl)phthalate	1.10E+00	5.10E-03	1.20E+01	1.43E+00	7.51E+00	4.74E+00
Di-n-butylphthalate	3.90E-02	8.84E-02	1.25E-01	1.07E-03	3.40E-03	5.52E-03
Pesticides/PCBs						
Dieldrin	4.70E-03	1.20E-01	4.70E-02	1.05E-04	2.06E-04	5.77E-04
Heptachlor	2.60E-03	4.90E-02	2.40E-01	9.26E-05	3.93E-04	4.45E-04
Metals						
Selenium	1.90E+00	6.20E+00	5.00E+00	1.29E+00	5.50E+00	4.14E+00

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as
ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW
Where, ED = exposure dose
Cs = RME conc in soil (mg/kg)
CF = plant dry-to-wet-weight conversion factor
(0.2 for inorganics only, 1 for organics)
SP = soil-to-plant uptake factor
Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03656 kg/day for robin)
BAF = bioaccumulation factor (unitless)
Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
SFF = Site foraging factor (1 for both mouse and shrew; 0.583 for robin)
BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE O-14
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64C - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Semivolatile Organics					
Bis(2-Ethylhexyl)phthalate	1.43E+00	7.51E+00	1.83E+01	7.8E-02	4.1E-01
Di-n-butylphthalate	1.07E-03	3.40E-03	5.50E+02	1.9E-06	6.2E-06
Pesticides/PCBs					
Dieldrin	1.05E-04	2.06E-04	2.00E-02	5.3E-03	1.0E-02
Heptachlor	9.26E-05	3.93E-04	1.00E-01	9.3E-04	3.9E-03
Metals					
Selenium	1.29E+00	5.50E+00	2.00E-01	6.4E+00	2.7E+01

(1) Receptor exposure from Table O-13.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

TABLE O-15
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64C - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Semivolatile Organics			
Bis(2-Ethylhexyl)phthalate	4.74E+00	1.10E+00	4.3E+00
Di-n-butylphthalate	5.52E-03	1.10E-01	5.0E-02
Pesticides/PCBs			
Dieldrin	5.77E-04	7.70E-02	7.5E-03
Heptachlor	4.45E-04	4.80E+00	9.3E-05
Metals			
Selenium	4.14E+00	4.00E-01	1.0E+01

(1) Receptor exposure from Table O13.

(2) Toxicity reference value from Table 3.6-5.

(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

APPENDIX P
SEAD-64D: Garbage Disposal Area

Table P-1:	Soil Analysis Results
Table P-2:	Groundwater Analysis Results
Table P-3:	Inorganics Analysis of Soil
Table P-4:	Inorganics Analysis of Groundwater
Table P-5:	Exposure Point Concentrations for Chemicals of Potential Concern
Table P-6:	Ambient Air Exposure Point Concentrations
Table P-7:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table P-8:	Calculation of Intake and Risk from the Ingestion of Soil
Table P-9:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table P-10:	Calculation of Intake and Risk from Inhalation of Groundwater (while showering)
Table P-11:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table P-12:	Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering)
Table P-13:	Calculated Soil Receptor Exposure
Table P-14:	Calculation of Soil Hazard Quotients – Mammals
Table P-15:	Calculation of Soil Hazard Quotients - Birds

TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value	(Q)	Value	(O)	Value	(Q)	Value	(Q)	Value	(O)	Value	(Q)
SEAD								SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
LOCATION ID								SB64D-1		SB64D-1		SB64D-1		SB64D-10		SB64D-10		SB64D-10	
MATRIX								SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE NUMBER								SB64D-1-00		SB64D-1-01		SB64D-1-02		SB64D-10-00		SB64D-10-01		SB64D-10-03	
SAMP_DEPTH_TOP								0		0 2		2		0		0.2		4	
SAMP_DEPTH_BOT								0 2		1 2		3		0 2		2		5.1	
SAMP_DATE								06/23/94		06/23/94		06/23/94		06/25/94		06/25/94		06/25/94	
SAMPLE TYPE								SA		SA		SA		SA		SA		SA	
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36	11	U	12	U	11	U	14	U	12	U	12	U
Methylene chloride	UG/KG	3	22%	100	0	8	36	11	U	1	J	1	J	14	U	12	U	12	U
Toluene	UG/KG	1	3%	1500	0	1	36	11	U	12	U	11	U	14	U	12	U	12	U
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36	370	U	380	U	360	U	460	U	400	U	370	U
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36	370	U	380	U	360	U	460	U	400	U	370	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36	370	U	380	U	360	U	460	U	400	U	370	U
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36	370	U	380	U	360	U	460	U	400	U	370	U
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36	370	U	380	U	360	U	460	U	400	U	370	U
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36	370	U	380	U	360	U	460	U	400	U	370	U
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36	370	U	32	J	29	J	460	U	400	U	370	U
Chrysene	UG/KG	110	28%	400	0	10	36	370	U	380	U	360	U	460	U	400	U	370	U
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36	370	U	380	U	360	U	70	J	45	J	24	J
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36	370	U	380	U	360	U	460	U	400	U	370	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36	370	U	380	U	360	U	460	U	400	U	370	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36	370	U	380	U	360	U	38	J	400	U	370	U
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36	370	U	380	U	360	U	460	U	400	U	370	U
Naphthalene	UG/KG	31	6%	13000	0	2	36	370	U	380	U	360	U	460	U	400	U	370	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36	370	U	380	U	360	U	460	U	400	U	370	U
Phenol	UG/KG	42	3%	30	1	1	36	370	U	380	U	360	U	460	U	400	U	370	U
Pyrene	UG/KG	160	42%	50000	0	15	36	370	U	380	U	360	U	33	J	400	U	370	U
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	35	36	16700		14100		7480		12100		19900		9180	
Antimony	MG/KG	0 49	25%	5.9	0	9	36	0 23	UJ	0.17	UJ	0.17	UJ	0 28	UJ	0.26	UJ	0.35	J
Arsenic	MG/KG	7.8	100%	8 2	0	36	36	6.1		6.9		3.8		4 6	J	7.8	J	4.4	J
Barium	MG/KG	152	100%	300	0	36	36	87.7		81 5		38.5		100		147		97 7	
Beryllium	MG/KG	0.99	100%	1 1	0	36	36	0 76	J	0.7		0.32	J	0.66	J	0.99	J	0.47	J
Cadmium	MG/KG	0.97	100%	2.3	0	36	36	0.76	J	0.66	J	0.54	J	0 43	J	0.56	J	0.4	J
Calcium	MG/KG	162000	100%	121000	3	36	36	10600		3830		36900		4750		5810		162000	
Chromium	MG/KG	29.6	100%	29 6	0	36	36	25.2		22.1		11 8		16.7		27.5		14 5	
Cobalt	MG/KG	18.6	100%	30	0	36	36	12 8		11.5		7.7		8.5	J	11.9		6.7	J
Copper	MG/KG	32.7	100%	33	0	36	36	28.1		27.5		18.7		25		26.8		15.7	
Iron	MG/KG	36600	100%	36500	1	36	36	33800		32000		16800		21000		36200		17000	
Lead	MG/KG	60.7	100%	24.8	3	36	36	14.2		15.1		8.8		17.5		13.6		8	
Magnesium	MG/KG	16300	100%	21500	0	36	36	6610		5240		11800		3140		5180		16300	
Manganese	MG/KG	1790	100%	1060	2	36	36	606		640		415		684		776		352	
Mercury	MG/KG	0.08	69%	0 1	0	25	36	0.02	J	0.04	J	0.02	J	0.11	JR	0.06	JR	0.03	J
Nickel	MG/KG	41.8	100%	49	0	36	36	40.3		37.8		20.6		18.1		35.3		19	
Potassium	MG/KG	3240	100%	2380	3	36	36	1870	J	1380	J	1080	J	1670	J	2300	J	2040	J
Selenium	MG/KG	2	81%	2	0	29	36	1 7		1 4		0.44	J	1.3		1.3		0.5	U
Sodium	MG/KG	266	86%	172	1	31	36	43.6	J	35.7	J	26 4	J	97.3	J	108	J	266	J
Thallium	MG/KG	0 76	44%	0 7	2	16	36	0.33	U	0.45	J	0.3	J	0.49	J	0.62	J	0.35	U
Vanadium	MG/KG	35 3	100%	150	0	36	36	24 7		23.3		13.5		21.4		35.3		17.3	
Zinc	MG/KG	111	100%	110	1	36	36	102		95 3		63.1		61.8	J	89.4	J	40.6	J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
g) R = The data was rejected during the data validation process.

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TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
LOCATION ID								SB64D-2		SB64D-2		SB64D-2		SB64D-3		SB64D-3		SB64D-3	
MATRIX								SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE NUMBER								SB64D-2-00		SB64D-2-02		SB64D-2-03		SB64D-3-00		SB64D-3-20		SB64D-3-01	
SAMP_DEPTH_TOP								0		2		4		0		0		0 2	
SAMP_DEPTH_BOT								0 2		3.5		6		0 2		2		2	
SAMP_DATE								06/23/94		06/23/94		06/23/94		06/24/94		06/24/94		06/24/94	
SAMPLE TYPE								SA		SA		SA		SA		DU		SA	
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36	12	U	12	U	11	U	13	U	13	U	11	U
Methylene chloride	UG/KG	3	22%	100	0	8	36	12	U	12	U	11	U	13	U	13	U	11	U
Toluene	UG/KG	1	3%	1500	0	1	36	12	U	12	U	11	U	13	U	13	U	11	U
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36	380	U	410	U	350	U	440	U	440	U	390	U
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36	380	U	410	U	350	U	86	J	69	J	390	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36	380	U	410	U	350	U	77	J	61	J	390	U
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36	380	U	410	U	350	U	86	J	63	J	390	U
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36	380	U	410	U	350	U	54	J	440	U	390	U
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36	380	U	410	U	350	U	110	J	77	J	390	U
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36	25	J	410	U	33	J	96	J	440	U	390	U
Chrysene	UG/KG	110	28%	400	0	10	36	380	U	410	U	350	U	110	J	74	J	390	U
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36	380	U	410	U	350	U	440	U	37	J	390	U
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36	380	U	410	U	350	U	440	U	440	U	390	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36	380	U	410	U	350	U	34	J	24	J	390	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36	380	U	410	U	350	U	240	J	170	J	31	J
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36	380	U	410	U	350	U	61	J	42	J	390	U
Naphthalene	UG/KG	31	6%	13000	0	2	36	380	U	410	U	350	U	440	U	440	U	390	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36	380	U	410	U	350	U	98	J	58	J	22	J
Phenol	UG/KG	42	3%	30	1	1	36	380	U	410	U	350	U	440	U	42	J	390	U
Pyrene	UG/KG	160	42%	50000	0	15	36	380	U	410	U	350	U	160	J	100	J	20	J
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	36	36	14800		17600		11100		14200		16100		14900	
Antimony	MG/KG	0 49	25%	5.9	0	9	36	0 22	UJ	0 28	UJ	0.21	UJ	0.26	UJ	0.47	J	0.22	J
Arsenic	MG/KG	7.8	100%	8.2	0	36	36	6 2		6.3		5		5 9		6		5.9	
Barium	MG/KG	152	100%	300	0	36	36	93 2		115		45.3		103		111		92.1	
Beryllium	MG/KG	0.99	100%	1 1	0	36	36	0 73	J	0.93	J	0 5	J	0.71	J	0.73	J	0.74	
Cadmium	MG/KG	0.97	100%	2 3	0	36	36	0.78	J	0.97	J	0.65	J	0.64	J	0.4	J	0.36	J
Calcium	MG/KG	162000	100%	121000	3	36	36	13800		4250		45600		4900		4940	J	3060	J
Chromium	MG/KG	29.6	100%	29.6	0	36	36	21 7		25.3		16.9		18 6		20.5		20.7	
Cobalt	MG/KG	18 6	100%	30	0	36	36	11 8		18.6		11.1		8.1	J	8.5	J	10 4	
Copper	MG/KG	32 7	100%	33	0	36	36	24 9		22.1		20.6		21.6		24		20.7	
Iron	MG/KG	36600	100%	36500	1	36	36	29800		36600		24200		23200		24400		26900	
Lead	MG/KG	60.7	100%	24 8	3	36	36	60.7		15 5		8.2		19.1		19.3	J	17	J
Magnesium	MG/KG	16300	100%	21500	0	36	36	5700		5850		9520		3800		4110		3890	
Manganese	MG/KG	1790	100%	1060	2	36	36	688		1240		476		549		564		690	
Mercury	MG/KG	0.08	69%	0 1	0	25	36	0 05	J	0.06	J	0.02	J	0.08	J	0 08	J	0.07	J
Nickel	MG/KG	41 8	100%	49	0	36	36	31.4		41.2		28		22.5		23.6		25.8	
Potassium	MG/KG	3240	100%	2380	3	36	36	1800	J	1470	J	1190	J	1820	J	2130	J	1440	J
Selenium	MG/KG	2	81%	2	0	29	36	1 6		1 6		0.62	J	2		1.4		1.3	
Sodium	MG/KG	266	86%	172	1	31	36	50.4	J	35.9	J	78.9	J	19.7	U	24.3	U	14.5	U
Thallium	MG/KG	0 76	44%	0 7	2	16	36	0 32	U	0.41	U	0.3	U	0 58	J	0.46	U	0.41	J
Vanadium	MG/KG	35.3	100%	150	0	36	36	22 1		23 9		15.8		22.4		25.4		23.7	
Zinc	MG/KG	111	100%	110	1	36	36	93		98 4		86.1		82.9		89		85.8	

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis
g) R = The data was rejected during the data validation process

TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
SEAD								SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
LOCATION ID								SB64D-3		SB64D-4		SB64D-4		SB64D-4		SB64D-5		SB64D-5	
MATRIX								SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE NUMBER								SB64D-3-02		SB64D-4-00		SB64D-4-01		SB64D-4-02		SB64D-5-00		SB64D-5-02	
SAMP_DEPTH_TOP								2		0		0.2		2		0		2	
SAMP_DEPTH_BOT								3.2		0.2		2		4		0.2		4	
SAMP_DATE								06/24/94		06/24/94		06/24/94		06/24/94		06/25/94		06/25/94	
SAMPLE TYPE								SA		SA		SA		SA		SA		SA	
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36	12	U	14	U	12	U	11	U	13	U	12	U
Methylene chloride	UG/KG	3	22%	100	0	8	36	12	U	14	U	12	U	11	U	13	U	1	J
Toluene	UG/KG	1	3%	1500	0	1	36	12	U	14	U	12	U	11	U	13	U	1	J
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36	390	U	460	U	420	U	370	U	46	J	22	J
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36	390	U	38	J	420	U	370	U	66	J	380	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36	390	U	68	J	420	U	370	U	64	J	23	J
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36	390	U	61	J	420	U	370	U	160	J	22	J
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36	390	U	68	J	420	U	370	U	41	J	22	J
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36	390	U	47	J	420	U	370	U	450	UJ	21	J
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36	390	U	39	J	1100		34	J	450	U	380	U
Chrysene	UG/KG	110	28%	400	0	10	36	390	U	41	J	420	U	370	U	97	J	28	J
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36	390	U	71	J	420	U	370	U	77	J	46	J
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36	390	U	460	U	420	U	370	U	450	U	380	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36	390	U	40	J	420	U	370	U	34	J	380	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36	390	U	61	J	420	U	370	U	140	J	25	J
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36	390	U	53	J	420	U	370	U	53	J	380	U
Naphthalene	UG/KG	31	6%	13000	0	2	36	390	U	460	U	420	U	370	U	31	J	380	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36	390	U	36	J	420	U	370	U	100	J	29	J
Phenol	UG/KG	42	3%	30	1	1	36	390	U	460	U	420	U	370	U	450	U	380	U
Pyrene	UG/KG	160	42%	50000	0	15	36	390	U	54	J	420	U	370	U	100	J	380	U
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	36	36	15500		17400		20100		9770		16400		16900	
Antimony	MG/KG	0 49	25%	5 9	0	9	36	0.21	UJ	0.4	J	0.3	UJ	0.21	UJ	0.49	J	0.24	UJ
Arsenic	MG/KG	7 8	100%	8 2	0	36	36	7 1		6.6		6.9		4 3		5 8	J	6	J
Barium	MG/KG	152	100%	300	0	36	36	107		116		114		62.7		116		123	
Beryllium	MG/KG	0.99	100%	1.1	0	36	36	0 76	J	0.78	J	0.81	J	0.46	J	0.88	J	0.8	J
Cadmium	MG/KG	0.97	100%	2 3	0	36	36	0 51	J	0.43	J	0.4	J	0 41	J	0.75	J	0.43	J
Calcium	MG/KG	162000	100%	121000	3	36	36	3970	J	5120	J	11800	J	130000	J	4770		3260	
Chromium	MG/KG	29 6	100%	29 6	0	36	36	22.9		22.9		27.7		14.3		22.4		23.3	
Cobalt	MG/KG	18 6	100%	30	0	36	36	16 2		11.5	J	13.6		9.7		10.5	J	11.4	
Copper	MG/KG	32.7	100%	33	0	36	36	30 7		20.6		25.2		17.5		22.7		21.6	
Iron	MG/KG	36600	100%	36500	1	36	36	30700		28300		34800		20500		25600		29000	
Lead	MG/KG	60 7	100%	24 8	3	36	36	14 4	J	21.5	J	15.6	J	7.4	J	29.9		13.5	
Magnesium	MG/KG	16300	100%	21500	0	36	36	4980		3990		5330		9290		3970		4540	
Manganese	MG/KG	1790	100%	1060	2	36	36	1790		884		859		751		698		851	
Mercury	MG/KG	0 08	69%	0 1	0	25	36	0 06	J	0.08		0.06	J	0.02	J	0.14	R	0.07	JR
Nickel	MG/KG	41 8	100%	49	0	36	36	41 8		27.2		35 6		24 8		25.7		28.2	
Potassium	MG/KG	3240	100%	2380	3	36	36	1730	J	2280	J	2020	J	1520	J	3240	J	2470	J
Selenium	MG/KG	2	81%	2	0	29	36	1.2		1.7		1.1	J	0.51	J	1.6		1.1	
Sodium	MG/KG	266	86%	172	1	31	36	25.4	J	27.1	U	28.6	J	90.4	J	71.2	J	90	J
Thallium	MG/KG	0 76	44%	0.7	2	16	36	0 48	J	0 52	U	0.44	U	0.31	U	0.65	J	0.5	J
Vanadium	MG/KG	35.3	100%	150	0	36	36	25 2		26.9		30.8		14.4		26.6		26.4	
Zinc	MG/KG	111	100%	110	1	36	36	97.5		91		88.3		63 9		111	J	83.3	J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process

TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
							SEAD	SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
							LOCATION ID	SB64D-5		SB64D-6		SB64D-6		SB64D-6		SB64D-7		SB64D-7	
							MATRIX	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
							SAMPLE NUMBER	SB64D-5-03		SB64D-6-00		SB64D-6-01		SB64D-6-02		SB64D-7-00		SB64D-7-01	
							SAMP_DEPTH_TOP	4		0		0.2		2		0		0.2	
							SAMP_DEPTH_BOT	6		0.2		2		4		0.2		2	
							SAMP_DATE	06/25/94		06/25/94		06/25/94		06/25/94		06/24/94		06/24/94	
							SAMPLE TYPE	SA		SA		SA		SA		SA		SA	
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36	12	U	13	U	12	U	11	U	14	U	12	U
Methylene chloride	UG/KG	3	22%	100	0	8	36	12	U	13	U	12	U	1	J	14	U	12	U
Toluene	UG/KG	1	3%	1500	0	1	36	12	U	13	U	12	U	11	U	14	U	12	U
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36	370	U	440	U	380	U	370	U	460	U	390	U
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36	370	U	43	J	380	U	370	U	460	U	390	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36	370	U	47	J	380	U	370	U	460	U	390	U
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36	370	U	48	J	380	U	370	U	460	U	390	U
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36	370	U	46	J	380	U	370	U	460	U	390	U
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36	370	U	47	J	380	U	370	U	460	U	390	U
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36	370	U	440	U	380	U	370	U	66	J	58	J
Chrysene	UG/KG	110	28%	400	0	10	36	370	U	47	J	380	U	370	U	460	U	390	U
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36	75	J	76	J	32	J	74	J	54	J	390	U
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36	370	U	75	J	380	U	370	U	460	U	390	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36	370	U	33	J	380	U	370	U	460	U	390	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36	370	U	52	J	380	U	370	U	39	J	390	U
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36	370	U	43	J	380	U	370	U	460	U	390	U
Naphthalene	UG/KG	31	6%	13000	0	2	36	370	U	440	U	380	U	370	U	460	U	390	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36	370	U	34	J	380	U	370	U	460	U	390	U
Phenol	UG/KG	42	3%	30	1	1	36	370	U	440	U	380	U	370	U	460	U	390	U
Pyrene	UG/KG	160	42%	50000	0	15	36	370	U	41	J	380	U	370	U	41	J	390	U
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	36	36	20800		14500		18900		12200		17700		17500	
Antimony	MG/KG	0 49	25%	5 9	0	9	36	0.28	UJ	0.22	J	0.23	UJ	0.22	UJ	0.25	UJ	0.25	UJ
Arsenic	MG/KG	7.8	100%	8 2	0	36	36	6	J	5.6	J	5.5	J	3.4	J	5.7		5.7	
Barium	MG/KG	152	100%	300	0	36	36	110		113		152		59.1		127		124	
Beryllium	MG/KG	0 99	100%	1.1	0	36	36	0 87	J	0 72	J	0 88	J	0.56	J	0.82	J	0.85	J
Cadmium	MG/KG	0 97	100%	2.3	0	36	36	0.4	J	0.48	J	0.45	J	0.35	J	0.49	J	0.42	J
Calcium	MG/KG	162000	100%	121000	3	36	36	2760		3700		3630		30500		5980	J	3690	J
Chromium	MG/KG	29 6	100%	29.6	0	36	36	29 6		20		24		19.5		23.9		24.1	
Cobalt	MG/KG	16.6	100%	30	0	36	36	12.9		10.1		10 7		11 1		11 5		12.2	
Copper	MG/KG	32 7	100%	33	0	36	36	23 7		27.2		24 9		17		32.7		28.5	
Iron	MG/KG	36600	100%	36500	1	36	36	34600		24300		28200		25300		30100		34400	
Lead	MG/KG	60.7	100%	24 8	3	36	36	13 4		16.4		13.1		6 1		18.9	J	15.8	J
Magnesium	MG/KG	16300	100%	21500	0	36	36	6030		3980		4650		7390		4350		4980	
Manganese	MG/KG	1790	100%	1060	2	36	36	638		627		851		645		776		830	
Mercury	MG/KG	0 08	69%	0 1	0	25	36	0 04	JR	0 06	JR	0.06	JR	0 01	U	0.07	J	0.05	
Nickel	MG/KG	41 8	100%	49	0	36	36	39 5		24.7		26.1		30.8		28		30 5	
Potassium	MG/KG	3240	100%	2380	3	36	36	3090	J	2170	J	2340	J	1220	J	2550	J	1670	J
Selenium	MG/KG	2	81%	2	0	29	36	1 2		0 94		1.2		0.46	U	1.2		1.7	
Sodium	MG/KG	266	86%	172	1	31	36	99.7	J	75	J	94 9	J	170	J	27.5	J	22.6	J
Thallium	MG/KG	0.76	44%	0.7	2	16	36	0.53	J	0.74	J	0.34	U	0.33	U	0.47	J	0.37	U
Vanadium	MG/KG	35 3	100%	150	0	36	36	32		24.9		31 9		16.6		28.3		27.2	
Zinc	MG/KG	111	100%	110	1	36	36	101	J	70 3	J	77	J	60.7	J	90.8		86	

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process

TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
SEAD								SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
LOCATION ID								SB64D-7		SB64D-8		SB64D-8		SB64D-8		SB64D-9		SB64D-9	
MATRIX								SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMPLE NUMBER								SB64D-7-02		SB64D-8-00		SB64D-8-01		SB64D-8-02		SB64D-9-00		SB64D-9-01	
SAMP_DEPTH_TOP								2		0		0.2		2		0		0.2	
SAMP_DEPTH_BOT								4		0.2		2		4		0.2		2	
SAMP_DATE								06/24/94		06/24/94		06/24/94		06/24/94		06/25/94		06/25/94	
SAMPLE TYPE								SA		SA		SA		SA		SA		SA	
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36	11	U	13	UJ	8	J	11	U	13	U	12	U
Methylene chloride	UG/KG	3	22%	100	0	8	36	11	U	13	UJ	12	U	11	U	13	U	12	U
Toluene	UG/KG	1	3%	1500	0	1	36	11	U	13	UJ	12	U	11	U	13	U	12	U
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36	360	U	450	U	380	U	370	U	450	U	400	U
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36	360	U	450	U	380	U	370	U	450	U	400	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36	360	U	450	U	380	U	370	U	450	U	400	U
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36	360	U	450	U	380	U	370	U	450	U	400	U
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36	360	U	450	U	380	U	370	U	450	U	400	U
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36	360	U	450	U	380	U	370	U	450	U	400	U
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36	46	J	48	J	380	U	32	J	450	U	400	U
Chrysene	UG/KG	110	28%	400	0	10	36	360	U	450	U	380	U	370	U	450	U	400	U
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36	360	U	56	J	44	J	370	U	53	J	34	J
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36	360	U	450	U	380	U	370	U	450	U	400	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36	360	U	450	U	380	U	370	U	450	U	400	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36	360	U	48	J	380	U	370	U	33	J	400	U
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36	360	U	450	U	380	U	370	U	450	U	400	U
Naphthalene	UG/KG	31	6%	13000	0	2	36	360	U	450	U	380	U	370	U	450	U	400	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36	360	U	24	J	380	U	370	U	450	U	400	U
Phenol	UG/KG	42	3%	30	1	1	36	360	U	450	U	380	U	370	U	450	U	400	U
Pyrene	UG/KG	160	42%	50000	0	15	36	360	U	54	J	380	U	370	U	24	J	400	U
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	36	36	13000		16100		15500		12400		13800		15800	
Antimony	MG/KG	0.49	25%	5 9	0	9	36	0.24	UJ	0.28	UJ	0.22	UJ	0.27	UJ	0.31	UJ	0.25	J
Arsenic	MG/KG	7.8	100%	8 2	0	36	36	3 7		5.8		4.5		5.3		6	J	6.7	J
Barium	MG/KG	152	100%	300	0	36	36	59.3		116		85		65.6		110		107	
Beryllium	MG/KG	0 99	100%	1 1	0	36	36	0.6	J	0.81	J	0 68	J	0 56	J	0.82	J	0 84	J
Cadmium	MG/KG	0.97	100%	2 3	0	36	36	0 46	J	0 61	J	0.49	J	0 44	J	0.53	J	0.51	J
Calcium	MG/KG	162000	100%	121000	3	36	36	80900	J	10900	J	29700	J	64000	J	3090		16300	
Chromium	MG/KG	29.6	100%	29.6	0	36	36	19		23.3		21 3		19.3		20.2		23.7	
Cobalt	MG/KG	18.6	100%	30	0	36	36	11.7		13.9		10.8		12.7		11.2	J	12.8	
Copper	MG/KG	32.7	100%	33	0	36	36	17.2		28		21.2		22.4		30.4		28.3	
Iron	MG/KG	36600	100%	36500	1	36	36	26600		32500		28200		28600		25500		32500	
Lead	MG/KG	60.7	100%	24.8	3	36	36	13.8	J	32.5	J	9.9	J	9	J	19.1		12.6	
Magnesium	MG/KG	16300	100%	21500	0	36	36	5810		5740		6010		8170		3620		4850	
Manganese	MG/KG	1790	100%	1060	2	36	36	642		1040		659		748		973		971	
Mercury	MG/KG	0.08	69%	0 1	0	25	36	0.04	J	0.06	J	0.04	J	0.02	J	0.06	JR	0.47	R
Nickel	MG/KG	41.8	100%	49	0	36	36	29.5		34.4		29.4		34.7		25.1		34	
Potassium	MG/KG	3240	100%	2380	3	36	36	1790	J	2030	J	1840	J	1390	J	1970	J	1530	J
Selenium	MG/KG	2	81%	2	0	29	36	0.62	J	1.9		1.3		0.55	U	1	J	1.2	
Sodium	MG/KG	266	86%	172	1	31	36	90.6	J	21.3	U	37.3	J	94.7	J	103	J	101	J
Thallium	MG/KG	0.76	44%	0 7	2	16	36	0.57	J	0.57	J	0.32	U	0.39	U	0.66	J	0.76	J
Vanadium	MG/KG	35 3	100%	150	0	36	36	16 7		23.9		22 3		16 7		23.7		23 9	
Zinc	MG/KG	111	100%	110	1	36	36	69.8		106		85.2		85.9		72.9	J	81.8	J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE P-1
SOIL ANALYSIS RESULTS-SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D		SEAD-64D	
							LOCATION ID	SB64D-9		SS64D-1		SS64D-2		SS64D-3		SS64D-4		SS64D-5	
							MATRIX	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
							SAMPLE NUMBER	SB64D-9-02		SS64D-1		SS64D-2		SS64D-3		SS64D-4		SS64D-5	
							SAMP_DEPTH_TOP	2		0		0		0		0		0	
							SAMP_DEPTH_BOT	4		0 2		0 2		0 2		0 2		0 2	
							SAMP_DATE	06/25/94		04/14/94		04/14/94		04/14/94		04/14/94		04/14/94	
							SAMPLE TYPE	SA		SA		SA		SA		SA		SA	
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value	(Q)	Value	(Q)	Value	(O)	Value	(O)	Value	(O)	Value	(O)
VOLATILE ORGANICS																			
Methyl ethyl ketone	UG/KG	8	3%	300	0	1	36		11	U	14	U	14	U	14	U	12	U	14	U
Methylene chloride	UG/KG	3	22%	100	0	8	36		1	J	2	J	3	J	14	U	12	U	2	J
Toluene	UG/KG	1	3%	1500	0	1	36		11	U	14	U	14	U	14	U	12	U	14	U
SEMIVOLATILE ORGANICS																			
2-Methylnaphthalene	UG/KG	49	14%	36400	0	5	36		360	U	30	J	27	J	49	J	400	U	420	U
Benzo(a)anthracene	UG/KG	86	22%	224	0	8	36		360	U	22	J	23	J	41	J	400	U	420	U
Benzo(a)pyrene	UG/KG	77	25%	61	3	9	36		360	U	25	J	27	J	43	J	400	U	420	U
Benzo(b)fluoranthene	UG/KG	160	25%	1100	0	9	36		360	U	26	J	28	J	39	J	400	U	420	U
Benzo(ghi)perylene	UG/KG	68	17%	50000	0	6	36		360	U	460	U	470	U	23	J	400	U	420	U
Benzo(k)fluoranthene	UG/KG	110	19%	1100	0	7	36		360	U	27	J	470	U	53	J	400	U	420	U
Bis(2-Ethylhexyl)phthalate	UG/KG	1100	42%	50000	0	15	36		360	U	120	J	470	U	440	U	19	J	420	U
Chrysene	UG/KG	110	28%	400	0	10	36		360	U	34	J	36	J	53	J	400	U	22	J
Di-n-butylphthalate	UG/KG	77	44%	8100	0	16	36		360	U	460	U	470	U	440	U	400	U	420	U
Di-n-octylphthalate	UG/KG	75	3%	50000	0	1	36		360	U	460	U	470	U	440	U	400	U	420	U
Dibenz(a,h)anthracene	UG/KG	40	14%	14	5	5	36		360	U	460	U	470	U	440	U	400	U	420	U
Fluoranthene	UG/KG	240	44%	50000	0	16	36		360	U	47	J	62	J	99	J	21	J	33	J
Indeno(1,2,3-cd)pyrene	UG/KG	61	17%	3200	0	6	36		360	U	460	U	470	U	26	J	400	U	420	U
Naphthalene	UG/KG	31	6%	13000	0	2	36		360	U	460	U	470	U	29	J	400	U	420	U
Phenanthrene	UG/KG	100	33%	50000	0	12	36		360	U	35	J	36	J	57	J	400	U	24	J
Phenol	UG/KG	42	3%	30	1	1	36		360	U	460	U	470	U	440	U	400	U	420	U
Pyrene	UG/KG	160	42%	50000	0	15	36		360	U	38	J	47	J	81	J	20	J	25	J
METALS																			
Aluminum	MG/KG	20800	100%	19300	3	36	36		12600		11300		8930		12900		12000		10300	
Antimony	MG/KG	0.49	25%	5.9	0	9	36		0 33	J	0.24	UJ	0.16	UJ	0 18	UJ	0.19	J	0.19	UJ
Arsenic	MG/KG	7 8	100%	8 2	0	36	36		5 2	J	4 3		3.9		6.4		4.5		3.6	
Barium	MG/KG	152	100%	300	0	36	36		62 5		76.4		74 6		89.3		61.8		77 3	
Beryllium	MG/KG	0 99	100%	1 1	0	36	36		0 61	J	0 53	J	0.43	J	0 65	J	0.56	J	0.45	J
Cadmium	MG/KG	0 97	100%	2 3	0	36	36		0 38	J	0 38	J	0.35	J	0.42	J	0.42	J	0.27	J
Calcium	MG/KG	162000	100%	121000	3	36	36		47700		88900		$\boxed{129000}$		34900		84800		84100	
Chromium	MG/KG	29.6	100%	29 6	0	36	36		19 9		18.3		13.5		20.4		18.8		15.3	
Cobalt	MG/KG	18 6	100%	30	0	36	36		9 8	J	9 3	J	7 8	J	12 7		8 8		7 3	J
Copper	MG/KG	32 7	100%	33	0	36	36		23 5		18.8		14.5		20.6		19.7		15.5	
Iron	MG/KG	36600	100%	36500	1	36	36		26000		23200		17800		28400		22900		17000	
Lead	MG/KG	60.7	100%	24 8	3	36	36		9.7		13.2		11 4		18.7		10		12.2	
Magnesium	MG/KG	16300	100%	21500	0	36	36		5700		7720		9080		7460		13400		11600	
Manganese	MG/KG	1790	100%	1060	2	36	36		539		475	J	424	J	750	J	457	J	323	J
Mercury	MG/KG	0.08	69%	0 1	0	25	36		0.09	JR	0.02	J	0 01	J	0.02	J	0.01	J	0.01	J
Nickel	MG/KG	41 8	100%	49	0	36	36		31.5		25.7		20.3		32.4		28.5		20.3	
Potassium	MG/KG	3240	100%	2380	3	36	36		1540	J	1610		1480		1590		2200		2330	
Selenium	MG/KG	2	81%	2	0	29	36		0.54	U	0.53	J	0.27	U	0.49	J	0.21	U	0.33	U
Sodium	MG/KG	266	86%	172	1	31	36		148	J	100	J	95.7	J	59.6	J	151	J	30.3	J
Thallium	MG/KG	0.76	44%	0.7	2	16	36		0.38	U	0.39	U	0.25	U	0.28	U	0.2	U	0.31	U
Vanadium	MG/KG	35 3	100%	150	0	36	36		19 1		18 2		14 1		21.1		18 5		18.4	
Zinc	MG/KG	111	100%	110	1	36	36		75.7	J	72.6		63.1		87.9		80.4		54.8	

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE P-2
GROUND WATER ANALYSIS RESULTS - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-64D	SEAD-64D	SEAD-64D	SEAD-64D	SEAD-64D
							LOCATION ID	MW64D-1	MW64D-2	MW64D-3	MW64D-4	MW64D-5
							MATRIX	GRND WTR	GRND WTR	GRND WTR	GRND WTR	GRND WTR
							SAMPLE NUMBER	MW64D-1	MW64D-2	MW64D-3	MW64D-4	MW64D-5
							SAMP_DEPTH_TOP	3.6	4	4.9	4.5	4.3
							SAMP_DEPTH_BOT	4.4	8	6.9	8.5	6.3
							SAMP_DATE	07/08/94	07/09/94	07/08/94	07/08/94	07/18/94
							SAMPLE TYPE	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA VALUE	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
METALS												
Aluminum	UG/L	30100	100%	50 (a)	5	5	5	177 J	1390	453	494	30100 J
Antimony	UG/L	1.5	20%	3 (b)	0	1	5	1.3 U	1.3 U	1.5 J	1.3 U	1.3 U
Arsenic	UG/L	10	20%	10 (c)	0	1	5	2 U	2 U	2 U	2 U	10
Barium	UG/L	693	100%	1000 (b)	0	5	5	88.6 J	62.8 J	75.9 J	63 J	693
Beryllium	UG/L	3.1	20%	4 (c)	0	1	5	0.1 U	0.1 U	0.1 U	0.1 U	3.1 J
Cadmium	UG/L	1.3	40%	5 (b)	0	2	5	0.2 U	0.2 U	1.3 J	0.2 U	1 J
Calcium	UG/L	902000	100%	NA (d)	0	5	5	142000	122000	120000	140000	902000
Chromium	UG/L	47.1	80%	50 (b)	0	4	5	0.4 U	1.5 J	0.63 J	0.42 J	47.1
Cobalt	UG/L	82.3	100%	NA (d)	0	5	5	0.69 J	2.8 J	1.5 J	1.4 J	82.3
Copper	UG/L	41.3	80%	200 (b)	0	4	5	0.5 U	3.9 J	2 J	0.68 J	41.3
Iron	UG/L	65800	100%	300 (b)	5	5	5	440	1730	538	552	65800
Lead	UG/L	71.6	40%	25 (b)	1	2	5	0.9 U	1.2 J	0.89 U	0.89 U	71.6
Magnesium	UG/L	35900	100%	NA (d)	0	5	5	14800	13000	14800	13200	35900
Manganese	UG/L	8250	100%	50 (a)	5	5	5	223	456	86.6	106	8250
Mercury	UG/L	0.05	40%	0.7 (b)	0	2	5	0.04 U	0.04 U	0.04 U	0.04 J	0.05 J
Nickel	UG/L	108	100%	100 (b)	1	5	5	1.4 J	4.1 J	1.1 J	1.5 J	108
Potassium	UG/L	7080	100%	NA (d)	0	5	5	3340 J	3240 J	1770 J	1280 J	7080 J
Sodium	UG/L	12300	100%	20000 (b)	0	5	5	12300	4490 J	6520	3350 J	4390 J
Thallium	UG/L	3.2	60%	2 (c)	3	3	5	2.2 J	1.9 U	3.2 J	1.9 U	2.1 J
Vanadium	UG/L	42.9	100%	NA (d)	0	5	5	0.69 J	2.1 J	0.9 J	0.69 J	42.9 J
Zinc	UG/L	305	100%	5000 (a)	0	5	5	3.8 J	12.4 J	14.4 J	6.5 J	305
OTHER ANALYSES												
pH	Standard Units							7.2	7.9	7.5	7.3	7.8
Conductivity	umhos/cm							725	490	550	595	550
Temperature	°C							22	15.6	16.9	15.2	15.3
Turbidity	NTU							1.5	181	127	141	>200

NOTES:
a) Secondary Drinking Water Regulation
b) NY State Class GA Groundwater Regulations
c) Maximum Contaminant Level
d) NA = Not Available

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE P-3
INORGANICS ANALYSIS OF SOIL - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-64D Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	14457.22	No
Antimony	3.56	7.12	0.32	No
Arsenic	5.08	10.15	5.48	No
Barium	78.43	156.86	95.02	No
Beryllium	0.67	1.33	0.69	No
Cadmium	0.97	1.94	0.50	No
Calcium	45449.65	90899.30	32886.39	No
Chromium	20.32	40.64	20.81	No
Cobalt	11.39	22.79	11.05	No
Copper	20.99	41.97	23.00	No
Iron	24704.74	49409.47	27136.11	No
Lead	16.47	32.95	15.98	No
Magnesium	10290.18	20580.35	6493.89	No
Manganese	576.14	1152.28	718.92	No
Mercury	0.04	0.09	0.04	No
Nickel	30.39	60.79	29.23	No
Potassium	1487.25	2974.49	1883.06	No
Selenium	0.63	1.26	1.21	No
Sodium	99.42	198.85	82.22	No
Thallium	0.43	0.86	0.55	No
Vanadium	21.41	42.82	22.68	No
Zinc	67.80	135.60	81.79	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE P-4
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-64D Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	6522.80	Yes
Antimony	33.18	66.35	1.50	No
Arsenic	5.63	11.25	10.00	No
Barium	81.20	162.40	196.66	Yes
Beryllium	0.90	1.79	3.10	Yes
Cadmium	ND	ND	1.15	Yes
Calcium	115619.35	231238.71	285200.00	Yes
Chromium	8.67	17.35	12.41	No
Cobalt	6.84	13.68	17.74	Yes
Copper	5.39	10.79	11.97	Yes
Iron	4476.26	8952.53	13812.00	Yes
Lead	6.59	13.18	36.40	Yes
Magnesium	28567.74	57135.48	18340.00	No
Manganese	231.41	462.82	1824.32	Yes
Mercury	0.05	0.10	0.05	No
Nickel	10.57	21.14	23.22	Yes
Potassium	4065.59	8131.17	3342.00	No
Sodium	15020.67	30041.33	6210.00	No
Thallium	3.90	7.80	2.50	No
Vanadium	8.23	16.47	9.46	No
Zinc	25.37	50.74	68.42	Yes

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE P-5
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-64D
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/Kg	Surface Soil mg/Kg	Ground Water mg/L
Volatile Organics			
Methyl ethyl ketone	8.00E-03	8.00E-03	
Methylene chloride	3.00E-03	3.00E-03	
Toluene	1.00E-03		
Semivolatile Organics			
2-Methylnaphthalene	4.90E-02	4.90E-02	
Benzo(a)anthracene	8.60E-02	8.60E-02	
Benzo(a)pyrene	7.70E-02	7.70E-02	
Benzo(b)fluoranthene	1.60E-01	1.60E-01	
Benzo(ghi)perylene	6.80E-02	6.80E-02	
Benzo(k)fluoranthene	1.10E-01	1.10E-01	
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.10E+00	
Chrysene	1.10E-01	1.10E-01	
Di-n-butylphthalate	7.70E-02	7.70E-02	
Di-n-octylphthalate	7.50E-02	7.50E-02	
Dibenz(a,h)anthracene	4.00E-02	4.00E-02	
Fluoranthene	2.40E-01	2.40E-01	
Indeno(1,2,3-cd)pyrene	6.10E-02	6.10E-02	
Naphthalene	3.10E-02	3.10E-02	
Phenanthrene	1.00E-01	1.00E-01	
Phenol	4.20E-02	4.20E-02	
Pyrene	1.60E-01	1.60E-01	
Metals			
Aluminum			3.01E+01
Barium			6.93E-01
Beryllium			3.10E-03
Cadmium			1.30E-03
Calcium			9.02E+02
Cobalt			8.23E-02
Copper			4.13E-02
Iron			6.58E+01
Lead			7.16E-02
Manganese			8.25E+00
Nickel			1.08E-01
Zinc			3.05E-01

TABLE P-6
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$	Equation for Air EPC from Total Soils (mg/m^3) = $CS_{tot} \times PM_{10} \times CF$
Variables:	Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)	CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3	PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug	CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)	Calculated Air EPC Total Soils (mg/m^3)
Volatile Organics				
Methyl ethyl ketone	8.00E-03	8.00E-03	1.36E-10	1.18E-09
Methylene chloride	3.00E-03	3.00E-03	5.10E-11	4.44E-10
Toluene	ND	1.00E-03	ND	1.48E-10
Semivolatile Organics				
2-Methylnaphthalene	4.90E-02	4.90E-02	8.33E-10	7.25E-09
Benzo(a)anthracene	8.60E-02	8.60E-02	1.46E-09	1.27E-08
Benzo(a)pyrene	7.70E-02	7.70E-02	1.31E-09	1.14E-08
Benzo(b)fluoranthene	1.60E-01	1.60E-01	2.72E-09	2.37E-08
Benzo(ghi)perylene	6.80E-02	6.80E-02	1.16E-09	1.01E-08
Benzo(k)fluoranthene	1.10E-01	1.10E-01	1.87E-09	1.63E-08
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.10E+00	1.87E-08	1.63E-07
Chrysene	1.10E-01	1.10E-01	1.87E-09	1.63E-08
Di-n-butylphthalate	7.70E-02	7.70E-02	1.31E-09	1.14E-08
Di-n-octylphthalate	7.50E-02	7.50E-02	1.28E-09	1.11E-08
Dibenz(a,h)anthracene	4.00E-02	4.00E-02	6.80E-10	5.92E-09
Fluoranthene	2.40E-01	2.40E-01	4.08E-09	3.55E-08
Indeno(1,2,3-cd)pyrene	6.10E-02	6.10E-02	1.04E-09	9.03E-09
Naphthalene	3.10E-02	3.10E-02	5.27E-10	4.59E-09
Phenanthrene	1.00E-01	1.00E-01	1.70E-09	1.48E-08
Phenol	4.20E-02	4.20E-02	7.14E-10	6.22E-09
Pyrene	1.60E-01	1.60E-01	2.72E-09	2.37E-08

ND = Compound was not detected.

TABLE P-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Air EPC* from Total Soils	Park Worker Intake (mg/kg-day)		Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day)		Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics																
Methyl ethyl ketone	2.86E-01	NA	1.36E-10	1.18E-09	7.45E-12		3E-11		3.03E-12		1E-11		1.20E-10		4E-10	
Methylene chloride	8.57E-01	1.65E-03	5.10E-11	4.44E-10	2.79E-12	9.98E-13	3E-12	2E-15	1.13E-12	8.10E-14	1E-12	1E-16	4.52E-11	6.45E-13	5E-11	1E-15
Toluene	1.14E-01	NA	ND	1.48E-10									1.51E-11		1E-10	
Semivolatile Organics																
2-Methylnaphthalene	NA	NA	8.33E-10	7.25E-09												
Benzo(a)anthracene	NA	NA	1.46E-09	1.27E-08												
Benzo(a)pyrene	NA	NA	1.31E-09	1.14E-08												
Benzo(b)fluoranthene	NA	NA	2.72E-09	2.37E-08												
Benzo(ghi)perylene	NA	NA	1.16E-09	1.01E-08												
Benzo(k)fluoranthene	NA	NA	1.87E-09	1.63E-08												
bis(2-Ethylhexyl)phthalate	NA	NA	1.87E-08	1.63E-07												
Chrysene	NA	NA	1.87E-09	1.63E-08												
Di-n-butylphthalate	NA	NA	1.31E-09	1.14E-08												
Di-n-octylphthalate	NA	NA	1.28E-09	1.11E-08												
Dibenz(a,h)anthracene	NA	NA	6.80E-10	5.92E-09												
Fluoranthene	NA	NA	4.08E-09	3.55E-08												
Indeno(1,2,3-cd)pyrene	NA	NA	1.04E-09	9.03E-09												
Naphthalene	8.60E-04	NA	5.27E-10	4.59E-09	2.89E-11		3E-08		1.17E-11		1E-08		4.67E-10		5E-07	
Phenanthrene	NA	NA	1.70E-09	1.48E-08												
Phenol	NA	NA	7.14E-10	6.22E-09												
Pyrene	NA	NA	2.72E-09	2.37E-08												
Total Hazard Quotient and Cancer Risk:							**3E-08**	**2E-15**			**1E-08**	**1E-16**			**5E-07**	**1E-15**

Assumptions for Park Worker

CA =	EPC Surface Only	
BW =	70	kg
IR =	8	m3/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CA =	EPC Surface and Sub-Surface	
BW =	70	kg
IR =	10.4	m3/day
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE P-6 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE P-8
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk
Volatile Organics								
Methyl ethyl ketone	6.00E-01	NA	8.00E-03	8.00E-03	5.48E-09		9E-09	
Methylene chloride	6.00E-02	7.50E-03	3.00E-03	3.00E-03	2.05E-09	7.34E-10	3E-08	6E-12
Toluene	2.00E-01	NA		1.00E-03				
Semivolatile Organics								
2-Methylnaphthalene	4.00E-02	NA	4.90E-02	4.90E-02	3.36E-08		8E-07	
Benzo(a)anthracene	NA	7.30E-01	8.60E-02	8.60E-02		2.10E-08		2E-08
Benzo(a)pyrene	NA	7.30E+00	7.70E-02	7.70E-02		1.88E-08		1E-07
Benzo(b)fluoranthene	NA	7.30E-01	1.60E-01	1.60E-01		3.91E-08		3E-08
Benzo(ghi)perylene	NA	NA	6.80E-02	6.80E-02				
Benzo(k)fluoranthene	NA	7.30E-02	1.10E-01	1.10E-01		2.69E-08		2E-09
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.10E+00	1.10E+00	7.53E-07	2.69E-07	4E-05	4E-09
Chrysene	NA	7.30E-03	1.10E-01	1.10E-01		2.69E-08		2E-10
Di-n-butylphthalate	1.00E-01	NA	7.70E-02	7.70E-02	5.27E-08		5E-07	
Di-n-octylphthalate	2.00E-02	NA	7.50E-02	7.50E-02	5.14E-08		3E-06	
Dibenz(a,h)anthracene	NA	7.30E+00	4.00E-02	4.00E-02		9.78E-09		7E-08
Fluoranthene	4.00E-02	NA	2.40E-01	2.40E-01	1.64E-07		4E-06	
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	6.10E-02	6.10E-02		1.49E-08		1E-08
Naphthalene	2.00E-02	NA	3.10E-02	3.10E-02	2.12E-08		1E-06	
Phenanthrene	NA	NA	1.00E-01	1.00E-01				
Phenol	6.00E-01	NA	4.20E-02	4.20E-02	2.88E-08		5E-08	
Pyrene	3.00E-02	NA	1.60E-01	1.60E-01	1.10E-07		4E-06	
Total Hazard Quotient and Cancer Risk:							**5E-05**	**3E-07**

Analyte	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics								
Methyl ethyl ketone	4.09E-09		7E-09		3.76E-08		6E-08	
Methylene chloride	1.53E-09	1.10E-10	3E-08	8E-13	1.41E-08	2.01E-10	2E-07	2E-12
Toluene					4.70E-09		2E-08	
Semivolatile Organics								
2-Methylnaphthalene	2.51E-08		6E-07		2.30E-07		6E-06	
Benzo(a)anthracene		3.14E-09		2E-09		5.77E-09		4E-09
Benzo(a)pyrene		2.81E-09		2E-08		5.17E-09		4E-08
Benzo(b)fluoranthene		5.84E-09		4E-09		1.07E-08		8E-09
Benzo(ghi)perylene								
Benzo(k)fluoranthene		4.02E-09		3E-10		7.38E-09		5E-10
bis(2-Ethylhexyl)phthalate	5.63E-07	4.02E-08	3E-05	6E-10	5.17E-06	7.38E-08	3E-04	1E-09
Chrysene		4.02E-09		3E-11		7.38E-09		5E-11
Di-n-butylphthalate	3.94E-08		4E-07		3.62E-07		4E-06	
Di-n-octylphthalate	3.84E-08		2E-06		3.52E-07		2E-05	
Dibenz(a,h)anthracene		1.46E-09		1E-08		2.68E-09		2E-08
Fluoranthene	1.23E-07		3E-06		1.13E-06		3E-05	
Indeno(1,2,3-cd)pyrene		2.23E-09		2E-09		4.09E-09		3E-09
Naphthalene	1.59E-08		8E-07		1.46E-07		7E-06	
Phenanthrene								
Phenol	2.15E-08		4E-08		1.97E-07		3E-07	
Pyrene	8.18E-08		3E-06		7.51E-07		3E-05	
Total Hazard Quotient and Cancer Risk:			**4E-05**	**4E-08**			**3E-04**	**7E-08**

Assumptions for Park Worker

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CF =	1E-06	kg/mg
CS =	EPC Surface and Subsurface	
BW =	70	kg
IR =	480	mg soil/day
FI =	1	unitless
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE P-9
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE P-10
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D

Decision Document- Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE P-11
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = CW x IR x EF x ED / BW x AT

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Metals															
Aluminum	1.00E+00	NA	3.01E+01	2.06E-01		2E-01		7.70E-02		8E-02		Ingestion of Groundwater Not Applicable for Construction Worker			
Barium	7.00E-02	NA	6.93E-01	4.75E-03		7E-02		1.77E-03		3E-02					
Beryllium	2.00E-03	NA	3.10E-03	2.12E-05		1E-02		7.93E-06		4E-03					
Cadmium	5.00E-04	NA	1.30E-03	8.90E-06		2E-02		3.32E-06		7E-03					
Calcium	NA	NA	9.02E+02												
Cobalt	6.00E-02	NA	8.23E-02	5.64E-04		9E-03		2.10E-04		4E-03					
Copper	4.00E-02	NA	4.13E-02	2.83E-04		7E-03		1.06E-04		3E-03					
Iron	3.00E-01	NA	6.58E+01	4.51E-01		2E+00		1.68E-01		6E-01					
Lead	NA	NA	7.16E-02												
Manganese	5.00E-02	NA	8.25E+00	5.65E-02		1E+00		2.11E-02		4E-01					
Nickel	2.00E-02	NA	1.08E-01	7.40E-04		4E-02		2.76E-04		1E-02					
Zinc	3.00E-01	NA	3.05E-01	2.09E-03		7E-03		7.80E-04		3E-03					
Total Hazard Quotient and Cancer Risk:						**3E+00**				**1E+00**					

Assumptions for Park Worker

BW =	70	kg
IR =	1	liter/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

BW =	15	kg
IR =	1	liter/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE P-12
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Metals							Dermal Contact to Groundwater Not Applicable for Park Worker								Dermal Contact to Groundwater Not Applicable for Construction Worker			
Aluminum	NA	NA	1.00E-03	NA	3.01E+01	7.53E-06												
Barium	3.50E-02	NA	1.00E-03	NA	6.93E-01	1.73E-07					4.07E-06		1E-04					
Beryllium	2.00E-05	NA	1.00E-03	NA	3.10E-03	7.75E-10					1.82E-08		9E-04					
Cadmium	5.00E-05	NA	1.00E-03	NA	1.30E-03	3.25E-10					7.63E-09		2E-04					
Calcium	NA	NA	1.00E-03	NA	9.02E+02	2.26E-04												
Cobalt	NA	NA	4.00E-04	NA	8.23E-02	8.23E-09												
Copper	2.40E-02	NA	1.00E-03	NA	4.13E-02	1.03E-08					2.42E-07		1E-05					
Iron	6.00E-02	NA	1.00E-03	NA	6.58E+01	1.65E-05					3.86E-04		6E-03					
Lead	NA	NA	4.00E-06	NA	7.16E-02	7.16E-11												
Manganese	1.50E-03	NA	1.00E-03	NA	8.25E+00	2.06E-06					4.84E-05		3E-02					
Nickel	8.00E-04	NA	1.00E-03	NA	1.08E-01	2.70E-08					6.34E-07		8E-04					
Zinc	7.50E-02	NA	6.00E-04	NA	3.05E-01	4.58E-08					1.07E-06		1E-05					
Total Hazard Quotient and Cancer Risk:													**4E-02**					

Assumptions for Recreational Worker (Child)

CF =	0.001	l/cm3
BW =	15	kg
SA =	9,180	cm2
ET =	0.25	hours/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE P-13
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day)[3]	Short-tailed Shrew Exposure (mg/kg/day)[3]	American Robin Exposure (mg/kg/day)[3]
Volatile Organics						
Methyl ethyl ketone	8.00E-03	2.74E+01	9.60E-01	2.45E-02	1.15E-02	6.40E-02
Methylene chloride	3.00E-03	6.86E+00	5.25E+00	3.94E-03	9.64E-03	1.15E-02
Semivolatile Organics						
2-Methylnaphthalene	4.90E-02	1.63E-01	3.42E-01	2.89E-03	1.04E-02	1.17E-02
Benzo(a)anthracene	8.60E-02	1.51E-02	1.25E-01	1.68E-03	7.29E-03	1.04E-02
Benzo(a)pyrene	7.70E-02	1.02E+00	4.50E+00	4.63E-02	2.00E-01	1.50E-01
Benzo(b)fluoranthene	1.60E-01	6.17E-03	3.20E-01	6.34E-03	3.12E-02	3.00E-02
Benzo(ghi)perylene	6.80E-02	3.05E-03	2.40E-01	2.08E-03	1.02E-02	1.08E-02
Benzo(k)fluoranthene	1.10E-01	4.25E-03	2.53E-01	3.54E-03	1.73E-02	1.80E-02
Bis(2-Ethylhexyl)phthalate	1.10E+00	5.10E-03	1.20E+01	1.43E+00	7.51E+00	4.74E+00
Chrysene	1.10E-01	2.22E-02	1.75E-01	2.83E-03	1.25E-02	1.55E-02
Di-n-butylphthalate	7.70E-02	8.84E-02	1.25E-01	2.11E-03	6.71E-03	1.09E-02
Di-n-octylphthalate	7.50E-02	1.60E-04	4.90E+03	3.97E+01	2.09E+02	1.30E+02
Dibenz(a,h)anthracene	4.00E-02	8.16E-03	1.75E-01	9.67E-04	4.52E-03	5.48E-03
Fluoranthene	2.40E-01	3.72E-02	7.92E-01	2.25E-02	1.11E-01	8.70E-02
Indeno(1,2,3-cd)pyrene	6.10E-02	1.37E-03	4.19E-01	3.04E-03	1.53E-02	1.35E-02
Naphthalene	3.10E-02	4.43E-01	3.42E-01	2.76E-03	6.87E-03	9.80E-03
Phenanthrene	1.00E-01	1.02E-01	1.22E-01	2.86E-03	8.59E-03	1.44E-02
Phenol	4.20E-02	5.40E+00	1.00E+00	2.92E-02	3.17E-02	8.07E-02
Pyrene	1.60E-01	4.43E-02	9.20E-02	3.06E-03	1.07E-02	1.88E-02

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as

$ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW$

Where, ED = exposure dose
- Cs = RME conc in soil (mg/kg)
- CF = plant dry-to-wet-weight conversion factor (0.2 for inorganics only, 1 for organics)
- SP = soil-to-plant uptake factor
- Ip = plant-matter intake rate (0.00216 kg/day for mouse, 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
- BAF = bioaccumulation factor (unitless)
- Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
- Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
- SFF = Site foraging factor (1 for both mouse and shrew; 0.583 for robin)
- BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE P-14
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64D - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Methyl ethyl ketone	2.45E-02	1.15E-02	1.77E+02	1.4E-04	6.5E-05
Methylene chloride	3.94E-03	9.64E-03	none available	--	--
Semivolatile Organics					
2-Methylnaphthalene	2.89E-03	1.04E-02	7.16E+00	4.0E-04	1.5E-03
Benzo(a)anthracene	1.68E-03	7.29E-03	1.00E+00	1.7E-03	7.3E-03
Benzo(a)pyrene	4.63E-02	2.00E-01	1.00E+00	4.6E-02	2.0E-01
Benzo(b)fluoranthene	6.34E-03	3.12E-02	1.00E+00	6.3E-03	3.1E-02
Benzo(ghi)perylene	2.08E-03	1.02E-02	1.00E+00	2.1E-03	1.0E-02
Benzo(k)fluoranthene	3.54E-03	1.73E-02	1.00E+00	3.5E-03	1.7E-02
Bis(2-Ethylhexyl)phthalate	1.43E+00	7.51E+00	1.83E+01	7.8E-02	4.1E-01
Chrysene	2.83E-03	1.25E-02	1.00E+00	2.8E-03	1.2E-02
Di-n-butylphthalate	2.11E-03	6.71E-03	5.50E+02	3.8E-06	1.2E-05
Di-n-octylphthalate	3.97E+01	2.09E+02	1.83E+01	2.2E+00	1.1E+01
Dibenz(a,h)anthracene	9.67E-04	4.52E-03	1.00E+00	9.7E-04	4.5E-03
Fluoranthene	2.25E-02	1.11E-01	1.25E+00	1.8E-02	8.9E-02
Indeno(1,2,3-cd)pyrene	3.04E-03	1.53E-02	1.00E+00	3.0E-03	1.5E-02
Naphthalene	2.76E-03	6.87E-03	7.16E+00	3.9E-04	9.6E-04
Phenanthrene	2.86E-03	8.59E-03	1.00E+00	2.9E-03	8.6E-03
Phenol	2.92E-02	3.17E-02	none available	--	--
Pyrene	3.06E-03	1.07E-02	1.00E+00	3.1E-03	1.1E-02

(1) Receptor exposure from Table P-13.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE P-15
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-64D - BIRDS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day)[2]	American Robin Hazard Quotient[3]
Volatile Organics			
Methyl ethyl ketone	6.40E-02	none available	--
Methylene chloride	1.15E-02	none available	--
Semivolatile Organics			
2-Methylnaphthalene	1.17E-02	2.85E+01	4.1E-04
Benzo(a)anthracene	1.04E-02	4.00E+01	2.6E-04
Benzo(a)pyrene	1.50E-01	4.00E+01	3.7E-03
Benzo(b)fluoranthene	3.00E-02	4.00E+01	7.5E-04
Benzo(ghi)perylene	1.08E-02	4.00E+01	2.7E-04
Benzo(k)fluoranthene	1.80E-02	4.00E+01	4.5E-04
Bis(2-Ethylhexyl)phthalate	4.74E+00	1.10E+00	4.3E+00
Chrysene	1.55E-02	4.00E+01	3.9E-04
Di-n-butylphthalate	1.09E-02	1.10E-01	9.9E-02
Di-n-octylphthalate	1.30E+02	1.10E+00	1.2E+02
Dibenz(a,h)anthracene	5.48E-03	4.00E+01	1.4E-04
Fluoranthene	8.70E-02	4.00E+01	2.2E-03
Indeno(1,2,3-cd)pyrene	1.35E-02	4.00E+01	3.4E-04
Naphthalene	9.80E-03	2.85E+01	3.4E-04
Phenanthrene	1.44E-02	2.85E+01	5.1E-04
Phenol	8.07E-02	none available	--
Pyrene	1.88E-02	4.00E+01	4.7E-04

(1) Receptor exposure from Table P-13.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX Q

SEAD-66: Pesticide Storage near Buildings 5 and 6

Table Q-1: Soil Analysis Results
Table Q-2: Exposure Point Concentrations for Chemicals of Potential Concern
Table Q-3: Ambient Air Exposure Point Concentrations
Table Q-4: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table Q-5: Calculation of Intake and Risk from the Ingestion of Soil
Table Q-6: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table Q-7: Calculated Soil Receptor Exposure
Table Q-8: Calculation of Soil Hazard Quotients – Mammals
Table Q-9: Calculation of Soil Hazard Quotients - Bird

TABLE Q-1
SOIL ANALYSIS RESULTS - SEAD-66
Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

							SEAD	SEAD-66	SEAD-66	SEAD-66	SEAD-66
							LOCATION ID				
							MATRIX	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER	SS66-1	SS66-2	SS66-3RE	SS66-4
							SAMP_DEPTH_TOP	0-0.2	0-0.2	0-0.2	0-0.2
							SAMP_DEPTH_BOT	0-0.2	0-0.2	0-0.2	0-0.2
							SAMPLE DATE	12/17/93	12/17/93	12/17/93	12/17/93
							SAMPLE TYPE				
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)
PESTICIDES/PCBs											
4,4'-DDD	ug/Kg	560	33%	2900	0	3	9	3.5 U	4.4 U	4.1 UJ	11 J
4,4'-DDE	ug/Kg	8700	89%	2100	1	8	9	4.5 J	2.5 J	3.1 J	110 J
4,4'-DDT	ug/Kg	36000	89%	2100	1	8	9	3.5 J	4.4 U	5.5 J	170
Aldrin	ug/Kg	0	0%	41	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
alpha-BHC	ug/Kg	0	0%	110	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
alpha-Chlordane	ug/Kg	16	22%	NA	0	2	9	1.8 U	2.3 U	2.1 UJ	11 U
Aroclor-1016	ug/Kg	0	0%	1000	0	0	9	35 U	44 U	41 UJ	220 U
Aroclor-1221	ug/Kg	0	0%	1000	0	0	9	72 U	89 U	84 UJ	450 U
Aroclor-1232	ug/Kg	0	0%	1000	0	0	9	35 U	44 U	41 UJ	220 U
Aroclor-1242	ug/Kg	0	0%	1000	0	0	9	35 U	44 U	41 UJ	220 U
Aroclor-1248	ug/Kg	0	0%	1000	0	0	9	35 U	44 U	41 UJ	220 U
Aroclor-1254	ug/Kg	80	44%	1000	0	4	9	43	44 U	31 J	220 U
Aroclor-1260	ug/Kg	0	0%	1000	0	0	9	35 U	44 U	41 UJ	220 U
beta-BHC	ug/Kg	0	0%	200	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
delta-BHC	ug/Kg	0	0%	300	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
Dieldrin	ug/Kg	0	0%	44	0	0	9	3.5 U	4.4 U	4.1 UJ	22 U
Endosulfan I	ug/Kg	9.4	44%	900	0	4	9	3.2	4.3	9.4 J	11 U
Endosulfan II	ug/Kg	48	33%	900	0	3	9	3.5 U	4.4 U	4.1 UJ	22 U
Endosulfan sulfate	ug/Kg	0	0%	1000	0	0	9	3.5 U	4.4 U	4.1 UJ	22 U
Endrin	ug/Kg	0	0%	100	0	0	9	3.5 U	4.4 U	4.1 UJ	22 U
Endrin aldehyde	ug/Kg	0	0%	NA	0	0	9	3.5 U	4.4 U	4.1 UJ	22 U
Endrin ketone	ug/Kg	0	0%	NA	0	0	9	3.5 U	4.4 U	4.1 UJ	22 U
gamma-BHC (Lindane)	ug/Kg	39	11%	60	0	1	9	1.8 U	2.3 U	2.1 UJ	11 U
gamma-Chlordane	ug/Kg	0	0%	540	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
Heptachlor	ug/Kg	0	0%	100	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
Heptachlor epoxide	ug/Kg	0	0%	20	0	0	9	1.8 U	2.3 U	2.1 UJ	11 U
Methoxychlor	ug/Kg	0	0%	10,000	0	0	9	18 U	23 U	21 UJ	110 U
Toxaphene	ug/Kg	0	0%	NA	0	0	9	180 U	230 U	210 UJ	1100 U
OTHER ANALYSES											
Total Solids	%W/W	99	100%	NA	0	9	9	93	74.6	79.9	75.3

NOTES:

a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) The TAGM value for PCBs is 1000ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
c) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
d) NA = Not Available.
e) U = The compound was not detected at or above this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)fluoranthene.

TABLE Q-1
SOIL ANALYSIS RESULTS - SEAD-66
Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

							SEAD	SEAD-66	SEAD-66	SEAD-66	SEAD-66
							LOCATION ID				
							MATRIX	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER	SS66-5	SS66-6	SS66-7	SS66-8
							SAMP_DEPTH_TOP	0-0.2	0-0.2	0-0.2	0-0.2
							SAMP_DEPTH_BOT	0-0.2	0-0.2	0-0.2	0-0.2
							SAMPLE DATE	12/17/93	12/17/93	12/17/93	12/17/93
							SAMPLE TYPE				
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)
PESTICIDES/PCBs											
4,4'-DDD	ug/Kg	560	33%	2900	0	3	9	2.7 J	4 U	4 UJ	560 J
4,4'-DDE	ug/Kg	8700	89%	2100	1	8	9	4.7 J	4 U	4 J	8700
4,4'-DDT	ug/Kg	36000	89%	2100	1	8	9	9.4 J	2 J	25 J	36000
Aldrin	ug/Kg	0	0%	41	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
alpha-BHC	ug/Kg	0	0%	110	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
alpha-Chlordane	ug/Kg	16	22%	NA	0	2	9	2.3 UJ	2.1 U	1.3 J	16 J
Aroclor-1016	ug/Kg	0	0%	1000	0	0	9	45 UJ	40 U	40 UJ	370 U
Aroclor-1221	ug/Kg	0	0%	1000	0	0	9	92 UJ	82 U	81 UJ	740 U
Aroclor-1232	ug/Kg	0	0%	1000	0	0	9	45 UJ	40 U	40 UJ	370 U
Aroclor-1242	ug/Kg	0	0%	1000	0	0	9	45 UJ	40 U	40 UJ	370 U
Aroclor-1248	ug/Kg	0	0%	1000	0	0	9	45 UJ	40 U	40 UJ	370 U
Aroclor-1254	ug/Kg	80	44%	1000	0	4	9	45 UJ	40 U	24 J	370 U
Aroclor-1260	ug/Kg	0	0%	1000	0	0	9	45 UJ	40 U	40 UJ	370 U
beta-BHC	ug/Kg	0	0%	200	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
delta-BHC	ug/Kg	0	0%	300	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
Dieldrin	ug/Kg	0	0%	44	0	0	9	4.5 UJ	4 U	4 UJ	37 U
Endosulfan I	ug/Kg	9.4	44%	900	0	4	9	2.3 UJ	2.1 U	2 UJ	19 U
Endosulfan II	ug/Kg	48	33%	900	0	3	9	3.5 J	2.5 J	4 UJ	48 J
Endosulfan sulfate	ug/Kg	0	0%	1000	0	0	9	4.5 UJ	4 U	4 UJ	37 U
Endrin	ug/Kg	0	0%	100	0	0	9	4.5 UJ	4 U	4 UJ	37 U
Endrin aldehyde	ug/Kg	0	0%	NA	0	0	9	4.5 UJ	4 U	4 UJ	37 U
Endrin ketone	ug/Kg	0	0%	NA	0	0	9	4.5 UJ	4 U	4 UJ	37 U
gamma-BHC (Lindane)	ug/Kg	39	11%	60	0	1	9	2.3 UJ	2.1 U	2 UJ	39
gamma-Chlordane	ug/Kg	0	0%	540	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
Heptachlor	ug/Kg	0	0%	100	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
Heptachlor epoxide	ug/Kg	0	0%	20	0	0	9	2.3 UJ	2.1 U	2 UJ	19 U
Methoxychlor	ug/Kg	0	0%	10,000	0	0	9	23 UJ	21 U	20 UJ	190 U
Toxaphene	ug/Kg	0	0%	NA	0	0	9	230 UJ	210 U	200 UJ	1900 U
OTHER ANALYSES											
Total Solids	%W/W	99	100%	NA	0	9	9	73	82	82.6	99

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) The TAGM value for PCBs is 1000ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
c) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
d) NA = Not Available.
e) U = The compound was not detected at or above this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)fluoranthene.

TABLE Q-1
SOIL ANALYSIS RESULTS - SEAD-66
Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

SEAD	SEAD-66
LOCATION ID	
MATRIX	SOIL
SAMPLE NUMBER	SS66-9
SAMP_DEPTH_TOP	0-0.2
SAMP_DEPTH_BOT	0-0.2
SAMPLE DATE	12/17/93
SAMPLE TYPE	(SS66-1DUP)

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)
PESTICIDES/PCBs								
4,4'-DDD	ug/Kg	560	33%	2900	0	3	9	4 U
4,4'-DDE	ug/Kg	8700	89%	2100	1	8	9	11 J
4,4'-DDT	ug/Kg	36000	89%	2100	1	8	9	10 J
Aldrin	ug/Kg	0	0%	41	0	0	9	2.1 U
alpha-BHC	ug/Kg	0	0%	110	0	0	9	2.1 U
alpha-Chlordane	ug/Kg	16	22%	NA	0	2	9	2.1 U
Aroclor-1016	ug/Kg	0	0%	1000	0	0	9	40 U
Aroclor-1221	ug/Kg	0	0%	1000	0	0	9	82 U
Aroclor-1232	ug/Kg	0	0%	1000	0	0	9	40 U
Aroclor-1242	ug/Kg	0	0%	1000	0	0	9	40 U
Aroclor-1248	ug/Kg	0	0%	1000	0	0	9	40 U
Aroclor-1254	ug/Kg	80	44%	1000	0	4	9	80
Aroclor-1260	ug/Kg	0	0%	1000	0	0	9	40 U
beta-BHC	ug/Kg	0	0%	200	0	0	9	2.1 U
delta-BHC	ug/Kg	0	0%	300	0	0	9	2.1 U
Dieldrin	ug/Kg	0	0%	44	0	0	9	4 U
Endosulfan I	ug/Kg	9.4	44%	900	0	4	9	6
Endosulfan II	ug/Kg	48	33%	900	0	3	9	4 U
Endosulfan sulfate	ug/Kg	0	0%	1000	0	0	9	4 U
Endrin	ug/Kg	0	0%	100	0	0	9	4 U
Endrin aldehyde	ug/Kg	0	0%	NA	0	0	9	4 U
Endrin ketone	ug/Kg	0	0%	NA	0	0	9	4 U
gamma-BHC (Lindane)	ug/Kg	39	11%	60	0	1	9	2.1 U
gamma-Chlordane	ug/Kg	0	0%	540	0	0	9	2.1 U
Heptachlor	ug/Kg	0	0%	100	0	0	9	2.1 U
Heptachlor epoxide	ug/Kg	0	0%	20	0	0	9	2.1 U
Methoxychlor	ug/Kg	0	0%	10,000	0	0	9	21 U
Toxaphene	ug/Kg	0	0%	NA	0	0	9	210 U
OTHER ANALYSES								
Total Solids	%W/W	99	100%	NA	0	9	9	82.3

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) The TAGM value for PCBs is 1000ug/kg for surface soils and 10,000 ug/kg for subsurface soils.
c) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
d) NA = Not Available.
e) U = The compound was not detected at or above this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.
i) N = Benzo(b)fluoranthene and benzo(k)fluoranthene peaks could not be differentiated. Combined result is reported as benzo(b)fluoranthene.

TABLE Q-2
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-66
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg
Pesticides/PCBs		
4,4'-DDD	5.60E-01	5.60E-01
4,4'-DDE	8.70E+00	8.70E+00
4,4'-DDT	3.60E+01	3.60E+01
alpha-Chlordane	1.60E-02	1.60E-02
Aroclor-1254	8.00E-02	8.00E-02
Endosulfan I	9.40E-03	9.40E-03
Endosulfan II	4.80E-02	4.80E-02
gamma-BHC (Lindane)	3.90E-02	3.90E-02

TABLE Q-3
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-66
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Pesticides/PCBs				
4,4'-DDD	5.60E-01	5.60E-01	9.52E-09	8.29E-08
4,4'-DDE	8.70E+00	8.70E+00	1.48E-07	1.29E-06
4,4'-DDT	3.60E+01	3.60E+01	6.12E-07	5.33E-06
alpha-Chlordane	1.60E-02	1.60E-02	2.72E-10	2.37E-09
Aroclor-1254	8.00E-02	8.00E-02	1.36E-09	1.18E-08
Endosulfan I	9.40E-03	9.40E-03	1.60E-10	1.39E-09
Endosulfan II	4.80E-02	4.80E-02	8.16E-10	7.10E-09
gamma-BHC (Lindane)	3.90E-02	3.90E-02	6.63E-10	5.77E-09

TABLE Q-4
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Industrial Worker Intake (mg/kg-day) (Nc)	Industrial Worker Intake (mg/kg-day) (Car)	Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Pesticides/PCBs																				
4,4'-DDD	NA	NA	9.52E-09	8.29E-08																
4,4'-DDE	NA	NA	1.48E-07	1.29E-06																
4,4'-DDT	NA	3.40E-01	6.12E-07	5.33E-06		2.05E-08		7E-09		7.75E-09		3E-09		1.71E-08		6E-09		9.58E-09		3E-09
alpha-Chlordane	2.00E-04	3.50E-01	2.72E-10	2.37E-09	2.55E-11	9.12E-12	1E-07	3E-12	2.41E-10	3.44E-12	1E-06	1E-12	2.13E-11	7.60E-12	1E-07	3E-12	4.97E-11	4.26E-12	2E-07	1E-12
Aroclor-1254	NA	4.00E-01	1.36E-09	1.18E-08		4.56E-11		2E-11		1.72E-11		7E-12		3.80E-11		2E-11		2.13E-11		9E-12
Endosulfan I	NA	NA	1.60E-10	1.39E-09																
Endosulfan II	NA	NA	8.16E-10	7.10E-09																
gamma-BHC (Lindane)	NA	NA	6.63E-10	5.77E-09																
Total Hazard Quotient and Cancer Risk:							**1E-07**	**7E-09**			**1E-06**	**3E-09**			**1E-07**	**6E-09**			**2E-07**	**3E-09**

	Assumptions for Industrial Worker	Assumptions for Construction Worker	Assumptions for Worker at Day Care Center	Assumptions for Child at Day Care Center
CA =	EPC Surface Only	EPC Surface and Sub-Surface	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	15 kg
IR =	9.6 m3/day	10.4 m3/day	8 m3/day	4 m3/day
EF =	250 days/year	250 days/year	250 days/year	250 days/year
ED =	25 years	1 years	25 years	6 years
AT (Nc) =	9,125 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE Q-3 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1

TABLE Q-5
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Report - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Industrial Worker Intake (mg/kg-day) (Nc)	Industrial Worker Intake (mg/kg-day) (Car)	Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
Pesticides/PCBs																				
4,4'-DDD	NA	2.40E-01	5.60E-01	5.60E-01		1.96E-07		5E-08		3.76E-08		9E-09		1.96E-07		5E-08		4.38E-07		1E-07
4,4'-DDE	NA	3.40E-01	8.70E+00	8.70E+00		3.04E-06		1E-06		5.84E-07		2E-07		3.04E-06		1E-06		6.81E-06		2E-06
4,4'-DDT	5.00E-04	3.40E-01	3.60E+01	3.60E+01	3.52E-05	1.26E-05	7E-02	4E-06	1.69E-04	2.42E-06	3E-01	8E-07	3.52E-05	1.26E-05	7E-02	4E-06	3.29E-04	2.82E-05	7E-01	1E-05
alpha-Chlordane	5.00E-04	3.50E-01	1.60E-02	1.60E-02	1.57E-08	5.59E-09	3E-05	2E-09	7.51E-08	1.07E-09	2E-04	4E-10	1.57E-08	5.59E-09	3E-05	2E-09	1.46E-07	1.25E-08	3E-04	4E-09
Aroclor-1254	2.00E-05	2.00E+00	8.00E-02	8.00E-02	7.83E-08	2.80E-08	4E-03	6E-08	3.76E-07	5.37E-09	2E-02	1E-08	7.83E-08	2.80E-08	4E-03	6E-08	7.31E-07	6.26E-08	4E-02	1E-07
Endosulfan I	6.00E-03	NA	9.40E-03	9.40E-03	9.20E-09		2E-06		4.41E-08		7E-06		9.20E-09		2E-06		8.58E-08		1E-05	
Endosulfan II	6.00E-03	NA	4.80E-02	4.80E-02	4.70E-08		8E-06		2.25E-07		4E-05		4.70E-08		8E-06		4.38E-07		7E-05	
gamma-BHC (Lindane)	3.00E-04	1.30E+00	3.90E-02	3.90E-02	3.82E-08	1.36E-08	1E-04	2E-08	1.83E-07	2.62E-09	6E-04	3E-09	3.82E-08	1.36E-08	1E-04	2E-08	3.56E-07	3.05E-08	1E-03	4E-08
Total Hazard Quotient and Cancer Risk:							**7E-02**	**5E-06**			**4E-01**	**1E-06**			**7E-02**	**5E-06**			**7E-01**	**1E-05**

Assumptions for Industrial Worker		Assumptions for Construction Worker		Assumptions for Worker at Day Care Center		Assumptions for Child at Day Care Center	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface and Subsurface	CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	70 kg	BW =	70 kg	BW =	15 kg
IR =	100 mg soil/day	IR =	480 mg soil/day	IR =	100 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless	FI =	1 unitless	FI =	1 unitless
EF =	250 days/year	EF =	250 days/year	EF =	250 days/year	EF =	250 days/year
ED =	25 years	ED =	1 years	ED =	25 years	ED =	6 years
AT (Nc) =	9,125 days	AT (Nc) =	365 days	AT (Nc) =	9,125 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE Q-6
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Report - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Surface Soil	EPC from Total Soils	Industrial Worker Absorbed Dose (mg/kg-day)		Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Absorbed Dose (mg/kg-day)		Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Absorbed Dose (mg/kg-day)		Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Pesticides/PCBs																					
4,4'-DDD	NA	1.20E+00	NA	5.60E-01	5.60E-01																
4,4'-DDE	NA	1.70E+00	NA	8.70E+00	8.70E+00																
4,4'-DDT	1.00E-04	1.70E+00	NA	3.60E+01	3.60E+01																
alpha-Chlordane	5.00E-04	3.50E-01	NA	1.60E-02	1.60E-02																
Aroclor-1254	1.80E-05	2.22E+00	6.00E-02	8.00E-02	8.00E-02	2.72E-07	9.73E-08	2E-02	2E-07	2.72E-07	3.89E-09	2E-02	9E-09	2.72E-07	9.73E-08	2E-02	2E-07	4.80E-07	4.11E-08	3E-02	9E-08
Endosulfan I	6.00E-03	NA	NA	9.40E-03	9.40E-03																
Endosulfan II	6.00E-03	NA	NA	4.80E-02	4.80E-02																
gamma-BHC (Lindane)	3.00E-04	1.80E+00	NA	3.90E-02	3.90E-02																
Total Hazard Quotient and Cancer Risk:								**2E-02**	**2E-07**			**2E-02**	**9E-09**			**2E-02**	**2E-07**			**3E-02**	**9E-08**

	Assumptions for Industrial Worker	Assumptions for Construction Worker	Assumptions for Worker at Day Care Center	Assumptions for Child at Day Care Center
CF =	1.00E-06 kg/mg	1.00E-06 kg/mg	1.00E-06 kg/mg	1.00E-06 kg/mg
CS =	EPC Surface Only	EPC Surface and Subsurface	EPC Surface Only	EPC Surface Only
BW =	70 kg	70 kg	70 kg	15 kg
SA =	5,800 cm2	5,800 cm2	5,800 cm2	2,190 cm2
AF =	1 mg/cm2	1 mg/cm2	1 mg/cm2	1 mg/cm2
EF =	250 days/year	250 days/year	250 days/year	250 days/year
ED =	25 years	1 years	25 years	6 years
AT (Nc) =	9,125 days	365 days	9,125 days	2,190 days
AT (Car) =	25,550 days	25,550 days	25,550 days	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE Q-7
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-66
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day) [3]	Short-tailed Shrew Exposure (mg/kg/day) [3]	American Robin Exposure (mg/kg/day) [3]
Pesticides/PCBs						
4,4'-DDD	5.60E-01	1.34E-02	1.00E-01	9.32E-03	3.95E-02	4.50E-02
4,4'-DDE	8.70E+00	1.79E-02	2.50E-02	7.86E-02	2.45E-01	6.86E-01
4,4'-DDT	3.60E+01	1.00E-02	1.00E-01	5.86E-01	2.54E+00	2.86E+00
alpha-Chlordane	1.60E-02	1.45E-02	2.40E-01	5.10E-04	2.40E-03	1.37E-03
Aroclor-1254	8.00E-02	7.05E-03	4.50E+00	3.93E-02	2.06E-01	1.87E-02
Endosulfan I	9.40E-03	3.44E-01	2.50E-01	6.44E-04	1.56E-03	1.66E-03
Endosulfan II	4.80E-02	3.13E-01	2.50E-01	3.13E-03	7.94E-03	8.09E-03
gamma-BHC (Lindane)	3.90E-02	4.00E-01	4.03E+02	1.70E+00	8.92E+00	5.61E-01

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as

$ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW$

Where, ED = exposure dose
Cs = RME conc in soil (mg/kg)
CF = plant dry-to-wet-weight conversion factor
(0.2 for inorganics only, 1 for organics)
SP = soil-to-plant uptake factor
Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
BAF = bioaccumulation factor (unitless)
Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
SFF = Site foraging factor (1 for mouse and shrew; 0.583 for robin)
BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE Q-8
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-66 - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Pesticides/PCBs					
4,4'-DDD	9.32E-03	3.95E-02	8.00E-01	1.2E-02	4.9E-02
4,4'-DDE	7.86E-02	2.45E-01	8.00E-01	9.8E-02	3.1E-01
4,4'-DDT	5.86E-01	2.54E+00	8.00E-01	7.3E-01	3.2E+00
alpha-Chlordane	5.10E-04	2.40E-03	none available	--	--
Aroclor-1254	3.93E-02	2.06E-01	6.80E-02	5.8E-01	3.0E+00
Endosulfan I	6.44E-04	1.56E-03	none available	--	--
Endosulfan II	3.13E-03	7.94E-03	none available	--	--
gamma-BHC (Lindane)	1.70E+00	8.92E+00	8.00E+00	2.1E-01	1.1E+00

(1) Receptor exposure from Table Q-7.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE Q-9
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-66 - BIRD
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Pesticides/PCBs			
4,4'-DDD	4.50E-02	5.60E-02	8.0E-01
4,4'-DDE	6.86E-01	5.60E-02	1.2E+01
4,4'-DDT	2.86E+00	5.60E-02	5.1E+01
alpha-Chlordane	1.37E-03	2.14E+00	6.4E-04
Aroclor-1254	1.87E-02	9.80E-01	1.9E-02
Endosulfan I	1.66E-03	1.00E+00	1.7E-03
Endosulfan II	8.09E-03	1.00E+01	8.1E-04
gamma-BHC (Lindane)	5.61E-01	2.00E+00	2.8E-01

(1) Receptor exposure from Table Q-7.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX R

SEAD-68: Building S-335 - Old Pest Control Shop

Table R-1: Soil Analysis Results

Table R-2: Inorganics Analysis of Soil

Table R-3: Exposure Point Concentrations for Chemicals of Potential Concern

Table R-4: Ambient Air Exposure Point Concentrations

Table R-5: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air

Table R-6: Calculation of Intake and Risk from the Ingestion of Soil

Table R-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil

Table R-8: Calculated Soil Receptor Exposure

Table R-9: Calculation of Soil Hazard Quotients – Mammals

Table R-10: Calculation of Soil Hazard Quotients – Bird

TABLE R-1
SOIL ANALYSIS RESULTS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							SEAD	SEAD-68	SEAD-68	SEAD-68	SEAD-68	SEAD-68
							LOCATION ID	SB68-1	SB68-1	SB68-2	SB68-2	SS68-1
							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER	EB250	EB251	EB248	EB249	EB142
							SAMP_DEPTH_TOP	0	4.5	0	4	0
							SAMP_DEPTH_BOT	0.3	4.8	0.2	4.4	0.2
							SAMP_DATE	03/16/98	03/16/98	03/16/98	03/16/98	03/10/98
							SAMPLE TYPE	SA	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS												
Benzene	UG/KG	3	11.11%	60	0	1	9		11 U	11 U	11 U	3 J	11 U
Chloroform	UG/KG	4	11.11%	300	0	1	9		11 U	4 J	11 U	10 U	11 U
Tetrachloroethene	UG/KG	8	11.11%	1400	0	1	9		11 U	11 U	11 U	10 U	8 J
Toluene	UG/KG	87	66.67%	1500	0	6	9		9 J	21	30	87	11 U
Total Xylenes	UG/KG	6	22.22%	1200	0	2	9		11 U	11 U	2 J	6 J	11 U
Trichloroethene	UG/KG	4	11.11%	700	0	1	9		11 U	11 U	11 U	4 J	11 U
2-Methylnaphthalene	UG/KG	310	44.44%	36400	0	4	9		69 U	69 U	4.9 J	69 U	8.7 J
Acenaphthene	UG/KG	49	44.44%	50000	0	4	9		69 U	69 U	71 U	69 U	34 J
Anthracene	UG/KG	97	66.67%	50000	0	6	9		69 U	69 U	6 J	69 U	53 J
Benzo(a)anthracene	UG/KG	900	88.89%	224	2	8	9		69 U	7.2 J	46 J	9.6 J	360
Benzo(a)pyrene	UG/KG	770	88.89%	61	5	8	9		69 U	6.7 J	50 J	9 J	350
Benzo(b)fluoranthene	UG/KG	940	88.89%	1100	0	8	9		69 U	7.4 J	68 J	10 J	380
Benzo(ghi)perylene	UG/KG	420	88.89%	50000	0	8	9		69 U	7.1 J	47 J	12 J	280
Benzo(k)fluoranthene	UG/KG	830	88.89%	1100	0	8	9		69 U	8.2 J	58 J	12 J	460
Bis(2-Ethylhexyl)phthalate	UG/KG	150	11.11%	50000	0	1	9		69 U	69 U	71 U	69 U	140 U
Butylbenzylphthalate	UG/KG	18	55.56%	50000	0	5	9		4.9 J	69 U	6.5 J	69 U	15 J
Carbazole	UG/KG	80	66.67%	NA	0	6	9		69 U	69 U	9.3 J	69 U	67 J
Chrysene	UG/KG	1000	100.00%	400	2	9	9		4 J	8.8 J	60 J	14 J	430
Di-n-butylphthalate	UG/KG	4.2	11.11%	8100	0	1	9		69 U	4.2 J	71 U	69 U	140 U
Di-n-octylphthalate	UG/KG	18	11.11%	50000	0	1	9		69 U	69 U	71 U	69 U	140 U
Dibenz(a,h)anthracene	UG/KG	220	88.89%	14	6	8	9		69 U	5 J	17 J	4.8 J	110 J
Dibenzofuran	UG/KG	43	44.44%	6200	0	4	9		69 U	69 U	71 U	69 U	13 J
Fluoranthene	UG/KG	1500	100.00%	50000	0	9	9		6.1 J	14 J	120	23 J	700
Fluorene	UG/KG	34	44.44%	50000	0	4	9		69 U	69 U	71 U	69 U	22 J
Indeno(1,2,3-cd)pyrene	UG/KG	400	88.89%	3200	0	8	9		69 U	6.6 J	44 J	7.6 J	260
Naphthalene	UG/KG	78	22.22%	13000	0	2	9		69 U	69 U	71 U	69 U	140 U
Pentachlorophenol	UG/KG	24	11.11%	1000	0	1	9		18 UJ	18 UJ	18 UJ	18 UJ	19 UJ
Phenanthrene	UG/KG	480	77.78%	50000	0	7	9		69 U	69 U	42 J	11 J	350
Pyrene	UG/KG	1500	100.00%	50000	0	9	9		4.3 J	11 J	94	16 J	840
4,4'-DDE	UG/KG	260	77.78%	2100	0	7	9		3.5 U	3.5 U	19	4.2	77 J
4,4'-DDT	UG/KG	130	44.44%	2100	0	4	9		3.5 U	3.5 U	22	3.5 U	28
Alpha-Chlordane	UG/KG	21	33.33%	NA	0	3	9		1.8 U	1.8 U	19 U	1.8 U	21 J
Gamma-Chlordane	UG/KG	23	44.44%	540	0	4	9		1.8 U	1.8 U	7.5	4.4	23

See Last Page for Notes:
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TABLE R-1
SOIL ANALYSIS RESULTS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES					
							SEAD	SEAD-68	SEAD-68	SEAD-68	SEAD-68	SEAD-68
							LOCATION ID	SB68-1	SB68-1	SB68-2	SB68-2	SS68-1
							MATRIX	SOIL	SOIL	SOIL	SOIL	SOIL
							SAMPLE NUMBER	EB250	EB251	EB248	EB249	EB142
							SAMP_DEPTH_TOP	0	4.5	0	4	0
							SAMP_DEPTH_BOT	0.3	4.8	0.2	4.4	0.2
							SAMP_DATE	03/16/98	03/16/98	03/16/98	03/16/98	03/10/98
							SAMPLE TYPE	SA	SA	SA	SA	SA
								Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
Heptachlor epoxide	UG/KG	4	44.44%	20	0	4	9	1.8 U	1.8 U	1.6 J	1.8 U	4 J
2,4,5-T	UG/KG	25	11.11%	1900	0	1	9	5 U	5 U	5.1 U	5 U	5.3 U
2,4-DB	UG/KG	90	11.11%	NA	0	1	9	50 U	50 U	51 U	50 U	53 U
Arsenic	MG/KG	11.3	100.00%	8.2	2	9	9	5.2 J	4.7 J	3.9 J	6 J	8.3 J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE R-1
SOIL ANALYSIS RESULTS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD	SEAD-68	SEAD-68	SEAD-68	SEAD-68
LOCATION ID	SS68-2	SS68-3	SS68-4	SS68-5
MATRIX	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER	EB143	EB144	EB145	EB146
SAMP_DEPTH_TOP	0	0	0	0
SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2
SAMP_DATE	03/10/98	03/10/98	03/10/98	03/10/98
SAMPLE TYPE	SA	SA	SA	SA

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS											
Benzene	UG/KG	3	11.11%	60	0	1	9	12 U	12 U	13 U	11 U
Chloroform	UG/KG	4	11.11%	300	0	1	9	12 U	12 U	13 U	11 U
Tetrachloroethene	UG/KG	8	11.11%	1400	0	1	9	12 U	12 U	13 U	11 U
Toluene	UG/KG	87	66.67%	1500	0	6	9	12 U	12 U	4 J	2 J
Total Xylenes	UG/KG	6	22.22%	1200	0	2	9	12 U	12 U	13 U	11 U
Trichloroethene	UG/KG	4	11.11%	700	0	1	9	12 U	12 U	13 U	11 U
2-Methylnaphthalene	UG/KG	310	44.44%	36400	0	4	9	76 U	310 U	310 J	7.9 J
Acenaphthene	UG/KG	49	44.44%	50000	0	4	9	4.8 J	49 J	410 U	14 J
Anthracene	UG/KG	97	66.67%	50000	0	6	9	7.5 J	97 J	31 J	23 J
Benzo(a)anthracene	UG/KG	900	88.89%	224	2	8	9	66 J	900	100 J	130
Benzo(a)pyrene	UG/KG	770	88.89%	61	5	8	9	77	770	120 J	130 J
Benzo(b)fluoranthene	UG/KG	940	88.89%	1100	0	8	9	110	940 J	130 J	170 J
Benzo(ghi)perylene	UG/KG	420	88.89%	50000	0	8	9	64 J	420 J	110 J	100 J
Benzo(k)fluoranthene	UG/KG	830	88.89%	1100	0	8	9	100	830 J	150 J	180 J
Bis(2-Ethylhexyl)phthalate	UG/KG	150	11.11%	50000	0	1	9	76 U	310 U	410 U	150 J
Butylbenzylphthalate	UG/KG	18	55.56%	50000	0	5	9	76 U	18 J	410 U	8.7 J
Carbazole	UG/KG	80	66.67%	NA	0	6	9	13 J	80 J	46 J	36 J
Chrysene	UG/KG	1000	100.00%	400	2	9	9	94	1000	150 J	160
Di-n-butylphthalate	UG/KG	4.2	11.11%	8100	0	1	9	76 U	310 U	410 U	77 U
Di-n-octylphthalate	UG/KG	18	11.11%	50000	0	1	9	76 U	18 J	410 U	77 UJ
Dibenz(a,h)anthracene	UG/KG	220	88.89%	14	6	8	9	26 J	220 J	50 J	40 J
Dibenzofuran	UG/KG	43	44.44%	6200	0	4	9	76 U	18 J	43 J	6.6 J
Fluoranthene	UG/KG	1500	100.00%	50000	0	9	9	150	1500	220 J	320
Fluorene	UG/KG	34	44.44%	50000	0	4	9	76 U	34 J	27 J	12 J
Indeno(1,2,3-cd)pyrene	UG/KG	400	88.89%	3200	0	8	9	61 J	400	96 J	98
Naphthalene	UG/KG	78	22.22%	13000	0	2	9	76 U	310 U	78 J	6.5 J
Pentachlorophenol	UG/KG	24	11.11%	1000	0	1	9	24 J	19 UJ	23 UJ	19 UJ
Phenanthrene	UG/KG	480	77.78%	50000	0	7	9	54 J	480	210 J	150
Pyrene	UG/KG	1500	100.00%	50000	0	9	9	150	1500	260 J	310
4,4'-DDE	UG/KG	260	77.78%	2100	0	7	9	81 J	26	260	36
4,4'-DDT	UG/KG	130	44.44%	2100	0	4	9	1.9 U	23	21 U	130 J
Alpha-Chlordane	UG/KG	21	33.33%	NA	0	3	9	1.9 U	1.9 U	19 J	1.6 J
Gamma-Chlordane	UG/KG	23	44.44%	540	0	4	9	1.9 U	1.9 U	18 J	1.2 U

TABLE R-1
SOIL ANALYSIS RESULTS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

									SEAD-68	SEAD-68	SEAD-68	SEAD-68
								LOCATION ID	SS68-2	SS68-3	SS68-4	SS68-5
								MATRIX	SOIL	SOIL	SOIL	SOIL
								SAMPLE NUMBER	EB143	EB144	EB145	EB146
								SAMP_DEPTH_TOP	0	0	0	0
								SAMP_DEPTH_BOT	0.2	0.2	0.2	0.2
								SAMP_DATE	03/10/98	03/10/98	03/10/98	03/10/98
								SAMPLE TYPE	SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES		Value (Q)	Value (Q)	Value (Q)	Value (Q)
Heptachlor epoxide	UG/KG	4	44.44%	20	0	4	9		1.3 J	3.6	21 U	1.9 U
2,4,5-T	UG/KG	25	11.11%	1900	0	1	9		5.5 U	5.4 U	25 J	5.3 U
2,4-DB	UG/KG	90	11.11%	NA	0	1	9		55 U	54 U	90 J	53 U
Arsenic	MG/KG	11.3	100.00%	8.2	2	9	9		3.8 J	7.7 J	$\boxed{11.3}$ J	6.6 J

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs <10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

See Last Page for Notes:

TABLE R-2
INORGANICS ANALYSIS OF SOIL - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/Kg)	2 x Average of Background Soils (ug/Kg)	Average of SEAD-68 Soils (ug/Kg)	Is Average of Site data > than 2 x Average of Background data?
Arsenic	5.08	10.15	6.39	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE R-3
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-68
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/Kg	Surface Soil mg/Kg
Volatile Organics		
Benzene	3.00E-03	
Chloroform	4.00E-03	
Tetrachloroethene	8.00E-03	8.00E-03
Toluene	8.70E-02	3.00E-02
Total Xylenes	6.00E-03	2.00E-03
Trichloroethene	4.00E-03	
Semivolatile Organics		
2-Methylnaphthalene	3.10E-01	3.10E-01
Acenaphthene	4.90E-02	4.90E-02
Anthracene	9.70E-02	9.70E-02
Benzo(a)anthracene	9.00E-01	9.00E-01
Benzo(a)pyrene	7.70E-01	7.70E-01
Benzo(b)fluoranthene	9.40E-01	9.40E-01
Benzo(ghi)perylene	4.20E-01	4.20E-01
Benzo(k)fluoranthene	8.30E-01	8.30E-01
Bis(2-Ethylhexyl)phthalate	1.50E-01	1.50E-01
Butylbenzylphthalate	1.80E-02	1.80E-02
Carbazole	8.00E-02	8.00E-02
Chrysene	1.00E+00	1.00E+00
Di-n-butylphthalate	4.20E-03	
Di-n-octylphthalate	1.80E-02	1.80E-02
Dibenz(a,h)anthracene	2.20E-01	2.20E-01
Dibenzofuran	4.30E-02	4.30E-02
Fluoranthene	1.50E+00	1.50E+00
Fluorene	3.40E-02	3.40E-02
Indeno(1,2,3-cd)pyrene	4.00E-01	4.00E-01
Naphthalene	7.80E-02	7.80E-02
Pentachlorophenol	2.40E-02	2.40E-02
Phenanthrene	4.80E-01	4.80E-01
Pyrene	1.50E+00	1.50E+00
Pesticides/PCBs		
4,4'-DDE	2.60E-01	2.60E-01
4,4'-DDT	1.30E-01	1.30E-01
Alpha-Chlordane	2.10E-02	2.10E-02
Gamma-Chlordane	2.30E-02	2.30E-02
Heptachlor epoxide	4.00E-03	4.00E-03
Herbicides		
2,4,5-T	2.50E-02	2.50E-02
2,4-DB	9.00E-02	9.00E-02

TABLE R-4
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 148 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Volatile Organics				
Benzene	ND	3.00E-03	ND	4.44E-10
Chloroform	ND	4.00E-03	ND	5.92E-10
Tetrachloroethene	8.00E-03	8.00E-03	1.36E-10	1.18E-09
Toluene	3.00E-02	8.70E-02	5.10E-10	1.29E-08
Total Xylenes	2.00E-03	6.00E-03	3.40E-11	8.88E-10
Trichloroethene	ND	4.00E-03	ND	5.92E-10
Semivolatile Organics				
2-Methylnaphthalene	3.10E-01	3.10E-01	5.27E-09	4.59E-08
Acenaphthene	4.90E-02	4.90E-02	8.33E-10	7.25E-09
Anthracene	9.70E-02	9.70E-02	1.65E-09	1.44E-08
Benzo(a)anthracene	9.00E-01	9.00E-01	1.53E-08	1.33E-07
Benzo(a)pyrene	7.70E-01	7.70E-01	1.31E-08	1.14E-07
Benzo(b)fluoranthene	9.40E-01	9.40E-01	1.60E-08	1.39E-07
Benzo(ghi)perylene	4.20E-01	4.20E-01	7.14E-09	6.22E-08
Benzo(k)fluoranthene	8.30E-01	8.30E-01	1.41E-08	1.23E-07
bis(2-Ethylhexyl)phthalate	1.50E-01	1.50E-01	2.55E-09	2.22E-08
Butylbenzylphthalate	1.80E-02	1.80E-02	3.06E-10	2.66E-09
Carbazole	8.00E-02	8.00E-02	1.36E-09	1.18E-08
Chrysene	1.00E+00	1.00E+00	1.70E-08	1.48E-07
Di-n-butylphthalate	ND	4.20E-03	ND	6.22E-10
Di-n-octylphthalate	1.80E-02	1.80E-02	3.06E-10	2.66E-09
Dibenz(a,h)anthracene	2.20E-01	2.20E-01	3.74E-09	3.26E-08
Dibenzofuran	4.30E-02	4.30E-02	7.31E-10	6.36E-09
Fluoranthene	1.50E+00	1.50E+00	2.55E-08	2.22E-07
Fluorene	3.40E-02	3.40E-02	5.78E-10	5.03E-09
Indeno(1,2,3-cd)pyrene	4.00E-01	4.00E-01	6.80E-09	5.92E-08
Naphthalene	7.80E-02	7.80E-02	1.33E-09	1.15E-08
Pentachlorophenol	2.40E-02	2.40E-02	4.08E-10	3.55E-09
Phenanthrene	4.80E-01	4.80E-01	8.16E-09	7.10E-08
Pyrene	1.50E+00	1.50E+00	2.55E-08	2.22E-07
Pesticides/PCBs				
4,4'-DDE	2.60E-01	2.60E-01	4.42E-09	3.85E-08
4,4'-DDT	1.30E-01	1.30E-01	2.21E-09	1.92E-08
alpha-Chlordane	2.10E-02	2.10E-02	3.57E-10	3.11E-09
gamma-Chlordane	2.30E-02	2.30E-02	3.91E-10	3.40E-09
Heptachlor epoxide	4.00E-03	4.00E-03	6.80E-11	5.92E-10
Herbicides				
2,4,5-T	2.50E-02	2.50E-02	4.25E-10	3.70E-09
2,4-DB	9.00E-02	9.00E-02	1.53E-09	1.33E-08

ND = Compound was not detected.

TABLE R-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Air EPC* from Total Soils	Industrial Worker Intake (mg/kg-day) (Nc)	Industrial Worker Intake (mg/kg-day) (Car)	Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day) (Nc)	Worker at Day Care Center Intake (mg/kg-day) (Car)	Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day) (Nc)	Child at Day Care Center Intake (mg/kg-day) (Car)	Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)																
Volatile Organics																				
Benzene	1.71E-03	2.73E-02	ND	4.44E-10					4.52E-11	6.45E-13	3E-08	2E-14								
Chloroform	NA	8.05E-02	ND	5.92E-10						8.61E-13		7E-14								
Tetrachloroethene	NA	2.00E-03	1.36E-10	1.18E-09		4.56E-12		9E-15		1.72E-12		3E-15		3.80E-12		8E-15		2.13E-12		4E-15
Toluene	1.14E-01	NA	5.10E-10	1.29E-08	4.79E-11		4E-10		1.31E-09		1E-08		3.99E-11		3E-10		9.32E-11		8E-10	
Total Xylenes	NA	NA	3.40E-11	8.88E-10																
Trichloroethene	NA	6.00E-03	ND	5.92E-10						8.61E-13		5E-15								
Semivolatile Organics																				
2-Methylnaphthalene	NA	NA	5.27E-09	4.59E-08																
Acenaphthene	NA	NA	8.33E-10	7.25E-09																
Anthracene	NA	NA	1.65E-09	1.44E-08																
Benzo(a)anthracene	NA	NA	1.53E-08	1.33E-07																
Benzo(a)pyrene	NA	NA	1.31E-08	1.14E-07																
Benzo(b)fluoranthene	NA	NA	1.60E-08	1.39E-07																
Benzo(ghi)perylene	NA	NA	7.14E-09	6.22E-08																
Benzo(k)fluoranthene	NA	NA	1.41E-08	1.23E-07																
bis(2-Ethylhexyl)phthalate	NA	NA	2.55E-09	2.22E-08																
Butylbenzylphthalate	NA	NA	3.06E-10	2.66E-09																
Carbazole	NA	NA	1.36E-09	1.18E-08																
Chrysene	NA	NA	1.70E-08	1.48E-07																
Di-n-butylphthalate	NA	NA	ND	6.22E-10																
Di-n-octylphthalate	NA	NA	3.06E-10	2.66E-09																
Dibenz(a,h)anthracene	NA	NA	3.74E-09	3.26E-08																
Dibenzofuran	NA	NA	7.31E-10	6.36E-09																
Fluoranthene	NA	NA	2.55E-08	2.22E-07																
Fluorene	NA	NA	5.78E-10	5.03E-09																
Indeno(1,2,3-cd)pyrene	NA	NA	6.80E-09	5.92E-08																
Naphthalene	8.60E-04	NA	1.33E-09	1.15E-08	1.25E-10		1E-07		1.17E-09		1E-06		1.04E-10		1E-07		2.42E-10		3E-07	
Pentachlorophenol	NA	NA	4.08E-10	3.55E-09																
Phenanthrene	NA	NA	8.16E-09	7.10E-08																
Pyrene	NA	NA	2.55E-08	2.22E-07																
Pesticides/PCBs																				
4,4'-DDE	NA	NA	4.42E-09	3.85E-08																
4,4'-DDT	NA	3.40E-01	2.21E-09	1.92E-08		7.41E-11		3E-11		2.80E-11		1E-11		6.18E-11		2E-11		3.46E-11		1E-11
alpha-Chlordane	2.00E-04	3.50E-01	3.57E-10	3.11E-09	3.35E-11	1.20E-11	2E-07	4E-12	3.16E-10	4.52E-12	2E-06	2E-12	2.79E-11	9.98E-12	1E-07	3E-12	6.52E-11	5.59E-12	3E-07	2E-12
gamma-Chlordane	2.00E-04	3.50E-01	3.91E-10	3.40E-09	3.67E-11	1.31E-11	2E-07	5E-12	3.46E-10	4.95E-12	2E-06	2E-12	3.06E-11	1.09E-11	2E-07	4E-12	7.14E-11	6.12E-12	4E-07	2E-12
Heptachlor epoxide	NA	9.10E+00	6.80E-11	5.92E-10		2.28E-12		2E-11		8.61E-13		8E-12		1.90E-12		2E-11		1.06E-12		1E-11
Herbicides																				
2,4,5-T	NA	NA	4.25E-10	3.70E-09																
2,4-DB	NA	NA	1.53E-09	1.33E-08																
Total Hazard Quotient and Cancer Risk:							5E-07	5E-11			5E-06	2E-11			4E-07	5E-11			1E-06	3E-11

Assumptions for Industrial Worker

CA =	EPC Surface Only
BW =	70 kg
IR =	9.6 m3/day
EF =	250 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Construction Worker

CA =	EPC Surface and Sub-Surface
BW =	70 kg
IR =	10.4 m3/day
EF =	250 days/year
ED =	1 years
AT (Nc) =	365 days
AT (Car) =	25,550 days

Assumptions for Worker at Day Care Center

CA =	EPC Surface Only
BW =	70 kg
IR =	8 m3/day
EF =	250 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Child at Day Care Center

CA =	EPC Surface Only
BW =	15 kg
IR =	4 m3/day
EF =	250 days/year
ED =	6 years
AT (Nc) =	2,190 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE R-4 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE R-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Industrial Worker Intake (mg/kg-day)		Industrial Worker Hazard Quotient	Industrial Worker Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk	Worker at Day Care Center Intake (mg/kg-day)		Worker at Day Care Center Hazard Quotient	Worker at Day Care Center Cancer Risk	Child at Day Care Center Intake (mg/kg-day)		Child at Day Care Center Hazard Quotient	Child at Day Care Center Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics																				
Benzene	3.00E-03	2.90E-02		3.00E-03					1.41E-08	2.01E-10	5E-06	6E-12								
Chloroform	1.00E-02	6.10E-03		4.00E-03					1.88E-08	2.68E-10	2E-06	2E-12								
Tetrachloroethene	1.00E-02	5.20E-02	8.00E-03	8.00E-03	7.83E-09	2.80E-09	8E-07	1E-10	3.76E-08	5.37E-10	4E-06	3E-11	7.83E-09	2.80E-09	8E-07	1E-10	7.31E-08	6.26E-09	7E-06	3E-10
Toluene	2.00E-01	NA	3.00E-02	8.70E-02	2.94E-08		1E-07		4.09E-07		2E-06		2.94E-08		1E-07		2.74E-07		1E-06	
Total Xylenes	2.00E+00	NA	2.00E-03	6.00E-03	1.96E-09		1E-09		2.82E-08		1E-08		1.96E-09		1E-09		1.83E-08		9E-09	
Trichloroethene	NA	1.10E-02		4.00E-03						2.68E-10		3E-12								
Semivolatile Organics																				
2-Methylnaphthalene	4.00E-02	NA	3.10E-01	3.10E-01	3.03E-07		8E-06		1.46E-06		4E-05		3.03E-07		8E-06		2.83E-06		7E-05	
Acenaphthene	6.00E-02	NA	4.90E-02	4.90E-02	4.79E-08		8E-07		2.30E-07		4E-06		4.79E-08		8E-07		4.47E-07		7E-06	
Anthracene	3.00E-01	NA	9.70E-02	9.70E-02	9.49E-08		3E-07		4.56E-07		2E-06		9.49E-08		3E-07		8.86E-07		3E-06	
Benzo(a)anthracene	NA	7.30E-01	9.00E-01	9.00E-01		3.15E-07		2E-07		6.04E-08		4E-08		3.15E-07		2E-07		7.05E-07		5E-07
Benzo(a)pyrene	NA	7.30E+00	7.70E-01	7.70E-01		2.69E-07		2E-06		5.17E-08		4E-07		2.69E-07		2E-06		6.03E-07		4E-06
Benzo(b)fluoranthene	NA	7.30E-01	9.40E-01	9.40E-01		3.28E-07		2E-07		6.31E-08		5E-08		3.28E-07		2E-07		7.36E-07		5E-07
Benzo(ghi)perylene	NA	NA	4.20E-01	4.20E-01																
Benzo(k)fluoranthene	NA	7.30E-02	8.30E-01	8.30E-01		2.90E-07		2E-08		5.57E-08		4E-09		2.90E-07		2E-08		6.50E-07		5E-08
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.50E-01	1.50E-01	1.47E-07	5.24E-08	7E-06	7E-10	7.05E-07	1.01E-08	4E-05	1E-10	1.47E-07	5.24E-08	7E-06	7E-10	1.37E-06	1.17E-07	7E-05	2E-09
Butylbenzylphthalate	2.00E-01	NA	1.80E-02	1.80E-02	1.76E-08		9E-08		8.45E-08		4E-07		1.76E-08		9E-08		1.64E-07		8E-07	
Carbazole	NA	2.00E-02	8.00E-02	8.00E-02		2.80E-08		6E-10		5.37E-09		1E-10		2.80E-08		6E-10		6.26E-08		1E-09
Chrysene	NA	7.30E-03	1.00E+00	1.00E+00		3.49E-07		3E-09		6.71E-08		5E-10		3.49E-07		3E-09		7.83E-07		6E-09
Di-n-butylphthalate	1.00E-01	NA		4.20E-03					1.97E-08		2E-07									
Di-n-octylphthalate	2.00E-02	NA	1.80E-02	1.80E-02	1.76E-08		9E-07		8.45E-08		4E-06		1.76E-08		9E-07		1.64E-07		8E-06	
Dibenz(a,h)anthracene	NA	7.30E+00	2.20E-01	2.20E-01		7.69E-08		6E-07		1.48E-08		1E-07		7.69E-08		6E-07		1.72E-07		1E-06
Dibenzofuran	NA	NA	4.30E-02	4.30E-02																
Fluoranthene	4.00E-02	NA	1.50E+00	1.50E+00	1.47E-06		4E-05		7.05E-06		2E-04		1.47E-06		4E-05		1.37E-05		3E-04	
Fluorene	4.00E-02	NA	3.40E-02	3.40E-02	3.33E-08		8E-07		1.60E-07		4E-06		3.33E-08		8E-07		3.11E-07		8E-06	
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	4.00E-01	4.00E-01		1.40E-07		1E-07		2.68E-08		2E-08		1.40E-07		1E-07		3.13E-07		2E-07
Naphthalene	2.00E-02	NA	7.80E-02	7.80E-02	7.63E-08		4E-06		3.66E-07		2E-05		7.63E-08		4E-06		7.12E-07		4E-05	
Pentachlorophenol	3.00E-02	1.20E-01	2.40E-02	2.40E-02	2.35E-08	8.39E-09	8E-07	1E-09	1.13E-07	1.61E-09	4E-06	2E-10	2.35E-08	8.39E-09	8E-07	1E-09	2.19E-07	1.88E-08	7E-06	2E-09
Phenanthrene	NA	NA	4.80E-01	4.80E-01																
Pyrene	3.00E-02	NA	1.50E+00	1.50E+00	1.47E-06		5E-05		7.05E-06		2E-04		1.47E-06		5E-05		1.37E-05		5E-04	
Pesticides/PCBs																				
4,4'-DDE	NA	3.40E-01	2.60E-01	2.60E-01		9.09E-08		3E-08		1.74E-08		6E-09		9.09E-08		3E-08		2.04E-07		7E-08
4,4'-DDT	5.00E-04	3.40E-01	1.30E-01	1.30E-01	1.27E-07	4.54E-08	3E-04	2E-08	6.11E-07	8.72E-09	1E-03	3E-09	1.27E-07	4.54E-08	3E-04	2E-08	1.19E-06	1.02E-07	2E-03	3E-08
alpha-Chlordane	5.00E-04	3.50E-01	2.10E-02	2.10E-02	2.05E-08	7.34E-09	4E-05	3E-09	9.86E-08	1.41E-09	2E-04	5E-10	2.05E-08	7.34E-09	4E-05	3E-09	1.92E-07	1.64E-08	4E-04	6E-09
gamma-Chlordane	5.00E-04	3.50E-01	2.30E-02	2.30E-02	2.25E-08	8.04E-09	5E-05	3E-09	1.08E-07	1.54E-09	2E-04	5E-10	2.25E-08	8.04E-09	5E-05	3E-09	2.10E-07	1.80E-08	4E-04	6E-09
Heptachlor epoxide	1.30E-05	9.10E+00	4.00E-03	4.00E-03	3.91E-09	1.40E-09	3E-04	1E-08	1.88E-08	2.68E-10	1E-03	2E-09	3.91E-09	1.40E-09	3E-04	1E-08	3.65E-08	3.13E-09	3E-03	3E-08
Herbicides																				
2,4,5-T	1.00E-02	NA	2.50E-02	2.50E-02	2.45E-08		2E-06		1.17E-07		1E-05		2.45E-08		2E-06		2.28E-07		2E-05	
2,4-DB	8.00E-03	NA	9.00E-02	9.00E-02	8.81E-08		1E-05		4.23E-07		5E-05		8.81E-08		1E-05		8.22E-07		1E-04	
Total Hazard Quotient and Cancer Risk:							**8E-04**	**3E-06**			**4E-03**	**6E-07**			**8E-04**	**3E-06**			**7E-03**	**7E-06**

Assumptions for Industrial Worker		Assumptions for Construction Worker		Assumptions for Worker at Day Care Center		Assumptions for Child at Day Care Center	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface and Subsurface	CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	70 kg	BW =	70 kg	BW =	15 kg
IR =	100 mg soil/day	IR =	480 mg soil/day	IR =	100 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless	FI =	1 unitless	FI =	1 unitless
EF =	250 days/year	EF =	250 days/year	EF =	250 days/year	EF =	250 days/year
ED =	25 years	ED =	1 years	ED =	25 years	ED =	6 years
AT (Nc) =	9,125 days	AT (Nc) =	365 days	AT (Nc) =	9,125 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE R-7
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Industrial Worker				Construction Worker				Worker at Day Care Center				Child at Day Care Center			
						Absorbed Dose (mg/kg-day) (Nc)	Absorbed Dose (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	Absorbed Dose (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	Absorbed Dose (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk	Absorbed Dose (mg/kg-day) (Nc)	Absorbed Dose (mg/kg-day) (Car)	Hazard Quotient	Cancer Risk
Volatile Organics																					
Benzene	2.85E-03	3.05E-02	NA		3.00E-03																
Chloroform	1.00E-02	6.10E-03	NA		4.00E-03																
Tetrachloroethene	1.00E-02	5.20E-02	NA	8.00E-03	8.00E-03																
Toluene	2.00E-01	NA	NA	3.00E-02	8.70E-02																
Total Xylenes	1.80E+00	NA	NA	2.00E-03	6.00E-03																
Trichloroethene	NA	1.22E-02			4.00E-03																
Semivolatile Organics																					
2-Methylnaphthalene	4.00E-02	NA	NA	3.10E-01	3.10E-01																
Acenaphthene	6.00E-02	NA	NA	4.90E-02	4.90E-02																
Anthracene	3.00E-01	NA	NA	9.70E-02	9.70E-02																
Benzo(a)anthracene	NA	7.30E-01	NA	9.00E-01	9.00E-01																
Benzo(a)pyrene	NA	1.46E+01	NA	7.70E-01	7.70E-01																
Benzo(b)fluoranthene	NA	7.30E-01	NA	9.40E-01	9.40E-01																
Benzo(ghi)perylene	NA	NA	NA	4.20E-01	4.20E-01																
Benzo(k)fluoranthene	NA	7.30E-02	NA	8.30E-01	8.30E-01																
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	1.50E-01	1.50E-01																
Butylbenzylphthalate	2.00E-01	NA	NA	1.80E-02	1.80E-02																
Carbazole	NA	2.00E-02	NA	8.00E-02	8.00E-02																
Chrysene	NA	7.30E-03	NA	1.00E+00	1.00E+00																
Di-n-butylphthalate	9.00E-02	NA	NA		4.20E-03																
Di-n-octylphthalate	NA	NA	NA	1.80E-02	1.80E-02																
Dibenz(a,h)anthracene	NA	7.30E+00	NA	2.20E-01	2.20E-01																
Dibenzofuran	NA	NA	NA	4.30E-02	4.30E-02																
Fluoranthene	4.00E-02	NA	NA	1.50E+00	1.50E+00																
Fluorene	4.00E-02	NA	NA	3.40E-02	3.40E-02																
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	4.00E-01	4.00E-01																
Naphthalene	2.00E-02	NA	NA	7.80E-02	7.80E-02																
Pentachlorophenol	3.00E-02	1.20E-01	1.00E-02	2.40E-02	2.40E-02	1.36E-08	4.86E-09	5E-07	6E-10	1.36E-08	1.95E-10	5E-07	2E-11	1.36E-08	4.86E-09	5E-07	6E-10	2.40E-08	2.06E-09	8E-07	2E-10
Phenanthrene	NA	NA	NA	4.80E-01	4.80E-01																
Pyrene	3.00E-02	NA	NA	1.50E+00	1.50E+00																
Pesticides/PCBs																					
4,4'-DDE	NA	1.70E+00	NA	2.60E-01	2.60E-01																
4,4'-DDT	1.00E-04	1.70E+00	NA	1.30E-01	1.30E-01																
alpha-Chlordane	5.00E-04	3.50E-01	NA	2.10E-02	2.10E-02																
gamma-Chlordane	5.00E-04	3.50E-01	NA	2.30E-02	2.30E-02																
Heptachlor epoxide	1.30E-05	9.10E+00	NA	4.00E-03	4.00E-03																
Herbicides																					
2,4,5-T	1.00E-02	NA	NA	2.50E-02	2.50E-02																
2,4-DB	8.00E-03	NA	NA	9.00E-02	9.00E-02																
Total Hazard Quotient and Cancer Risk:								5E-07	6E-10			5E-07	2E-11			5E-07	6E-10			8E-07	2E-10

Assumptions for Industrial Worker			Assumptions for Construction Worker			Assumptions for Worker at Day Care Center			Assumptions for Child at Day Care Center		
CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg	CF =	1.00E-06	kg/mg
CS =	EPC Surface Only		CS =	EPC Surface and Subsurface		CS =	EPC Surface Only		CS =	EPC Surface Only	
BW =	70	kg	BW =	70	kg	BW =	70	kg	BW =	15	kg
SA =	5,800	cm2	SA =	5,800	cm2	SA =	5,800	cm2	SA =	2,190	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2	AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	250	days/year	EF =	250	days/year	EF =	250	days/year	EF =	250	days/year
ED =	25	years	ED =	1	years	ED =	25	years	ED =	6	years
AT (Nc) =	9,125	days	AT (Nc) =	365	days	AT (Nc) =	9,125	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days	AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Industrial Development Land provided in Table 3.3-1.

TABLE R-8
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day) [3]	Short-tailed Shrew Exposure (mg/kg/day) [3]	American Robin Exposure (mg/kg/day) [3]
Volatile Organics						
Tetrachloroethene	8.00E-03	1.22E+00	1.00E+00	1.31E-03	5.11E-04	1.53E-03
Toluene	3.00E-02	1.39E+00	7.24E+01	1.61E-01	1.27E-01	1.95E-01
Total Xylenes	2.00E-03	5.62E-01	6.00E+00	9.58E-04	7.09E-04	1.17E-03
Semivolatile Organics						
2-Methylnaphthalene	3.10E-01	1.63E-01	3.42E-01	1.23E-02	6.79E-03	1.85E-02
Acenaphthene	4.90E-02	2.10E-01	3.42E-01	2.11E-03	1.08E-03	3.08E-03
Anthracene	9.70E-02	1.04E-01	5.10E-02	1.38E-03	4.56E-04	2.90E-03
Benzo(a)anthracene	9.00E-01	1.51E-02	1.25E-01	1.18E-02	7.86E-03	2.73E-02
Benzo(a)pyrene	7.70E-01	1.02E+00	4.50E+00	3.11E-01	2.06E-01	3.74E-01
Benzo(b)fluoranthene	9.40E-01	6.17E-03	3.20E-01	2.50E-02	1.89E-02	4.41E-02
Benzo(ghi)perylene	4.20E-01	3.05E-03	2.40E-01	8.65E-03	6.48E-03	1.66E-02
Benzo(k)fluoranthene	8.30E-01	4.25E-03	2.53E-01	1.80E-02	1.34E-02	3.39E-02
Bis(2-Ethylhexyl)phthalate	1.50E-01	5.10E-03	1.20E+01	1.31E-01	1.06E-01	1.61E-01
Butylbenzylphthalate	1.80E-02	1.00E+00	1.00E+00	2.67E-03	1.14E-03	3.16E-03
Carbazole	8.00E-02	1.00E+00	1.15E+02	6.74E-01	5.39E-01	8.18E-01
Chrysene	1.00E+00	2.22E-02	1.75E-01	1.73E-02	1.17E-02	3.52E-02
Di-n-octylphthalate	1.80E-02	1.60E-04	4.90E+03	6.40E+00	5.16E+00	7.77E+00
Dibenz(a,h)anthracene	2.20E-01	8.16E-03	1.75E-01	3.58E-03	2.56E-03	7.54E-03
Dibenzofuran	4.30E-02	1.51E-01	1.00E+00	3.72E-03	2.60E-03	5.02E-03
Fluoranthene	1.50E+00	3.72E-02	7.92E-01	9.47E-02	7.17E-02	1.36E-01
Fluorene	3.40E-02	1.49E-01	3.42E-01	1.31E-03	7.44E-04	2.00E-03
Indeno(1,2,3-cd)pyrene	4.00E-01	1.37E-03	4.19E-01	1.34E-02	1.04E-02	2.21E-02
Naphthalene	7.80E-02	4.43E-01	3.42E-01	4.67E-03	1.78E-03	6.17E-03
Pentachlorophenol	2.40E-02	3.40E-01	8.30E-02	8.08E-04	1.76E-04	1.18E-03
Phenanthrene	4.80E-01	1.02E-01	1.22E-01	9.24E-03	4.25E-03	1.73E-02
Pyrene	1.50E+00	4.43E-02	9.20E-02	1.93E-02	1.04E-02	4.42E-02
Pesticides/PCBs						
4,4'-DDE	2.60E-01	1.79E-02	2.50E-02	1.58E-03	7.53E-04	5.64E-03
4,4'-DDT	1.30E-01	1.00E-02	1.00E-01	1.42E-03	9.43E-04	3.61E-03
Alpha-Chlordane	2.10E-02	1.45E-02	2.40E-01	4.50E-04	3.25E-04	8.49E-04
Gamma-Chlordane	2.30E-02	2.40E-02	2.40E-01	5.09E-04	3.56E-04	9.45E-04
Heptachlor epoxide	4.00E-03	7.00E-02	1.30E-01	6.99E-05	3.68E-05	1.38E-04
Herbicides						
2,4,5-T	2.50E-02	1.74E+01	1.61E-06	3.16E-02	1.47E-03	3.06E-02
2,4-DB	9.00E-02	no data	no data	--	--	--
Metals						
Arsenic	1.13E+01	4.00E-02	5.00E-02	8.10E-02	4.89E-02	2.62E-01

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as

$ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW$

Where, ED = exposure dose
Cs = RME conc in soil (mg/kg)
CF = plant dry-to-wet-weight conversion factor
(0.2 for inorganics only, 1 for organics)
SP = soil-to-plant uptake factor
Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
BAF = bioaccumulation factor (unitless)
Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
SFF = Site foraging factor (0.672 for mouse; 0.103 for shrew; 0.146 for robin)
BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE R-9
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-68 -MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Tetrachloroethene	1.31E-03	5.11E-04	none available	--	--
Toluene	1.61E-01	1.27E-01	2.60E+01	6.2E-03	4.9E-03
Total Xylenes	9.58E-04	7.09E-04	2.10E+00	4.6E-04	3.4E-04
Semivolatile Organics					
2-Methylnaphthalene	1.23E-02	6.79E-03	7.16E+00	1.7E-03	9.5E-04
Acenaphthene	2.11E-03	1.08E-03	1.75E+00	1.2E-03	6.2E-04
Anthracene	1.38E-03	4.56E-04	1.00E+02	1.4E-05	4.6E-06
Benzo(a)anthracene	1.18E-02	7.86E-03	1.00E+00	1.2E-02	7.9E-03
Benzo(a)pyrene	3.11E-01	2.06E-01	1.00E+00	3.1E-01	2.1E-01
Benzo(b)fluoranthene	2.50E-02	1.89E-02	1.00E+00	2.5E-02	1.9E-02
Benzo(ghi)perylene	8.65E-03	6.48E-03	1.00E+00	8.7E-03	6.5E-03
Benzo(k)fluoranthene	1.80E-02	1.34E-02	1.00E+00	1.8E-02	1.3E-02
Bis(2-Ethylhexyl)phthalate	1.31E-01	1.06E-01	1.83E+01	7.2E-03	5.8E-03
Butylbenzylphthalate	2.67E-03	1.14E-03	none available	--	--
Carbazole	6.74E-01	5.39E-01	none available	--	--
Chrysene	1.73E-02	1.17E-02	1.00E+00	1.7E-02	1.2E-02
Di-n-octylphthalate	6.40E+00	5.16E+00	1.83E+01	3.5E-01	2.8E-01
Dibenz(a,h)anthracene	3.58E-03	2.56E-03	1.00E+00	3.6E-03	2.6E-03
Dibenzofuran	3.72E-03	2.60E-03	no data	--	--
Fluoranthene	9.47E-02	7.17E-02	1.25E+00	7.6E-02	5.7E-02
Fluorene	1.31E-03	7.44E-04	1.25E+00	1.0E-03	5.9E-04
Indeno(1,2,3-cd)pyrene	1.34E-02	1.04E-02	1.00E+00	1.3E-02	1.0E-02
Naphthalene	4.67E-03	1.78E-03	7.16E+00	6.5E-04	2.5E-04
Pentachlorophenol	8.08E-04	1.76E-04	2.40E-01	3.4E-03	7.3E-04
Phenanthrene	9.24E-03	4.25E-03	1.00E+00	9.2E-03	4.2E-03
Pyrene	1.93E-02	1.04E-02	1.00E+00	1.9E-02	1.0E-02
Pesticides/PCBs					
4,4'-DDE	1.58E-03	7.53E-04	8.00E-01	2.0E-03	9.4E-04
4,4'-DDT	1.42E-03	9.43E-04	8.00E-01	1.8E-03	1.2E-03
Alpha-Chlordane	4.50E-04	3.25E-04	none available	--	--
Gamma-Chlordane	5.09E-04	3.56E-04	4.58E+00	1.1E-04	7.8E-05
Heptachlor epoxide	6.99E-05	3.68E-05	1.00E-01	7.0E-04	3.7E-04
Herbicides					
2,4,5-T	3.16E-02	1.47E-03	1.00E+00	3.2E-02	1.5E-03
2,4-DB	--	--	none available	--	--
Metals					
Arsenic	8.10E-02	4.89E-02	1.26E-01	6.4E-01	3.9E-01

(1) Receptor exposure from Table R-9.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

TABLE R-10
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Amercian Robin Exposure (mg/kg/day)[1]	Toxicity Reference Value (mg/kg/day)[2]	Amercian Robin Hazard Quotient[3]
Volatile Organics			
Tetrachloroethene	1.53E-03	none available	--
Toluene	1.95E-01	none available	--
Total Xylenes	1.17E-03	3.06E+02	3.8E-06
Semivolatile Organics			
2-Methylnaphthalene	1.85E-02	2.85E+01	6.5E-04
Acenaphthene	3.08E-03	1.00E+03	3.1E-06
Anthracene	2.90E-03	1.00E+03	2.9E-06
Benzo(a)anthracene	2.73E-02	4.00E+01	6.8E-04
Benzo(a)pyrene	3.74E-01	4.00E+01	9.3E-03
Benzo(b)fluoranthene	4.41E-02	4.00E+01	1.1E-03
Benzo(ghi)perylene	1.66E-02	4.00E+01	4.2E-04
Benzo(k)fluoranthene	3.39E-02	4.00E+01	8.5E-04
Bis(2-Ethylhexyl)phthalate	1.61E-01	1.10E+00	1.5E-01
Butylbenzylphthalate	3.16E-03	none available	--
Carbazole	8.18E-01	none available	--
Chrysene	3.52E-02	4.00E+01	8.8E-04
Di-n-octylphthalate	7.77E+00	1.10E+00	7.1E+00
Dibenz(a,h)anthracene	7.54E-03	4.00E+01	1.9E-04
Dibenzofuran	5.02E-03	2.18E-01	2.3E-02
Fluoranthene	1.36E-01	4.00E+01	3.4E-03
Fluorene	2.00E-03	2.85E+01	7.0E-05
Indeno(1,2,3-cd)pyrene	2.21E-02	4.00E+01	5.5E-04
Naphthalene	6.17E-03	2.85E+01	2.2E-04
Pentachlorophenol	1.18E-03	3.49E+01	3.4E-05
Phenanthrene	1.73E-02	2.85E+01	6.1E-04
Pyrene	4.42E-02	4.00E+01	1.1E-03
Pesticides/PCBs			
4,4'-DDE	5.64E-03	5.60E-02	1.0E-01
4,4'-DDT	3.61E-03	5.60E-02	6.4E-02
Alpha-Chlordane	8.49E-04	2.14E+00	4.0E-04
Gamma-Chlordane	9.45E-04	2.14E+00	4.4E-04
Heptachlor epoxide	1.38E-04	4.80E+00	2.9E-05
Herbicides			
2,4,5-T	3.06E-02	none available	--
2,4-DB	--	none available	--
Metals			
Arsenic	2.62E-01	2.46E+00	1.1E-01

(1) Receptor exposure from Table R-8.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.
(4) -- : no HQ could be calculated, as no toxicity data could be found.

APPENDIX S

SEAD-70: Fill Area Adjacent to Building T-2110

Table S-1:	Soil Analysis Results
Table S-2:	Groundwater Analysis Results
Table S-3:	Surface Water Analysis Results
Table S-4:	Sediment Analysis Results
Table S-5:	Inorganics Analysis of Soil
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Table S-7:	Exposure Point Concentrations for Chemicals of Potential Concern
Table S-8:	Ambient Air Exposure Point Concentrations
Table S-9:	Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air
Table S-10:	Calculation of Intake and Risk from the Ingestion of Soil
Table S-11:	Calculation of Absorbed Dose and Risk from Dermal Contact to Soil
Table S-12:	Calculation of Intake and Risk from Inhalation of Groundwater (while showering)
Table S-13:	Calculation of Intake and Risk from the Ingestion of Groundwater
Table S-14:	Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering)
Table S-15:	Calculation of Absorbed Dose and Risk from Dermal Contact to Surface Water
Table S-16:	Calculation of Absorbed Dose and Risk from Dermal Contact to Sediment
Table S-17:	Calculated Soil Receptor Exposure
Table S-18:	Calculation of Soil Hazard Quotients – Mammals
Table S-19:	Calculation of Soil Hazard Quotients – Bird

TABLE S-1
SOIL ANALYSIS RESULTS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
SEAD								SEAD-70	SEAD-70	SEAD-70	SEAD-70	SEAD-70	SEAD-70
LOCATION ID								MW70-1	MW70-1	MW70-1	SB70-1	SB70-1	SB70-1
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								MW70-1-00	MW70-1-02	MW70-1-03	SB70-1-01	SB70-1-02	SB70-1-03
SAMP_DEPTH_TOP								0	2	4	0	2	4
SAMP_DEPTH_BOT								0.2	4	6	0.2	4	6
SAMP_DATE								05/11/94	05/11/94	05/11/94	02/22/94	02/22/94	02/22/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
QC_CODE								ESI	ESI	ESI	ESI	ESI	ESI
VOLATILE ORGANICS													
Acetone	UG/KG	79	17%	200	0	2	12	14 U	14 U	11 U	11 U	79	35 U
Methyl ethyl ketone	UG/KG	36	8%	300	0	1	12	14 U	12 U	11 U	11 U	36	17 U
Toluene	UG/KG	3	8%	1500	0	1	12	14 U	12 U	11 U	11 U	3 J	11 U
SEMIVOLATILE ORGANICS													
Bis(2-Ethylhexyl)phthalate	UG/KG	610	100%	50000	0	12	12	78 J	550	610	21 J	27 J	73 J
Di-n-butylphthalate	UG/KG	54	58%	8100	0	7	12	490 U	400 U	370 U	35 J	28 J	35 J
Di-n-octylphthalate	UG/KG	30	8%	50000	0	1	12	490 U	400 U	370 U	390 U	30 J	400 U
Fluoranthene	UG/KG	29	8%	50000	0	1	12	490 U	400 U	370 U	390 U	370 U	400 U
Pyrene	UG/KG	26	8%	50000	0	1	12	490 U	400 U	370 U	390 U	370 U	400 U
METALS													
Aluminum	MG/KG	16600	100%	19300	0	12	12	12200	9480	11000	12400	15600	16600
Antimony	MG/KG	0.59	75%	5.9	0	9	12	0.23 UJ	0.21 UJ	0.19 UJ	0.36 J	0.45 J	0.39 J
Arsenic	MG/KG	88.5	100%	8.2	1	12	12	5.4	4.1	5.7	3.5 J	4.8 J	4.5 J
Barium	MG/KG	170	100%	300	0	12	12	67.5	56.6	79.9	55.9	91.7	170
Beryllium	MG/KG	0.81	100%	1.1	0	12	12	0.44 J	0.41 J	0.54 J	0.6 J	0.77 J	0.81 J
Cadmium	MG/KG	0.8	100%	2.3	0	12	12	0.57 J	0.43 J	0.8 J	0.05 J	0.07 J	0.14 J
Calcium	MG/KG	59100	100%	121000	0	12	12	3600	51600	48600	15000	6150	4300
Chromium	MG/KG	26.2	100%	29.6	0	12	12	13.7	14.7	17.8	21.3	26.2	25.3
Cobalt	MG/KG	21	100%	30	0	12	12	5.5 J	7.1 J	21	11.9	15	13.1
Copper	MG/KG	35.2	100%	33	2	12	12	12.4	19.7	$\boxed{33.5}$	22.9	$\boxed{35.2}$	22.5
Iron	MG/KG	32200	100%	36500	0	12	12	17700	16000	26400	26300	32200	30300
Lead	MG/KG	22.1	100%	24.8	0	12	12	20.7	9.1	13.6	17.2 J	22.1 J	11.4 J
Magnesium	MG/KG	13600	100%	21500	0	12	12	2830	13600	7980	5070	6150	5580
Manganese	MG/KG	1040	100%	1060	0	12	12	233	470	1040	465	425	689
Mercury	MG/KG	0.1	92%	0.1	0	11	12	0.1	0.03 J	0.02 J	0.04 J	0.04 J	0.04 J
Nickel	MG/KG	52.4	100%	49	1	12	12	12.3	17.6	$\boxed{52.4}$	39.3	47.4	36
Potassium	MG/KG	1750	100%	2380	0	12	12	982 J	1590	1350	1170	1300	1400
Selenium	MG/KG	1	67%	2	0	8	12	1 J	0.64 J	0.32 U	0.32 J	0.48 J	0.89 J
Sodium	MG/KG	165	75%	172	0	9	12	36.4 U	126 J	165 J	30.3 J	34.7 J	34.9 U
Vanadium	MG/KG	26.9	100%	150	0	12	12	23.3	17.2	17.6	16.4	21.7	26.9
Zinc	MG/KG	116	100%	110	1	12	12	55.4	42.4	$\boxed{116}$	46.4	78.8	79.2

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE S-1
SOIL ANALYSIS RESULTS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-70	SEAD-70	SEAD-70	SEAD-70	SEAD-70	SEAD-70
LOCATION ID								SB70-2	SB70-2	SB70-2	SB70-3	SB70-3	SB70-3
MATRIX								SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE NUMBER								SB70-2-01	SB70-2-03	SB70-2-05	SB70-3-01	SB70-3-03	SB70-3-05
SAMP_DEPTH_TOP								0	4	8	0	4	8
SAMP_DEPTH_BOT								0.2	6	10	0.2	6	10
SAMP_DATE								02/21/94	02/21/94	02/21/94	02/21/94	02/21/94	02/21/94
SAMPLE TYPE								SA	SA	SA	SA	SA	SA
QC_CODE								ESI	ESI	ESI	ESI	ESI	ESI
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	TAGM (a)	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)	Value (Q)
VOLATILE ORGANICS													
Acetone	UG/KG	79	17%	200	0	2	12	62	11 U	11 U	12 U	11 U	11 U
Methyl ethyl ketone	UG/KG	36	8%	300	0	1	12	15 U	11 U	11 U	12 U	11 U	11 U
Toluene	UG/KG	3	8%	1500	0	1	12	15 U	11 U	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS													
Bis(2-Ethylhexyl)phthalate	UG/KG	610	100%	50000	0	12	12	550	43 J	66 J	48 J	89 J	48 J
Di-n-butylphthalate	UG/KG	54	58%	8100	0	7	12	54 J	360 U	360 U	45 J	51 J	25 J
Di-n-octylphthalate	UG/KG	30	8%	50000	0	1	12	500 U	360 U	360 U	430 U	370 U	360 U
Fluoranthene	UG/KG	29	8%	50000	0	1	12	29 J	360 U	360 U	430 U	370 U	360 U
Pyrene	UG/KG	26	8%	50000	0	1	12	26 J	360 U	360 U	430 U	370 U	360 U
METALS													
Aluminum	MG/KG	16600	100%	19300	0	12	12	15800	11600	12900	9340	11000	11400
Antimony	MG/KG	0.59	75%	5.9	0	9	12	0.59 J	0.47 J	0.41 J	0.19 J	0.45 J	0.25 J
Arsenic	MG/KG	88.5	100%	8.2	1	12	12	88.5 J	4.5 J	4.5 J	6.9 J	4 J	3.9 J
Barium	MG/KG	170	100%	300	0	12	12	106	42.1	55.8	40.5	74.8	50.4
Beryllium	MG/KG	0.81	100%	1.1	0	12	12	0.73 J	0.54 J	0.62 J	0.44 J	0.53 J	0.55 J
Cadmium	MG/KG	0.8	100%	2.3	0	12	12	0.24 J	0.23 J	0.12 J	0.07 J	0.18 J	0.13 J
Calcium	MG/KG	59100	100%	121000	0	12	12	4260	55500	31700	22500	59100	37300
Chromium	MG/KG	26.2	100%	29.6	0	12	12	21.1	19	21.9	15.3	18	19.7
Cobalt	MG/KG	21	100%	30	0	12	12	8.5 J	10.8	12.3	8.4	10.5	12.1
Copper	MG/KG	35.2	100%	33	2	12	12	18.9	28.8	28.7	17.9	24.2	17.2
Iron	MG/KG	32200	100%	36500	0	12	12	24700	23300	26700	18900	22800	24800
Lead	MG/KG	22.1	100%	24.8	0	12	12	17.9 J	9.5 J	4.2 J	8.9 J	8.1 J	5.3 J
Magnesium	MG/KG	13600	100%	21500	0	12	12	4070	8260	8360	5490	11000	8170
Manganese	MG/KG	1040	100%	1060	0	12	12	367	439	390	299	441	414
Mercury	MG/KG	0.1	92%	0.1	0	11	12	0.05 J	0.02 J	0.02 J	0.02 J	0.02 J	0.02 UJ
Nickel	MG/KG	52.4	100%	49	1	12	12	22	30.6	34	24.6	30.4	30.8
Potassium	MG/KG	1750	100%	2380	0	12	12	1730	1750	1420	1260	1680	1260
Selenium	MG/KG	1	67%	2	0	8	12	0.95	0.25 U	0.24 U	0.58 J	0.31 U	0.49 J
Sodium	MG/KG	165	75%	172	0	9	12	27.9 U	81.8 J	89.5 J	47.1 J	84.5 J	89.1 J
Vanadium	MG/KG	26.9	100%	150	0	12	12	26.7	17.3	17.7	13.9	16.6	16
Zinc	MG/KG	116	100%	110	1	12	12	75.1	78.6	67.1	53.4	67.8	73

NOTES:
a) TAGM = Technical and Administrative Guidance Memorandum HWR-94-4046 (January 24, 1994)
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) NA = Not Available
d) U = The compound was not detected at this concentration.
e) J = The reported value is an estimated concentration.
f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
g) R = The data was rejected during the data validation process.

TABLE S-2
GROUND WATER ANALYSIS RESULTS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

SEAD								SEAD-70	SEAD-70	SEAD-70	SEAD-70
LOCATION ID								MW70-1	MW70-2	MW70-3	MW70-4
MATRIX								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMPLE NUMBER								MW70-1	MW70-2	MW70-3	MW70-4
SAMP_DEPTH_TOP								3.7	4	4.3	3.4
SAMP_DEPTH_BOT								9.6	10.7	8.3	9.3
SAMP_DATE								07/07/94	07/07/94	07/08/94	07/08/94
SAMPLE TYPE								SA	SA	SA	SA
COMPOUND	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES				
VOLATILE ORGANICS											
Acetone	UG/L	11	25%	NA	0	1	4	10 U	11	10 U	10 U
METALS											
Aluminum	UG/L	1260	100%	50 (a)	3	4	4	88.2 J	1260	229	32.1 J
Barium	UG/L	165	100%	1000 (b)	0	4	4	86.5 J	165 J	130 J	152 J
Calcium	UG/L	213000	100%	NA (c)	0	4	4	119000	213000	180000	171000
Chromium	UG/L	2.9	25%	50 (b)	0	1	4	0.4 U	2.9 J	0.4 U	0.4 U
Cobalt	UG/L	1.7	75%	NA (c)	0	3	4	0.5 U	1.7 J	0.79 J	1.6 J
Copper	UG/L	4.1	25%	200 (b)	0	1	4	0.5 U	4.1 J	0.5 U	0.5 U
Iron	UG/L	2140	100%	300 (b)	1	4	4	213	2140	284	78.7 J
Magnesium	UG/L	51400	100%	NA (c)	0	4	4	28100	51400	40800	41000
Manganese	UG/L	519	100%	50 (a)	4	4	4	107	192	60.2	519
Mercury	UG/L	0.09	100%	0.7 (b)	0	4	4	0.06 J	0.07 J	0.09 J	0.04 J
Nickel	UG/L	4.5	100%	100 (b)	0	4	4	1.5 J	4.5 J	0.82 J	1.8 J
Potassium	UG/L	6380	100%	NA (c)	0	4	4	1540 J	2330 J	1250 J	6380
Sodium	UG/L	17800	100%	20000 (b)	0	4	4	5220	13700	8700	17800
Thallium	UG/L	2	25%	2 (d)	0	1	4	1.9 U	1.9 U	2 J	1.9 U
Vanadium	UG/L	2.6	75%	NA (c)	0	3	4	0.5 U	2.6 J	0.73 J	0.6 J
Zinc	UG/L	16.5	100%	5000 (a)	0	4	4	3.5 J	16.5 J	5.6 J	4.2 J
OTHER ANALYSES											
Conductivity	UMHOS/CM	1010	100.00%	NA	0	4	4	590	1010	850	875
Turbidity	NTU	329	100.00%	NA	0	4	4	26.7	329	54.6	2.8
pH	SU	8.2	100.00%	NA	0	4	4	8.2	7.1	8.2	8.1

NOTES:
a) Secondary Drinking Water Limit
b) NY State Class GA Groundwater Regulations
c) NA = Not Available
d) Maximum Contaminant Level

U = The compound was not detected at or above this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

TABLE S-3
SURFACE WATER ANALYSIS RESULTS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

						MATRIX		WATER	WATER
						LOCATION		SEAD-70	SEAD-70
						SAMPLE DATE		04/27/94	04/27/94
						SAMPLE ID		SW70-1	SW70-2
						LAB ID		219466	219467
						SDG NUMBER		43810	43810
COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a)(b)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)
METALS									
Aluminum	ug/L	273	100%	100	2	2	2	137 J	273
Arsenic	ug/L	4.6	100%	1.9	2	2	2	4.4 J	4.6 J
Barium	ug/L	52.3	100%		0	2	2	52.3 J	33.3 J
Calcium	ug/L	63500	100%		0	2	2	63500	50000
Chromium	ug/L	0.46	50%	140	0	1	2	0.4 U	0.46 J
Cobalt	ug/L	3	100%	0.05	2	2	2	3 J	1.3 J
Copper	ug/L	2.4	100%	17.36	0	2	2	1.5 J	2.4 J
Iron	ug/L	3160	100%	300	2	2	2	3160	2720
Lead	ug/L	0.92	50%	8.7	0	1	2	0.79 U	0.92 J
Magnesium	ug/L	12400	100%		0	2	2	12400	9140
Manganese	ug/L	2300	100%		0	2	2	2300	462
Mercury	ug/L	0.04	50%	0.77	0	1	2	0.04 J	0.03 U
Nickel	ug/L	1.9	100%	100.16	0	2	2	1.4 J	1.9 J
Potassium	ug/L	3280	100%		0	2	2	3010 J	3280 J
Sodium	ug/L	7540	100%		0	2	2	7540	5140
Thallium	ug/L	2.1	50%	0.08	1	1	2	1.6 U	2.1 J
Vanadium	ug/L	1.5	100%	14	0	2	2	0.92 J	1.5 J
Zinc	ug/L	7.7	100%	159.6	0	2	2	3 J	7.7 J
OTHER ANALYSES									
pH	Standard Units	7.9	100%		0	2	2	6.7	7.9
Conductivity	umhos/cm	370	100%		0	2	2	370	277
Temperature	°C	17.4	100%		0	2	2	17.4	16.6
Turbidity	NTU	4.2	100%		0	2	2	3.4	4.2

NOTES:
a) The New York State Ambient Water Quality standards and guidelines for Class C surface water (1998).
b) Hardness dependent values assume a hardness of 217 mg/L.
c) U = The compound was not detected below this concentration.
d) J = The reported value is an estimated concentration.

TABLE S-4
SEDIMENT ANALYSIS RESULTS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

							MATRIX	SOIL	SOIL
							LOCATION ID	SEAD-70	SEAD-70
							DEPTH (FEET)	0-0.2	0-0.2
							SAMPLE DATE	04/27/94	04/27/94
							SAMPLE ID	SD70-1	SD70-2
							LAB ID	219452	219453
							SDG NUMBER	43663	43663
COMPOUND	UNITS	MAXIMUM	FREQUENCY OF DETECTION	Sediment Criteria (a)	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	Value (Q)	Value (Q)
SEMIVOLATILE ORGANICS									
Phenanthrene	ug/Kg	40	50%	4693	0	1	2	690 UJ	40 J
Fluoranthene	ug/Kg	79	50%	39887	0	1	2	690 UJ	79 J
Pyrene	ug/Kg	77	50%	37580	0	1	2	690 UJ	77 J
Benzo(a)anthracene	ug/Kg	33	50%	NA	0	1	2	690 UJ	33 J
Chrysene	ug/Kg	45	50%	NA	0	1	2	690 UJ	45 J
METALS									
Aluminum	mg/Kg	13300	100%	NA	0	2	2	13300 J	10400
Arsenic	mg/Kg	3.4	100%	6	0	2	2	3.4 J	3.4 J
Barium	mg/Kg	126	100%	NA	0	2	2	126 J	73.7
Beryllium	mg/Kg	0.59	100%	NA	0	2	2	0.59 J	0.51 J
Cadmium	mg/Kg	0.4	100%	0.6	0	2	2	0.34 J	0.4 J
Calcium	mg/Kg	21400	100%	NA	0	2	2	4500 J	21400
Chromium	mg/Kg	16.3	100%	26	0	2	2	16.3 J	15.5
Cobalt	mg/Kg	7.2	100%	NA	0	2	2	5.8 J	7.2 J
Copper	mg/Kg	21.9	100%	16	1	2	2	14.3 J	21.9
Iron	mg/Kg	17900	100%	20000	0	2	2	17900 J	16900
Lead	mg/Kg	20.6	100%	31	0	2	2	16.9 J	20.6
Magnesium	mg/Kg	5300	100%	NA	0	2	2	2900 J	5300
Manganese	mg/Kg	512	100%	460	1	2	2	512 J	212 J
Nickel	mg/Kg	23.3	100%	16	1	2	2	15 J	23.3
Potassium	mg/Kg	1690	100%	NA	0	2	2	1690 J	1500 J
Selenium	mg/Kg	0.75	50%	NA	0	1	2	0.75 J	0.59 U
Thallium	mg/Kg	0.8	50%	NA	0	1	2	0.43 UJ	0.8 J
Vanadium	mg/Kg	21.7	100%	NA	0	2	2	21.7 J	19.4
Zinc	mg/Kg	105	100%	120	0	2	2	60.1 J	105
OTHER ANALYSES									
Total Solids	%W/W	52.8	1	NA	0	2	2	47.6	52.8

NOTES:
a) NA = Not Available.
b) U = The compound was not detected below this concentration.
c) J = The reported value is an estimated concentration.
d) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
e) R = The data was rejected during the data validation process.

TABLE S-5
INORGANICS ANALYSIS OF SOIL - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Soils (ug/kg)	2 x Average of Background Soils (ug/kg)	Average of SEAD-70 Soils (ug/kg)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	13340.53	26681.05	12443.33	No
Antimony	3.56	7.12	0.40	No
Arsenic	5.08	10.15	11.69	Yes
Barium	78.43	156.86	74.27	No
Beryllium	0.67	1.33	0.58	No
Cadmium	0.97	1.94	0.25	No
Calcium	45449.65	90899.30	28300.83	No
Chromium	20.32	40.64	19.50	No
Cobalt	11.39	22.79	11.35	No
Copper	20.99	41.97	23.49	No
Iron	24704.74	49409.47	24175.00	No
Lead	16.47	32.95	12.33	No
Magnesium	10290.18	20580.35	7213.33	No
Manganese	576.14	1152.28	472.67	No
Mercury	0.04	0.09	0.04	No
Nickel	30.39	60.79	31.45	No
Potassium	1487.25	2974.49	1407.67	No
Selenium	0.63	1.26	0.67	No
Sodium	99.42	198.85	83.11	No
Vanadium	21.41	42.82	19.28	No
Zinc	67.80	135.60	69.43	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE S-6
INORGANICS ANALYSIS OF GROUNDWATER - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	Average of Background Groundwater (ug/L)	2 x Average of Background Groundwater (ug/L)	Average of SEAD-70 Groundwater (ug/L)	Is Average of Site data > than 2 x Average of Background data?
Aluminum	2923.01	5846.01	402.33	No
Barium	81.20	162.40	133.38	No
Calcium	115619.35	231238.71	170750.00	No
Chromium	8.67	17.35	2.90	No
Cobalt	6.84	13.68	1.36	No
Copper	5.39	10.79	4.10	No
Iron	4476.26	8952.53	678.93	No
Magnesium	28567.74	57135.48	40325.00	No
Manganese	231.41	462.82	219.55	No
Mercury	0.05	0.10	0.07	No
Nickel	10.57	21.14	2.16	No
Potassium	4065.59	8131.17	2875.00	No
Sodium	15020.67	30041.33	11355.00	No
Thallium	3.90	7.80	2.00	No
Vanadium	8.23	16.47	1.31	No
Zinc	25.37	50.74	7.45	No

Notes:
A "Yes" value indicates that site metal levels are higher than background levels and metal will be retained for risk assessment.
A "No" value indicates that levels are considered to be similar to background levels and metal will not be retained for risk assessment.

TABLE S-7
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-70
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/Kg	Surface Soil mg/Kg	Ground Water mg/L	Surface Water mg/L	Sediment mg/Kg
Volatile Organics					
Acetone	7.90E-02	6.20E-02	1.10E-02		
Methyl ethyl ketone	3.60E-02				
Toluene	3.00E-03				
Semivolatile Organics					
Benzo(a)anthracene					3.30E-02
Bis(2-Ethylhexyl)phthalate	6.10E-01	5.50E-01			
Chrysene					4.50E-02
Di-n-butylphthalate	5.40E-02	5.40E-02			
Di-n-octylphthalate	3.00E-02				
Fluoranthene	2.90E-02	2.90E-02			7.90E-02
Phenanthrene					4.00E-02
Pyrene	2.60E-02	2.60E-02			7.70E-02
Metals					
Aluminum				2.73E-01	1.33E+04
Arsenic	8.85E+01	8.85E+01		4.60E-03	3.40E+00
Barium				5.23E-02	1.26E+02
Beryllium					5.90E-01
Cadmium					4.00E-01
Calcium				6.35E+01	2.14E+04
Chromium				4.60E-04	1.63E+01
Cobalt				3.00E-03	7.20E+00
Copper				2.40E-03	2.19E+01
Iron				3.16E+00	1.79E+04
Lead				9.20E-04	2.06E+01
Magnesium				1.24E+01	5.30E+03
Manganese				2.30E+00	5.12E+02
Mercury				4.00E-05	
Nickel				1.90E-03	2.33E+01
Potassium				3.28E+00	1.69E+03
Sodium				7.54E+00	
Thallium				2.10E-03	8.00E-01
Vanadium				1.50E-03	2.17E+01
Zinc				7.70E-03	1.05E+02

TABLE S-8
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = CSsurf x PM10 x CF	Equation for Air EPC from Total Soils (mg/m^3) = CStot x PM10 x CF
Variables:	Variables:
CSsurf = Chemical Concentration in Surface Soil, from EPC data (mg/kg)	CStot = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM10 = Average Measured PM10 Concentration = 17 ug/m^3	PM10 = PM10 Concentration Calculated for Construction Worker= 148 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug	CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)	Calculated Air EPC Total Soils (mg/m^3)
Volatile Organics				
Acetone	6.20E-02	7.90E-02	1.05E-09	1.17E-08
Methyl ethyl ketone	ND	3.60E-02	ND	5.33E-09
Toluene	ND	3.00E-03	ND	4.44E-10
Semivolatile Organics				
Bis(2-Ethylhexyl)phthalate	5.50E-01	6.10E-01	9.35E-09	9.03E-08
Di-n-butylphthalate	5.40E-02	5.40E-02	9.18E-10	7.99E-09
Di-n-octylphthalate	ND	3.00E-02	ND	4.44E-09
Fluoranthene	2.90E-02	2.90E-02	4.93E-10	4.29E-09
Pyrene	2.60E-02	2.60E-02	4.42E-10	3.85E-09
Metals				
Arsenic	8.85E+01	8.85E+01	1.50E-06	1.31E-05

ND = Compound was not detected.

TABLE S-9
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Air EPC* from Total Soils	Park Worker Intake (mg/kg-day)		Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day)		Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Volatile Organics																
Acetone	NA	NA	1.05E-09	1.17E-08												
Methyl ethyl ketone	2.86E-01	NA	ND	5.33E-09									5.42E-10		2E-09	
Toluene	1.14E-01	NA	ND	4.44E-10									4.52E-11		4E-10	
Semivolatile Organics																
bis(2-Ethylhexyl)phthalate	NA	NA	9.35E-09	9.03E-08												
Di-n-butylphthalate	NA	NA	9.18E-10	7.99E-09												
Di-n-octylphthalate	NA	NA	ND	4.44E-09												
Fluoranthene	NA	NA	4.93E-10	4.29E-09												
Pyrene	NA	NA	4.42E-10	3.85E-09												
Metals																
Arsenic	NA	1.51E+01	1.50E-06	1.31E-05		2.94E-08		4E-07		2.39E-09		4E-08		1.90E-08		3E-07
Total Hazard Quotient and Cancer Risk:								**4E-07**				**4E-08**			**2E-09**	**3E-07**

Assumptions for Park Worker

CA =	EPC Surface Only	
BW =	70	kg
IR =	8	m3/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CA =	EPC Surface and Sub-Surface	
BW =	70	kg
IR =	10.4	m3/day
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE S-8 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3 3-3.

TABLE S-10
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																
Acetone	1.00E-01	NA	6.20E-02	7.90E-02	4.25E-08		4E-07		3.17E-08		3E-07		3.71E-07		4E-06	
Methyl ethyl ketone	6.00E-01	NA		3.60E-02									1.69E-07		3E-07	
Toluene	2.00E-01	NA		3.00E-03									1.41E-08		7E-08	
Semivolatile Organics																
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	5.50E-01	6.10E-01	3.77E-07	1.35E-07	2E-05	2E-09	2.81E-07	2.01E-08	1E-05	3E-10	2.86E-06	4.09E-08	1E-04	6E-10
Di-n-butylphthalate	1.00E-01	NA	5.40E-02	5.40E-02	3.70E-08		4E-07		2.76E-08		3E-07		2.54E-07		3E-06	
Di-n-octylphthalate	2.00E-02	NA		3.00E-02									1.41E-07		7E-06	
Fluoranthene	4.00E-02	NA	2.90E-02	2.90E-02	1.99E-08		5E-07		1.48E-08		4E-07		1.36E-07		3E-06	
Pyrene	3.00E-02	NA	2.60E-02	2.60E-02	1.78E-08		6E-07		1.33E-08		4E-07		1.22E-07		4E-06	
Metals																
Arsenic	3.00E-04	1.50E+00	8.85E+01	8.85E+01	6.06E-05	2.16E-05	2E-01	3E-05	4.53E-05	3.23E-06	2E-01	5E-06	4.16E-04	5.94E-06	1E+00	9E-06
Total Hazard Quotient and Cancer Risk:							**2E-01**	**3E-05**			**2E-01**	**5E-06**			**1E+00**	**9E-06**

Assumptions for Park Worker

CF =	1E-06 kg/mg
CS =	EPC Surface Only
BW =	70 kg
IR =	100 mg soil/day
FI =	1 unitless
EF =	175 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Recreational Visitor (Child)

CF =	1E-06 kg/mg
CS =	EPC Surface Only
BW =	15 kg
IR =	200 mg soil/day
FI =	1 unitless
EF =	14 days/year
ED =	5 years
AT (Nc) =	1,825 days
AT (Car) =	25,550 days

Assumptions for Construction Worker

CF =	1E-06 kg/mg
CS =	EPC Surface and Subsurface
BW =	70 kg
IR =	480 mg soil/day
FI =	1 unitless
EF =	250 days/year
ED =	1 years
AT (Nc) =	365 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3

TABLE S-11
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\dfrac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Park Worker Absorbed Dose (mg/kg-day) (Nc)	Park Worker Absorbed Dose (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Nc)	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics																	
Acetone	1.00E-01	NA	NA	6.20E-02	7.90E-02												
Methyl ethyl ketone	6.00E-01	NA	NA		3.60E-02												
Toluene	2.00E-01	NA	NA		3.00E-03												
Semivolatile Organics																	
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	5.50E-01	6.10E-01												
Di-n-butylphthalate	9.00E-02	NA	NA	5.40E-02	5.40E-02												
Di-n-octylphthalate	NA	NA	NA		3.00E-02												
Fluoranthene	4.00E-02	NA	NA	2.90E-02	2.90E-02												
Pyrene	3.00E-02	NA	NA	2.60E-02	2.60E-02												
Metals																	
Arsenic	2.40E-04	1.88E+00	1.00E-02	8.85E+01	8.85E+01	3.52E-05	1.26E-05	1E-01	2E-05	5.20E-06	3.72E-07	2E-02	7E-07	5.02E-05	7.18E-07	2E-01	1E-06
Total Hazard Quotient and Cancer Risk:								**1E-01**	**2E-05**			**2E-02**	**7E-07**			**2E-01**	**1E-06**

Assumptions for Park Worker

CF =	1.00E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
SA =	5,800	cm2
AF =	1	mg/cm2
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

CF =	1.00E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
SA =	2,300	cm2
AF =	1	mg/cm2
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Assumptions for Construction Worker

CF =	1.00E-06	kg/mg
CS =	EPC Surface and Subsurface	
BW =	70	kg
SA =	5,800	cm2
AF =	1	mg/cm2
EF =	250	days/year
ED =	1	years
AT (Nc) =	365	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE S-12
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE S-13
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics												Ingestion of Groundwater Not Applicable for Construction Worker			
Acetone	1.00E-01	NA	1.10E-02	7.53E-05		8E-04		2.81E-05		3E-04					
Total Hazard Quotient and Cancer Risk:						**8E-04**				**3E-04**					

Assumptions for Park Worker

BW	70	kg
IR =	1	liter/day
EF =	175	days/year
ED =	25	years
AT (Nc) =	9,125	days
AT (Car) =	25,550	days

Assumptions for Recreational Visitor (Child)

BW	15	kg
IR =	1	liter/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3.

TABLE S-14
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient *Kp* (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Park Worker Intake (mg/kg-day) (Nc)	Park Worker Intake (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day) (Nc)	Recreational Visitor (Child) Intake (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Volatile Organics							Dermal Contact to Groundwater Not Applicable for Park Worker								Dermal Contact to Groundwater Not Applicable for Construction Worker			
Acetone	1.00E-01	NA	5.70E-04	2.00E-01	1.10E-02	3.87E-09					9.09E-08		9E-07					
Total Hazard Quotient and Cancer Risk:													9E-07					

Assumptions for Recreational Worker (Child)

CF =	0.001	l/cm3
BW =	15	kg
SA =	9,180	cm2
ET =	0.25	hours/day
EF =	14	days/year
ED =	5	years
AT (Nc) =	1,825	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3

TABLE S-15
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SURFACE WATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
ED = Exposure Duration
SA = Surface Area Contact
BW = Bodyweight
EF = Exposure Frequency
AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics: $$DA = 2 Kp \times CW \times \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$$

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability
CW = EPC Surface Water
ET = Exposure Time
Tau = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD	Carc. Slope Dermal	Permeability Coefficient *Kp*	Tau	EPC Surface Water	Absorbed Dose/Event	Park Worker Intake (mg/kg-day)		Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Intake (mg/kg-day)		Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(cm/hr)	(hours)	(mg/L)	(mg-cm²/event)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Metals																		
Aluminum	NA	NA	1.00E-03	NA	2.73E-01	2.73E-07									Dermal Contact to Surface Water			
Arsenic	2.40E-04	1.88E+00	1.00E-03	NA	4.60E-03	4.60E-09	6.42E-09	2.29E-09	3E-05	4E-09	2.72E-08	1.94E-09	1E-04	4E-09	Not Applicable			
Barium	3.50E-02	NA	1.00E-03	NA	5.23E-02	5.23E-08	7.30E-08	2.61E-08	2E-06		3.09E-07	2.21E-08	9E-06		for Construction Worker			
Calcium	NA	NA	1.00E-03	NA	6.35E+01	6.35E-05												
Chromium	6.00E-05	NA	4.00E-03	NA	4.60E-04	1.84E-09	2.57E-09	9.17E-10	4E-05		1.09E-08	7.77E-10	2E-04					
Cobalt	NA	NA	4.00E-04	NA	3.00E-03	1.20E-09												
Copper	2.40E-02	NA	1.00E-03	NA	2.40E-03	2.40E-09	3.35E-09	1.20E-09	1E-07		1.42E-08	1.01E-09	6E-07					
Iron	6.00E-02	NA	1.00E-03	NA	3.16E+00	3.16E-06	4.41E-06	1.57E-06	7E-05		1.87E-05	1.33E-06	3E-04					
Lead	NA	NA	4.00E-06	NA	9.20E-04	3.68E-12												
Magnesium	NA	NA	1.00E-03	NA	1.24E+01	1.24E-05												
Manganese	1.50E-03	NA	1.00E-03	NA	2.30E+00	2.30E-06	3.21E-06	1.15E-06	2E-03		1.36E-05	9.71E-07	9E-03					
Mercury	3.00E-06	NA	1.00E-03	NA	4.00E-05	4.00E-11	5.58E-11	1.99E-11	2E-05		2.37E-10	1.69E-11	8E-05					
Nickel	8.00E-04	NA	1.00E-03	NA	1.90E-03	1.90E-09	2.65E-09	9.47E-10	3E-06		1.12E-08	8.03E-10	1E-05					
Potassium	NA	NA	1.00E-03	NA	3.28E+00	3.28E-06												
Sodium	NA	NA	1.00E-03	NA	7.54E+00	7.54E-06												
Thallium	8.00E-05	NA	1.00E-03	NA	2.10E-03	2.10E-09	2.93E-09	1.05E-09	4E-05		1.24E-08	8.87E-10	2E-04					
Vanadium	7.00E-05	NA	1.00E-03	NA	1.50E-03	1.50E-09	2.09E-09	7.47E-10	3E-05		8.87E-09	6.34E-10	1E-04					
Zinc	7.50E-02	NA	6.00E-04	NA	7.70E-03	4.62E-09	6.44E-09	2.30E-09	9E-08		2.73E-08	1.95E-09	4E-07					
Total Hazard Quotient and Cancer Risk:									2E-03	4E-09			1E-02	4E-09				

Assumptions for Park Worker	
CF =	1E-03 liter/cm3
BW =	70 kg
SA =	1,980 cm2
ET =	1 hour/day
EF =	18 days/year
ED =	25 years
AT (Nc) =	9,125 days
AT (Car) =	25,550 days

Assumptions for Recreational Visitor (Child)	
CF =	1E-03 liter/cm3
BW =	15 kg
SA =	4,625 cm2
ET =	1 hour/day
EF =	7 days/year
ED =	5 years
AT (Nc) =	1,825 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3

TABLE S-16
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SEDIMENT
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = CS x CF x SA x AF x ABS x EF x ED / BW x AT

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Sediment, from Sediment EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Sediment (mg/kg)	Park Worker Absorbed Dose (mg/kg-day) (Nc)	Park Worker Absorbed Dose (mg/kg-day) (Car)	Park Worker Hazard Quotient	Park Worker Cancer Risk	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Nc)	Recreational Visitor (Child) Absorbed Dose (mg/kg-day) (Car)	Recreational Visitor (Child) Hazard Quotient	Recreational Visitor (Child) Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Semivolatile Organics													Dermal Contact to Sediment Not Applicable for Construction Worker			
Phenanthrene	NA	NA	NA	4.00E-02												
Fluoranthene	4.00E-02	NA	NA	7.90E-02												
Pyrene	3.00E-02	NA	NA	7.70E-02												
Benzo(a)anthracene	NA	7.30E-01	NA	3.30E-02												
Chrysene	NA	7.30E-03	NA	4.50E-02												
Metals																
Aluminum	NA	NA	NA	1.33E+04												
Arsenic	2.40E-04	1.88E+00	1.00E-02	3.40E+00	4.74E-08	1.69E-08	2E-04	3E-08	2.01E-07	1.44E-08	8E-04	3E-08				
Barium	3.50E-02	NA	NA	1.26E+02												
Beryllium	2.00E-05	NA	NA	5.90E-01												
Cadmium	5.00E-05	NA	1.00E-02	4.00E-01	5.58E-09		1E-04		2.37E-08		5E-04					
Calcium	NA	NA	NA	2.14E+04												
Chromium	6.00E-05	NA	NA	1.63E+01												
Cobalt	NA	NA	NA	7.20E+00												
Copper	2.40E-02	NA	NA	2.19E+01												
Iron	6.00E-02	NA	NA	1.79E+04												
Lead	NA	NA	NA	2.06E+01												
Magnesium	NA	NA	NA	5.30E+03												
Manganese	1.50E-03	NA	NA	5.12E+02												
Nickel	8.00E-04	NA	NA	2.33E+01												
Potassium	NA	NA	NA	1.69E+03												
Selenium	4.50E-03	NA	NA	7.50E-01												
Thallium	8.00E-05	NA	NA	8.00E-01												
Vanadium	7.00E-05	NA	NA	2.17E+01												
Zinc	7.50E-02	NA	NA	1.05E+02												
Total Hazard Quotient and Cancer Risk:							3E-04	3E-08			1E-03	3E-08				

Assumptions for Park Worker			Assumptions for Recreational Visitor (Child)		
CF =	1E-06	kg/mg	CF =	1E-06	kg/mg
BW =	70	kg	BW =	15	kg
SA =	1,980	cm2	SA =	4,625	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	18	days/year	EF =	7	days/year
ED =	25	years	ED =	5	years
AT (Nc) =	9,125	days	AT (Nc) =	1,825	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Conservation/Recreation Land provided in Table 3.3-3

TABLE S-17
CALCULATED SOIL RECEPTOR EXPOSURE - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	RME Concentration (mg/kg)	SP[1]	BAF[2]	Deer Mouse Exposure (mg/kg/day)[3]	Short-tailed Shrew Exposure (mg/kg/day)[3]	Amercian Robin Exposure (mg/kg/day)[3]
Volatile Organics						
Acetone	6.20E-02	5.33E+01	3.90E-01	3.60E-01	1.14E-01	9.28E-01
Semivolatile Organics						
Bis(2-Ethylhexyl)phthalate	5.50E-01	5.10E-03	1.20E+01	7.16E-01	3.56E+00	2.37E+00
Di-n-butylphthalate	5.40E-02	8.84E-02	1.25E-01	1.48E-03	4.47E-03	7.65E-03
Fluoranthene	2.90E-02	3.72E-02	7.92E-01	2.72E-03	1.28E-02	1.05E-02
Pyrene	2.60E-02	4.43E-02	9.20E-02	4.97E-04	1.65E-03	3.06E-03
Metals						
Arsenic	8.85E+01	4.00E-02	5.00E-02	9.44E-01	3.53E+00	8.22E+00

(1) SP: soil-to-plant uptake factor.
(2) BAF: bioaccumulation factor.
(3) Receptor exposure calculated as

ED = [(Cs * SP * CF * Ip) + (Cs * BAF * Ia) + (Cs * Is)] * SFF / BW

Where, ED = exposure dose
- Cs = RME conc in soil (mg/kg)
- CF = plant dry-to-wet-weight conversion factor (0.2 for inorganics only, 1 for organics)
- SP = soil-to-plant uptake factor
- Ip = plant-matter intake rate (0.00216 kg/day for mouse; 0.00048 kg/day for shrew; 0.03658 kg/day for robin)
- BAF = bioaccumulation factor (unitless)
- Ia = animal-matter intake rate (0.00216 kg/day for mouse; 0.00852 kg/day for shrew; 0.04656 kg/day for robin)
- Is = incidental soil intake rate (0.000088 kg/day for mouse; 0.0002 kg/day for shrew; 0.00965 kg/day for robin)
- SFF = Site foraging factor (1 for mouse; 0.95 for shrew; 0.583 for robin)
- BW = body weight (0.02 kg for mouse; 0.015 kg for shrew; 0.077 kg for robin)

NOTE: Soil samples used in ecological risk assessment were taken from a depth of 0-2 ft below ground surface.

TABLE S-18
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-70 - MAMMALS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	Deer Mouse Exposure (mg/kg/day) [1]	Short-tailed Shrew Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	Deer Mouse Hazard Quotient [3]	Short-tailed Shrew Hazard Quotient [3]
Volatile Organics					
Acetone	3.60E-01	1.14E-01	1.00E+01	3.6E-02	1.1E-02
Semivolatile Organics					
Bis(2-Ethylhexyl)phthalate	7.16E-01	3.56E+00	1.83E+01	3.9E-02	1.9E-01
Di-n-butylphthalate	1.48E-03	4.47E-03	5.50E+02	2.7E-06	8.1E-06
Fluoranthene	2.72E-03	1.28E-02	1.25E+00	2.2E-03	1.0E-02
Pyrene	4.97E-04	1.65E-03	1.00E+00	5.0E-04	1.7E-03
Metals					
Arsenic	9.44E-01	3.53E+00	1.26E-01	7.5E+00	2.8E+01

(1) Receptor exposure from Table S-17.
(2) Toxicity reference value from Table 3.6-4.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10. small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

TABLE S-19
CALCULATION OF SOIL HAZARD QUOTIENTS - SEAD-70 - BIRD
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Constituent	American Robin Exposure (mg/kg/day) [1]	Toxicity Reference Value (mg/kg/day) [2]	American Robin Hazard Quotient [3]
Volatile Organics			
Acetone	9.28E-01	6.10E+02	1.5E-03
Semivolatile Organics			
Bis(2-Ethylhexyl)phthalate	2.37E+00	1.10E+00	2.2E+00
Di-n-butylphthalate	7.65E-03	1.10E-01	7.0E-02
Fluoranthene	1.05E-02	4.00E+01	2.6E-04
Pyrene	3.06E-03	4.00E+01	7.7E-05
Metals			
Arsenic	8.22E+00	2.46E+00	3.3E+00

(1) Receptor exposure from Table S-17.
(2) Toxicity reference value from Table 3.6-5.
(3) Hazard quotient calculated as HQ = exposure rate / toxicity reference value
with HQ < 1, no effects expected
1 < HQ =< 10, small potential for effects
10 < HQ =< 100, potential for greater exposure to result in effects, and
HQ > 100, highest potential for effects.

APPENDIX T
SEAD-120B: Ovid Road Small Arms Range

Table T-1: Soil Analysis Results

Table T-2: Inorganics Statistical Analysis - Soil

Table T-3: Exposure Point Concentrations for Chemicals of Potential Concern

Table T-4: Ambient Air Exposure Point Concentrations

Table T-5: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air

Table T-6: Calculation of Intake and Risk from the Ingestion of Soil

Table T-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil

Table T-8: Ecological Risk Assessment

TABLE T-1
SOIL ANALYSIS RESULTS -SEAD-120B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

								SEAD-120B		SEAD-120B		SEAD-120B		SEAD-120B		SEAD-120B		SEAD-120B		SEAD-120B	
								TP120B-1		TP120B-1		TP120B-1		TP120B-2		TP120B-2		TP120B-3		TP120B-3	
								SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
								EB165		EB034		EB166		EB167		EB168		EB169		EB170	
								0.6		0.6		2		0.8		2		1		2.8	
								1		1		2.2		1		2.2		1.5		3	
								3/31/98		3/31/98		3/31/98		3/31/98		3/31/98		3/31/98		3/31/98	
								SA		DU		SA		SA		SA		SA		SA	
			FREQUENCY		NUMBER	NUMBER	NUMBER	EBS		EBS		EBS		EBS		EBS		EBS		EBS	
			OF		ABOVE	OF	OF														
PARAMETER	UNIT	MAXIMUM	DETECTION	TAGM	TAGM	DETECTS	ANALYSES	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
SEMIVOLATILE ORGANIC																					
Anthracene	UG/KG	4.5	16.7%	50000	0	1	6	79	U	NA		79	U	4.5	J	80	U	80	U	78	U
Chrysene	UG/KG	5.3	33.3%	400	0	2	6	4.9	J	NA		79	U	5.3	J	80	U	80	U	78	U
Fluoranthene	UG/KG	6.9	50.0%	50000	0	3	6	6.2	J	NA		79	U	6.9	J	4.7	J	80	U	78	U
Phenanthrene	UG/KG	4.4	16.7%	50000	0	1	6	79	U	NA		79	U	4.4	J	80	U	80	U	78	U
Pyrene	UG/KG	6.6	33.3%	50000	0	2	6	5.5	J	NA		79	U	6.6	J	80	U	80	U	78	U
METALS																					
Aluminum	MG/KG	15300	100.0%	19300	0	6	6	13300		NA		13400		15300		13600		13400		13100	
Antimony	MG/KG	1.4	50.0%	5.9	0	3	6	1.1	UJ	NA		1.2	UJ	1.4	J	1.2	UJ	1.2	J	1.3	J
Arsenic	MG/KG	10.7	100.0%	8.2	1	6	6	2.9		NA		10.7		5.1		4		3.2		2.7	
Barium	MG/KG	148	100.0%	300	0	6	6	105		NA		148		134		115		112		106	
Beryllium	MG/KG	0.56	100.0%	1.1	0	6	6	0.56		NA		0.4		0.51		0.53		0.54		0.56	
Calcium	MG/KG	36600	100.0%	121000	0	6	6	20300		NA		21700		8020		27200		28500		36600	
Chromium	MG/KG	21.9	100.0%	29.6	0	6	6	19.7		NA		20.1		21.9		20.2		19.6		19.3	
Cobalt	MG/KG	14.2	100.0%	30	0	6	6	9.8		NA		14.2		12.2		11.6		9.6		8.6	
Copper	MG/KG	212	100.0%	33	4	6	6	191		NA		57		136		212		33		32.1	
Iron	MG/KG	27100	100.0%	36500	0	6	6	24100		NA		26200		27100		24500		23100		22500	
Lead	MG/KG	522	100.0%	24.8	6	6	6	289		NA		324		522		166		82.6		72	
Magnesium	MG/KG	10300	100.0%	21500	0	6	6	6200		NA		7640		5130		7280		10300		10200	
Manganese	MG/KG	945	100.0%	1060	0	6	6	448		NA		945		871		585		474		352	
Mercury	MG/KG	0.07	16.7%	0.1	0	1	6	0.06	U	NA		0.07		0.06	U	0.06	U	0.05	U	0.06	U
Nickel	MG/KG	34.6	100.0%	49	0	6	6	29.9		NA		34.6		32.1		31.1		29.3		27.7	
Potassium	MG/KG	2270	100.0%	2380	0	6	6	1630		NA		1730		2270		1670		1800		1700	
Selenium	MG/KG	1.2	16.7%	2	0	1	6	1	UJ	NA		1.1	UJ	1.2	J	1	UJ	1	UJ	1	UJ
Silver	MG/KG	0.38	16.7%	0.75	0	1	6	0.29	U	NA		0.31	U	0.31	U	0.38		0.29	U	0.3	U
Sodium	MG/KG	92.5	83.3%	172	0	5	6	90.4		NA		88.5		92.5		72.2		58.5	U	69.6	
Thallium	MG/KG	2.9	33.3%	0.7	2	2	6	1.5	U	NA		1.9		2.9		1.5	U	1.5	U	1.6	U
Vanadium	MG/KG	25.7	100.0%	150	0	6	6	21.2		NA		24.2		25.7		22.7		22.6		21.9	
Zinc	MG/KG	110	100.0%	110	0	6	6	83.5		NA		87.2		105		110		83.9		79.9	

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs <50 ppm.

b) NA = Not Available.

c) U = The compound was not detected below this concentration.

d) J = The reported value is an estimated concentration.

e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.

f) R = The data was rejected during the data validation process.

TABLE T-2
INORGANICS ANALYSIS - SOIL
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One background comparison was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Table G-5 for the results.

TABLE T-3
EXPOSURE POINT CONCENTRATIONS FOR CHEMICALS OF POTENTIAL CONCERN - SEAD-120B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

COMPOUNDS	Total Soil mg/kg	Surface Soil mg/kg
Metals		
Cadmium	7.00E-02	7.00E-02
Copper	2.12E+02	1.91E+02
Lead	5.22E+02	5.22E+02
Potassium	2.27E+03	2.27E+03
Selenium	1.20E+00	1.20E+00
Zinc	1.10E+02	1.05E+02

TABLE T-4
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Equation for Air EPC from Total Soils (mg/m³) = $CS_{tot} \times PM_{10} \times CF$

Variables:
CS_{tot} = Chemical Concentration in Total Soils, from EPC data (mg/kg)
PM_{10} = PM_{10} Concentration Calculated for Construction Worker= 340 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	EPC Data for Total Soils (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)	Calculated Air EPC Total Soils (mg/m³)
Metals				
Copper	1.91E+02	2.12E+02	3.25E-06	7.21E-05
Lead	5.22E+02	5.22E+02	8.87E-06	1.77E-04
Potassium	2.27E+03	2.27E+03	3.86E-05	7.72E-04
Selenium	1.20E+00	1.20E+00	2.04E-08	4.08E-07
Zinc	1.05E+02	1.10E+02	1.79E-06	3.74E-05

ND = Compound was not detected above the detection limit shown

TABLE T-5

CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR

REASONABLE MAXIMUM EXPOSURE (RME)

Decision Document - Mini Risk Assessment - SEAD-120B

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Prison Inmate Intake (mg/kg-day) (Nc)	Prison Inmate Intake (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day) (Nc)	Prison Worker Intake (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day) (Nc)	Construction Worker Intake (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Metals																
Copper	NA	NA	8.87E-06	1.77E-04												
Lead	NA	NA	3.86E-05	7.72E-04												
Potassium	NA	NA	2.04E-08	4.08E-07												
Selenium	NA	NA	1.79E-06	3.74E-05												
Zinc	NA	NA														
Total Hazard Quotient and Cancer Risk:																

Assumptions for Prison Inmate		
CA =	EPC Surface Only	
IR =	15.2	m3/day
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker		
CA =	EPC Surface Only	
IR =	8	m3/day
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Assumptions for Construction Worker		
CA =	EPC Surface and Sub-Surface	
IR =	10.4	m3/day
EF =	1.5	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE T-4 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE T-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* fro Surface Soil (mg/m3)	Air EPC* from Total Soils (mg/m3)	Day Care Center Child Intake (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	(Car)	Hazard Quotient	Cancer Risk
Metals												
Copper	NA	NA	8.87E-06	1.77E-04								
Lead	NA	NA	1.86E-05	7.72E-04								
Potassium	NA	NA	2.04E-08	4.08E-07								
Selenium	NA	NA	1.79E-06	3.74E-05								
Zinc	NA	NA										

Total Hazard Quotient and Cancer Risk:

Assumptions for Day Care Center Child			Assumptions for Day Care Center Adult		
CA =	EPC Surface Only		CA =	EPC Surface Only	
IR =	4	m3/day	IR =	8	m3/day
EF =	250	days/year	EF =	250	days/year
ED =	6	years	ED =	25	years
BW =	15	kg	BW =	70	kg
AT (Nc) =	2190	days	AT (Nc) =	9125	days
AT (Car) =	25550	days	AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
* See TABLE T-4 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5

04/29/2002

TABLE T-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD	Carc. Slope Oral	EPC Surface Soil	EPC from Total Soils	Prison Inmate Intake (mg/kg-day)		Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Intake (mg/kg-day)		Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Intake (mg/kg-day)		Construction Worker Hazard Quotient	Construction Worker Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/kg)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			(Nc)	(Car)		
Metals																
Copper	4.0E-02	NA	1.91E+02	2.12E+02	2.73E-04		7E-03		1.87E-04		5E-03		5.97E-06		1E-04	
Lead	NA	NA	5.22E+02	5.22E+02												
Potassium	NA	NA	2.27E+03	2.27E+03												
Selenium	5.0E-03	NA	1.20E+00	1.20E+00	1.71E-06		3E-04		1.17E-06		2E-04		3.38E-08		7E-06	
Zinc	3.0E-01	NA	1.05E+02	1.10E+02	1.50E-04		5E-04		1.03E-04		3E-04		3.10E-06		1E-05	
Total Hazard Quotient and Cancer Risk:							**8E-03**				**5E-03**				**2E-04**	

Assumptions for Prison Inmate

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	365	days/year
ED =	24	years
BW =	70	kg
AT (Nc) =	8760	days
AT (Car) =	25550	days

Assumptions for Prison Worker

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Assumptions for Construction Worker

CS =	EPC Surface and Subsurface	
IR =	480	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	1.5	days/year
ED =	1	years
BW =	70	kg
AT (Nc) =	365	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE T-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\dfrac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Intake (mg/kg-day) (Nc)	Day Care Center Child Intake (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Intake (mg/kg-day) (Nc)	Day Care Center Adult Intake (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Metals												
Copper	4.0E-02	NA	1.91E+02	2.12E+02	1.74E-03		4E-02		1.87E-04		5E-03	
Lead	NA	NA	5.22E+02	5.22E+02								
Potassium	NA	NA	2.27E+03	2.27E+03								
Selenium	5.0E-03	NA	1.20E+00	1.20E+00	1.10E-05		2E-03		1.17E-06		2E-04	
Zinc	3.0E-01	NA	1.05E+02	1.10E+02	9.59E-04		3E-03		1.03E-04		3E-04	
Total Hazard Quotient and Cancer Risk:							**5E-02**				**5E-03**	

Assumptions for Day Care Center Child

CS =	EPC Surface Only	
IR =	200	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	6	years
BW =	15	kg
AT (Nc) =	2190	days
AT (Car) =	25550	days

Assumptions for Day Care Center Adult

CS =	EPC Surface Only	
IR =	100	mg soil/day
CF =	1E-06	kg/mg
FI =	1	unitless
EF =	250	days/year
ED =	25	years
BW =	70	kg
AT (Nc) =	9125	days
AT (Car) =	25550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA= Information not available.

TABLE T-7
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Prison Inmate Absorbed Dose (mg/kg-day) (Nc)	Prison Inmate Absorbed Dose (mg/kg-day) (Car)	Prison Inmate Hazard Quotient	Prison Inmate Cancer Risk	Prison Worker Absorbed Dose (mg/kg-day) (Nc)	Prison Worker Absorbed Dose (mg/kg-day) (Car)	Prison Worker Hazard Quotient	Prison Worker Cancer Risk	Construction Worker Absorbed Dose (mg/kg-day) (Nc)	Construction Worker Absorbed Dose (mg/kg-day) (Car)	Construction Worker Hazard Quotient	Construction Worker Cancer Risk
Metals																	
Copper	2.4E-02	NA	NA	1.91E+02	2.12E+02												
Lead	NA	NA	NA	5.22E+02	5.22E+02												
Potassium	NA	NA	NA	2.27E+03	2.27E+03												
Selenium	4.5E-03	NA	NA	1.20E+00	1.20E+00												
Zinc	7.5E-02	NA	NA	1.05E+02	1.10E+02												
Total Hazard Quotient and Cancer Risk:																	

Assumptions for Prison Inmate		Assumptions for Prison Worker		Assumptions for Construction Worker	
CS =	EPC Surface Only	CS =	EPC Surface Only	CS =	EPC Surface and Subsurface
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	5800 cm2	SA =	5800 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	365 days/year	EF =	250 days/year	EF =	1.5 days/year
ED =	24 years	ED =	25 years	ED =	1 years
BW =	70 kg	BW =	70 kg	BW =	70 kg
AT (Nc) =	8760 days	AT (Nc) =	9125 days	AT (Nc) =	365 days
AT (Car) =	25550 days	AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3.3-5.

TABLE T-7
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME)
Decision Document - Mini Risk Assessment - SEAD-120B
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = CS x CF x SA x AF x ABS x EF x ED / BW x AT

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	EPC from Total Soils (mg/kg)	Day Care Center Child Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Child Absorbed Dose (mg/kg-day) (Car)	Day Care Center Child Hazard Quotient	Day Care Center Child Cancer Risk	Day Care Center Adult Absorbed Dose (mg/kg-day) (Nc)	Day Care Center Adult Absorbed Dose (mg/kg-day) (Car)	Day Care Center Adult Hazard Quotient	Day Care Center Adult Cancer Risk
Metals													
Copper	2.4E-02	NA	NA	1.91E+02	2.12E+02								
Lead	NA	NA	NA	5.22E+02	5.22E+02								
Potassium	NA	NA	NA	2.27E+03	2.27E+03								
Selenium	4.5E-03	NA	NA	1.20E+00	1.20E+00								
Zinc	7.5E-02	NA	NA	1.05E+02	1.10E+02								
Total Hazard Quotient and Cancer Risk:													

Assumptions for Day Care Center Child		Day Care Center Adult	
CS =	EPC Surface Only	CS =	EPC Surface Only
CF =	1.00E-06 kg/mg	CF =	1.00E-06 kg/mg
SA =	2190 cm2	SA =	5800 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	250 days/year	EF =	250 days/year
ED =	6 years	ED =	25 years
BW =	15 kg	BW =	70 kg
AT (Nc) =	2190 days	AT (Nc) =	9125 days
AT (Car) =	25550 days	AT (Car) =	25550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Planned Prison Land provided in Table 3-5

TABLE T-8
ECOLOGICAL RISK ASSESSMENT
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

One ecological risk assessment was performed for the combination of SEADs-43,56,69, SEAD-44A, SEAD-44B, SEAD-52, SEAD-62, and SEAD-120B. See Appendix G, Tables G-16 through G-19 for the results.

APPENDIX U
Background Data

Table U-1: Background Soil Data
Table U-2: Background Groundwater Data

TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	S1105-24SOIL1 VALUE (Q)	S1105-25SOIL1 VALUE (Q)	S1105-26(1)SOIL1 VALUE (Q)	S1105-27SOIL1 VALUE (Q)	S1105-28SOIL1 VALUE (Q)
SAMPLE DATE:								11/05/91	11/05/91	11/05/91	11/05/91	11/05/91
Aluminum	MG/KG	21000	100%	19300	4	60	60	19200	**20500**	17700	12700	14800
Antimony	MG/KG	6.8	20%	5.9	3	12	60	10.3 UJ	8.8 UJ	8.2 UJ	8.4 UJ	9.9 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	5.1 J	6.1 J	6 J	4.2 J	4.3 J
Barium	MG/KG	159	100%	300	0	60	60	136 J	98.9 J	86.7 J	56.2 J	101 J
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	**1.4**	**1.2**	1	0.78 J	1.1
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	**2.6**	**2.9**	**2.4**	1.9	2.3
Calcium	MG/KG	293000	100%	121000	3	60	60	5390	4870	3560	85900	45600
Chromium	MG/KG	32.7	100%	29.6	3	60	60	27.4 J	**30.1** J	26.9 J	19.8 J	22.5 J
Cobalt	MG/KG	29.1	100%	30	0	60	60	13.8	18.4	14	14.2	13.7
Copper	MG/KG	62.8	100%	33	3	60	60	22.3	27.6	26	16.2	22.6
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.6 U	0.63 U	0.67 U	0.58 U	0.7 U
Iron	MG/KG	38600	100%	36500	3	60	60	**37200**	36100	32500	27400	31000
Lead	MG/KG	266	95%	24.8	3	57	60	14.5	11.4	13.6	10.1	10.8
Magnesium	MG/KG	29100	100%	21500	2	57	57	5850	7300	6490	6720	8860
Manganese	MG/KG	2380	93%	1060	3	55	59	**1130**	956	832	926	903
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.09	0.06 J	0.06 J	0.05 J	0.08 J
Nickel	MG/KG	62.3	98%	49	3	59	60	42.3	48.7	44.4	30.4	38.4
Potassium	MG/KG	3160	100%	2380	4	60	60	1910	2110	1760	1430	1320
Selenium	MG/KG	1.7	40%	2	0	24	60	0.17 UJ	0.21 UJ	0.2 UJ	0.61 UJ	0.21 UJ
Silver	MG/KG	0.87	4%	0.75	1	2	57	1.6 U	1.3 U	1.2 U	1.3 U	1.5 U
Sodium	MG/KG	269	83%	172	3	50	60	79.2 U	67.5 U	62.6 U	75.3 J	84.2 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.47 U	0.58 U	0.57 U	0.34 U	0.59 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	32.2	25.4	26.4	15.7	19.7
Zinc	MG/KG	126	93%	110	3	56	60	85.1 J	94.2 J	85 J	75 J	**126** J

New York State Soil Cleanup Objective Levles, TAGM #4046
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

Notes:
Italicized data represents duplicate pair; average of both samples, presented to right, is compared to TAGM.
Shaded cells with bolded text indicates TAGM value exceeded.

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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	S1105-29SOIL1 VALUE (Q)	S1105-30RESOIL1 VALUE (Q)	BK-1SOIL3 VALUE (Q)	BK-2RESOIL3 VALUE (Q)	GB35-1GRID VALUE (Q)
SAMPLE DATE:								11/05/91	11/05/91	12/16/92	12/16/92	01/20/93
Aluminum	MG/KG	21000	100%	19300	4	60	60	8880	7160	**19400**	14400	18000
Antimony	MG/KG	6.8	20%	5.9	3	12	60	9.9 UJ	7 UJ	7.9 U	7.2 U	5.8 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	3.8 J	4.4 J	3	2.7	6.2
Barium	MG/KG	159	100%	300	0	60	60	110 J	39.9 J	159	106	93.6
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.76	0.52 J	1.1	0.81	0.85
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	1.7	1.5	0.45 U	0.41 U	0.33 U
Calcium	MG/KG	293000	100%	121000	3	60	60	104000	101000	4590	22500	1590
Chromium	MG/KG	32.7	100%	29.6	3	60	60	13.8 J	11.2 J	**30**	22.3	23.5
Cobalt	MG/KG	29.1	100%	30	0	60	60	10.7	8.1	14.4	12.3	9.4
Copper	MG/KG	62.8	100%	33	3	60	60	21.6	19.3	26.9	18.8	17.5
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.63 U	0.62 U	0.57 U	0.61 U	0.78 U
Iron	MG/KG	38600	100%	36500	3	60	60	19600	17300	**38600**	26600	25200
Lead	MG/KG	266	95%	24.8	3	57	60	10.1	7.8	15.8	18.9	14.4
Magnesium	MG/KG	29100	100%	21500	2	57	57	17000	12600	5980	7910	3850
Manganese	MG/KG	2380	93%	1060	3	55	59	532	514	**2380**	800	701
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.04 J	0.05 J	**0.13** J	**0.11**	0.06 J
Nickel	MG/KG	62.3	98%	49	3	59	60	23.8	19	47.7	31	26.3
Potassium	MG/KG	3160	100%	2380	4	60	60	1080	1050	1720	1210	1110
Selenium	MG/KG	1.7	40%	2	0	24	60	0.65 UJ	0.21 UJ	0.73 J	0.94	0.23 UJ
Silver	MG/KG	0.87	4%	0.75	1	2	57	1.5 U	1.1 U	0.47 U	0.43 U	0.34 U
Sodium	MG/KG	269	83%	172	3	50	60	112 J	116 J	49.1 J	61.1 J	35.6 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.36 U	0.6 U	0.42 U	0.38 U	0.55 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	19.5	12.9	28	22.4	27.1
Zinc	MG/KG	126	93%	110	3	56	60	84.3 J	74.8 J	98.6	63.7	55

New York State Soil Cleanup Objective Levles, TAGM #4046
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

Notes:
Italicized data represents duplicate pair; average of both samples, presented to right, is compared to TAGM.
Shaded cells with bolded text indicates TAGM value exceeded.

TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	GB35-2GRID VALUE (Q)	GB35-6DUGRID VALUE (Q)	gb35-Pair VALUE (Q)	GB36-1GRID VALUE (Q)	GB36-2GRID VALUE (Q)
SAMPLE DATE:								01/20/93	01/20/93	01/20/93	01/20/93	01/20/93
Aluminum	MG/KG	21000	100%	19300	4	60	60	17600	16200	16900	18100	16200
Antimony	MG/KG	6.8	20%	5.9	3	12	60	**6.8** J	**6.3** J	**6.55**	5.9 J	5.8 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	7.7	5.3	6.5	4.6	**9.7**
Barium	MG/KG	159	100%	300	0	60	60	61.7	61.7	61.7	74.8	50.8
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.74	0.77	0.755	0.77	0.65
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.31 U	0.35 U	0.165 U	0.3 U	0.33 U
Calcium	MG/KG	293000	100%	121000	3	60	60	17700	1370	9535	1660	22900
Chromium	MG/KG	32.7	100%	29.6	3	60	60	29.3	25.1	27.2	24.8	27.4
Cobalt	MG/KG	29.1	100%	30	0	60	60	16.3	10.3	13.3	20.4	13.2
Copper	MG/KG	62.8	100%	33	3	60	60	24.5	17.2	20.85	17.7	17.5
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.71 U	0.82 U	**0.3825** u	0.7 U	0.68 U
Iron	MG/KG	38600	100%	36500	3	60	60	34200	30800	32500	26100	30700
Lead	MG/KG	266	95%	24.8	3	57	60	5.4	19.1	12.25	12.7	6.2
Magnesium	MG/KG	29100	100%	21500	2	57	57	7790	4490	6140	4490	7150
Manganese	MG/KG	2380	93%	1060	3	55	59	646	775	710.5	426	507
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.03 U	0.07 J	0.0425 J	0.02 J	0.02 J
Nickel	MG/KG	62.3	98%	49	3	59	60	48.7	28.3	38.5	28.3	42.8
Potassium	MG/KG	3160	100%	2380	4	60	60	1110	975	1042.5	1400	1100
Selenium	MG/KG	1.7	40%	2	0	24	60	0.23 UJ	0.21 UJ	0.11 UJ	0.2 UJ	0.18 UJ
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.32 U	0.36 U	0.17 U	0.31 U	0.34 U
Sodium	MG/KG	269	83%	172	3	50	60	77.5 J	34.6 J	56.05 J	46.6 J	97.6 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.54 U	0.5 U	0.26 U	0.46 U	0.43 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	22.3	26.1	24.2	27.8	19.7
Zinc	MG/KG	126	93%	110	3	56	60	83.4	53.1	68.25	59.2	74.1

New York State Soil Cleanup Objective Levles. TAGM #4046
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	MW36-3GRID VALUE (Q)	S2011121M W34GRID VALUE (Q)	SB24-5-1 VALUE (Q)	SB24-5-3 VALUE (Q)	SB24-5-5 VALUE (Q)
SAMPLE DATE:								01/11/93	11/20/91	12/02/93	12/02/93	12/02/93
Aluminum	MG/KG	21000	100%	19300	4	60	60	12700	16100	16200	10100	13700
Antimony	MG/KG	6.8	20%	5.9	3	12	60	5.7 UJ	5.7 J	12.5 UJ	5.8 UJ	11.3 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	2.9 J	6.3 U	4.2	3.3	5
Barium	MG/KG	159	100%	300	0	60	60	46.9 J	67.5	117	58.3	67.2
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.59	0.86	0.98 J	0.48 J	0.62 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.33 U	2.3	0.78 U	0.36 U	0.7 U
Calcium	MG/KG	293000	100%	121000	3	60	60	4170	28600	4540	74200	49000
Chromium	MG/KG	32.7	100%	29.6	3	60	60	23.3 J	26.6	24.5	16.9	23.1
Cobalt	MG/KG	29.1	100%	30	0	60	60	18.6	17	16	8.2	12
Copper	MG/KG	62.8	100%	33	3	60	60	19.2 J	32.7	28.4	20.9	22.2
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.56 U	0.54 U	0.6 U	0.51 U	0.57 U
Iron	MG/KG	38600	100%	36500	3	60	60	27500	35000	33600	21300	26700
Lead	MG/KG	266	95%	24.8	3	57	60	20.2	11.9	**45.5** J	8.7 J	7.9 J
Magnesium	MG/KG	29100	100%	21500	2	57	57	5750	6850	5150	12100	11400
Manganese	MG/KG	2380	93%	1060	3	55	59	540	803	**1080**	400	450
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.02 J	0.07 R	0.07 JR	0.06 JR	0.04 JR
Nickel	MG/KG	62.3	98%	49	3	59	60	43.3 J	**49.3** J	37.3	26.4	35.2
Potassium	MG/KG	3160	100%	2380	4	60	60	754	1290	1170 J	993	1660
Selenium	MG/KG	1.7	40%	2	0	24	60	0.19 UJ	0.18 UJ	0.15 UJ	0.23 UJ	0.22 UJ
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.34 U	**0.87** J	1.6 U	0.73 U	1.4 U
Sodium	MG/KG	269	83%	172	3	50	60	31.6 U	55.2 J	50.9 J	153 J	139 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.45 U	0.51 U	0.16 U	0.25 U	0.24 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	16.2 J	22.3	29.9	14.4	19.5
Zinc	MG/KG	126	93%	110	3	56	60	34.7 J	95.7	85.7	62.8	63.2

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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

SAMPLE DATE:								12/03/93	12/03/93	09/25/95	09/25/95	
METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB25-6-01 VALUE (Q)	SB25-6-02 VALUE (Q)	SB25-7-00 VALUE (Q)	SB25-7-10 VALUE (Q)	SB25-7 Pair VALUE (Q)
Aluminum	MG/KG	21000	100%	19300	4	60	60	10600	7070	12500	12500	12500
Antimony	MG/KG	6.8	20%	5.9	3	12	60	4.2 U	3 U	0.4	0.4 UJ	0.3 J
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	**8.3**	4.8	4.3	4.3	4.3
Barium	MG/KG	159	100%	300	0	60	60	59.1	35	71.3	71.3	71.3
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.48 J	0.35 J	0.56	0.56	0.56
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.41 U	0.29 U	0.05 U	0.05 U	0.025
Calcium	MG/KG	293000	100%	121000	3	60	60	82500	**122000**	47400 J	47400 J	47400 J
Chromium	MG/KG	32.7	100%	29.6	3	60	60	16.9	11.3	16.9 J	16.9 J	16.9 J
Cobalt	MG/KG	29.1	100%	30	0	60	60	11.2	6.6 J	8	8	8
Copper	MG/KG	62.8	100%	33	3	60	60	20.2 J	12 J	15.7	15.7	15.7
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.58 U	0.64 U	0.44 U	0.444 U	0.221 U
Iron	MG/KG	38600	100%	36500	3	60	60	21400	15800	20500	20500	20500
Lead	MG/KG	266	95%	24.8	3	57	60	9.5	13.8	11.1	11.1	11.1
Magnesium	MG/KG	29100	100%	21500	2	57	57	19600	**22800**	11700	11700	11700
Manganese	MG/KG	2380	93%	1060	3	55	59	722 J	610 J	452	452	452
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.03 J	0.04 U	0.03	0.03	0.03
Nickel	MG/KG	62.3	98%	49	3	59	60	26.8	18	22.3	22.3	22.3
Potassium	MG/KG	3160	100%	2380	4	60	60	1480	1060	1110	1110	1110
Selenium	MG/KG	1.7	40%	2	0	24	60	0.97 J	0.63 J	0.63 U	0.66 U	0.3225 U
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.82 U	0.59 U	0.89 U	0.92 U	0.4525 U
Sodium	MG/KG	269	83%	172	3	50	60	**269** J	**186** J	59.9	57.5	58.7
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.24 UJ	0.21 UJ	**1.2**	**1.2**	**1.2**
Vanadium	MG/KG	32.7	100%	150	0	60	60	18.5	12	21	21	21
Zinc	MG/KG	126	93%	110	3	56	60	71.6 J	40.6 J	54.1	54.1	54.1

New York State Soil Cleanup Objective Levles, TAGM #4046
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TABLE U-1
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Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB25-7-03 VALUE (Q)	SB25-7-04 VALUE (Q)	MW64A-1-1 VALUE (Q)	MW64A-1-2 VALUE (Q)	MW64A-1-3 VALUE (Q)
SAMPLE DATE:								09/25/95	09/25/95	04/02/94	04/02/94	04/02/94
Aluminum	MG/KG	21000	100%	19300	4	60	60	8020	7550	16100	**19800**	12600
Antimony	MG/KG	6.8	20%	5.9	3	12	60	0.42 UJ	0.44 U	0.23 J	0.2 UJ	0.2 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	4.1	3.4	7.1	8.2	5
Barium	MG/KG	159	100%	300	0	60	60	58	52	83.7	91.2	62.3
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.43	0.39	0.68 J	0.74 J	0.53 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.06 U	0.06 U	0.11 J	0.02 U	0.12 J
Calcium	MG/KG	293000	100%	121000	3	60	60	120000 J	**133000** J	7210	4300	72400
Chromium	MG/KG	32.7	100%	29.6	3	60	60	13.7 J	12.4 J	23	25	19
Cobalt	MG/KG	29.1	100%	30	0	60	60	8.2	6.9	11.8	11.3	9.1 J
Copper	MG/KG	62.8	100%	33	3	60	60	17.7	16.4	25.5	21	23.7
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.57 U	0.51 U	0.66 U	0.56 U	0.55 U
Iron	MG/KG	38600	100%	36500	3	60	60	18900	15400	28500	28000	22600
Lead	MG/KG	266	95%	24.8	3	57	60	7	6.5	21.6	13.6	15.4
Magnesium	MG/KG	29100	100%	21500	2	57	57	17400	20700	5480	5010	14800
Manganese	MG/KG	2380	93%	1060	3	55	59	735	402	558	604	402
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.02	0.01	0.05 J	0.03 J	0.02 J
Nickel	MG/KG	62.3	98%	49	3	59	60	26.4	22.4	32.2	28.6	26.7
Potassium	MG/KG	3160	100%	2380	4	60	60	1280	1430	**2590** J	2260 J	**2700** J
Selenium	MG/KG	1.7	40%	2	0	24	60	0.7 U	0.74 U	0.96	1.7	0.34 U
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.98 U	1 U	0.12 U	0.14 U	0.14 U
Sodium	MG/KG	269	83%	172	3	50	60	89.1	110	27.5 U	31.8 U	92.1 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	**1.1**	0.6 U	0.42 J	0.32 U	0.32 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	13.4	13.7	27.6	32.2	22.8
Zinc	MG/KG	126	93%	110	3	56	60	64.9	65.1	104	87.1	64.9

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BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

SAMPLE DATE:								05/13/94	05/13/94	05/13/94	05/13/94	03/30/94
METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	MW64B-1-1 VALUE (Q)	MW64B-1-2 VALUE (Q)	MW64B-1-3 VALUE (Q)	MW64B-1-04 VALUE (Q)	MW67-2-1 VALUE (Q)
Aluminum	MG/KG	21000	100%	19300	4	60	60	13400	8870	7620	7620	16700
Antimony	MG/KG	6.8	20%	5.9	3	12	60	0.3 J	0.15 UJ	0.15 UJ	0.15 UJ	0.27 J
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	5.5	4.3	5.5	5.5	4.4
Barium	MG/KG	159	100%	300	0	60	60	75.5	70.8	76.7	76.7	114
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.56 J	0.43 J	0.37 J	0.37 J	0.67 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.63 J	0.64 J	0.54 J	0.54 J	0.2 J
Calcium	MG/KG	293000	100%	121000	3	60	60	5530	70000	75900	75900	3580
Chromium	MG/KG	32.7	100%	29.6	3	60	60	17.5	14.1	13.5	13.5	19.5
Cobalt	MG/KG	29.1	100%	30	0	60	60	7.2 J	10	7.4 J	7.4 J	7.5 J
Copper	MG/KG	62.8	100%	33	3	60	60	18.9	20.2	17.6	17.6	16.5
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.6 U	0.5 U	0.48 U	0.48 U	0.64 U
Iron	MG/KG	38600	100%	36500	3	60	60	20900	18400	17100	17100	20500
Lead	MG/KG	266	95%	24.8	3	57	60	21.4	8.8	8.3	8.3	17.5
Magnesium	MG/KG	29100	100%	21500	2	57	57	3720	18900	21500	21500	
Manganese	MG/KG	2380	93%	1060	3	55	59	207	434	389	389	438
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.05 J	0.02 J	0.01 U	0.01 U	0.04
Nickel	MG/KG	62.3	98%	49	3	59	60	19.8	28.2	22.6	22.6	18.7
Potassium	MG/KG	3160	100%	2380	4	60	60	1700	1630	1650	1650	1780 J
Selenium	MG/KG	1.7	40%	2	0	24	60	0.99 J	0.26 U	0.57 J	0.57 J	0.81
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.16 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 U
Sodium	MG/KG	269	83%	172	3	50	60	35.9 U	96.8 J	79.6 J	79.6 J	25.1 U
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.41 J	0.24 U	0.24 U	0.24 U	0.48 J
Vanadium	MG/KG	32.7	100%	150	0	60	60	23.3	14.8	14.2	14.2	28.2
Zinc	MG/KG	126	93%	110	3	56	60	72.2	59	45.6	45.600	64.8

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SAMPLE DATE:								03/30/94	03/30/94	05/11/94	05/11/94	05/11/94
METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	MW67-2-2 VALUE (Q)	MW67-2-3 VALUE (Q)	MW70-1-1 VALUE (Q)	MW70-1-2 VALUE (Q)	MW70-1-3 VALUE (Q)
Aluminum	MG/KG	21000	100%	19300	4	60	60	14900	9460	12200	9480	11000
Antimony	MG/KG	6.8	20%	5.9	3	12	60	0.22 J	0.2 UJ	0.23 UJ	0.21 UJ	0.19 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	4.5	4.2	5.4	4.1	5.7
Barium	MG/KG	159	100%	300	0	60	60	105	80.8	67.5	56.6	79.9
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.61 J	0.4 J	0.44 J	0.41 J	0.54 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.11 J	0.12 J	0.57 J	0.43 J	0.8 J
Calcium	MG/KG	293000	100%	121000	3	60	60	79000	77800	3600	51600	48600
Chromium	MG/KG	32.7	100%	29.6	3	60	60	22.5	14.8	13.7	14.7	17.8
Cobalt	MG/KG	29.1	100%	30	0	60	60	10.4 J	9.7 J	5.5 J	7.1 J	21
Copper	MG/KG	62.8	100%	33	3	60	60	20.3	20.5	12.4	19.7	**33.5**
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.5 U	0.54 U			
Iron	MG/KG	38600	100%	36500	3	60	60	24400	18700	17700	16000	26400
Lead	MG/KG	266	95%	24.8	3	57	60	9.3	8.5	20.7	9.1	13.6
Magnesium	MG/KG	29100	100%	21500	2	57	57			2830	13600	7980
Manganese	MG/KG	2380	93%	1060	3	55	59	528	411	233	470	1040
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.01 J	0.02 J	0.1 J	0.03 J	0.02 J
Nickel	MG/KG	62.3	98%	49	3	59	60	32.3	25.9	12.3	17.6	**52.4**
Potassium	MG/KG	3160	100%	2380	4	60	60	**3160** J	1970 J	982 J	1590	1350
Selenium	MG/KG	1.7	40%	2	0	24	60	0.36 U	0.34 U	1 J	0.64 J	0.32 U
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.15 U	0.14 U			
Sodium	MG/KG	269	83%	172	3	50	60	112 J	107 J	36.4 U	126 J	165 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.34 U	0.32 U			
Vanadium	MG/KG	32.7	100%	150	0	60	60	24.8	16.5	23.3	17.2	17.6
Zinc	MG/KG	126	93%	110	3	56	60	62	60.1	55.4	42.4	**116**

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Shaded cells with bolded text indicates TAGM value exceeded.

TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB11-3-1 VALUE (Q)	SB11-3-2 VALUE (Q)	SB11-3-6 VALUE (Q)	SB13-1-1 VALUE (Q)	SB13-1-2 VALUE (Q)
SAMPLE DATE:								11/02/93	11/02/93	11/03/93	12/08/93	
Aluminum	MG/KG	21000	100%	19300	4	60	60	17600	6330	10900	18300	8250
Antimony	MG/KG	6.8	20%	5.9	3	12	60	10.8 UJ	8 UJ	7.6 UJ	5.1 J	3.7 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	5.6 R	3.4 R	6 R	7	6.2
Barium	MG/KG	159	100%	300	0	60	60	113	57.4	62.7	106	88.1
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.85 J	0.34 J	0.47 J	0.92 J	0.42 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.67 U	0.5 U	0.48 U	0.45 U	0.36 U
Calcium	MG/KG	293000	100%	121000	3	60	60	4950	91300	48600	3570	87700
Chromium	MG/KG	32.7	100%	29.6	3	60	60	24	11.1	18.6	29.4	13.3
Cobalt	MG/KG	29.1	100%	30	0	60	60	11.3	6.5 J	10.1	12	7.2 J
Copper	MG/KG	62.8	100%	33	3	60	60	20	12.2	21.7	11.6	18.4
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.57 U	0.47 U	0.53 U	0.61 U	0.5 U
Iron	MG/KG	38600	100%	36500	3	60	60	27200	13200	28300	32500	17400
Lead	MG/KG	266	95%	24.8	3	57	60	**27.9**	11.4	10.1	15 R	9 R
Magnesium	MG/KG	29100	100%	21500	2	57	57	4160	12900	10100	5890	20800
Manganese	MG/KG	2380	93%	1060	3	55	59	674	356	434	451	517
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.05 J	0.04 U	0.03 U	0.03 J	0.07 J
Nickel	MG/KG	62.3	98%	49	3	59	60	28.3	16.7	29.5	34.9	24
Potassium	MG/KG	3160	100%	2380	4	60	60	2110	1110	1230	2190	1390
Selenium	MG/KG	1.7	40%	2	0	24	60	0.24 J	0.13 UJ	0.21 UJ	0.26 J	0.56 J
Silver	MG/KG	0.87	4%	0.75	1	2	57	1.4 UJ	1 UJ	0.97 UJ	0.9 U	0.71 U
Sodium	MG/KG	269	83%	172	3	50	60	66.3 J	136 J	146 J	80.6 J	155 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.19 U	1.5 U	0.23 U	0.43 J	0.43 J
Vanadium	MG/KG	32.7	100%	150	0	60	60	31.8	13.3	17	32.7	13.3
Zinc	MG/KG	126	93%	110	3	56	60	83.2 R	65 R	77.3 R	81.9	56.2

New York State Soil Cleanup Objective Levles, TAGM #4046
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

SAMPLE DATE:								12/08/93	12/15/93	12/15/93	12/15/93	12/01/93
METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB13-1-3 VALUE (Q)	SB13-6-1 VALUE (Q)	SB13-6-3 VALUE (Q)	SB13-6-4 VALUE (Q)	SB17-1-1 VALUE (Q)
Aluminum	MG/KG	21000	100%	19300	4	60	60	11700	16000	13500	10200	13700
Antimony	MG/KG	6.8	20%	5.9	3	12	60	2.8 UJ	3.2 UJ	2.5 UJ	2.9 UJ	11.7 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	5.7	4.6	2.7	2.3	4.3
Barium	MG/KG	159	100%	300	0	60	60	33.9	103	60.4	56.8	107
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.54 J	0.92	0.71	0.58 J	0.7 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.27 U	0.31 U	0.25 U	0.28 U	0.73 U
Calcium	MG/KG	293000	100%	121000	3	60	60	50300	5140	31800	45200	2870
Chromium	MG/KG	32.7	100%	29.6	3	60	60	19.6	21.5	23.5	17.8	17.6
Cobalt	MG/KG	29.1	100%	30	0	60	60	11.1	10.6	15	11.3	9.9 J
Copper	MG/KG	62.8	100%	33	3	60	60	17.6	16	27.4	14.5	**46.4**
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.53 U	0.6 U	0.53 U	0.51 U	0 NA
Iron	MG/KG	38600	100%	36500	3	60	60	24700	25300	26900	20700	25100
Lead	MG/KG	266	95%	24.8	3	57	60	11.7 R	13.8	11.6	11.7	**266**
Magnesium	MG/KG	29100	100%	21500	2	57	57	12600	3750	6640	5220	3330
Manganese	MG/KG	2380	93%	1060	3	55	59	404	934	508	556	547
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.02 U	0.03 J	0.01 U	0.01 U	0.05 J
Nickel	MG/KG	62.3	98%	49	3	59	60	33.1	22.7	41.9	33	19.1
Potassium	MG/KG	3160	100%	2380	4	60	60	1270	1330	1120	1000	628 J
Selenium	MG/KG	1.7	40%	2	0	24	60	0.51 J	1.2	0.11 J	0.24 J	0.25 UJ
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.54 U	0.62 U	0.49 U	0.56 U	1.5 U
Sodium	MG/KG	269	83%	172	3	50	60	134 J	61.9 J	116 J	141 J	46.2 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.64 J	0.18 U	0.14 U	0.23 U	0.28 UJ
Vanadium	MG/KG	32.7	100%	150	0	60	60	16.3	29.9	18.5	13.8	23.1
Zinc	MG/KG	126	93%	110	3	56	60	45.8	62.5	64.7	39.3	93.4

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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB17-1-2 VALUE (Q)	SB17-1-3 VALUE (Q)	SB26-1-1 VALUE (Q)	SB26-1-2 VALUE (Q)	SB4-1-1 VALUE (Q)
SAMPLE DATE:								12/01/93	12/01/93	11/17/93	11/17/93	12/06/93
Aluminum	MG/KG	21000	100%	19300	4	60	60	18100	8700	5560	9040	14800
Antimony	MG/KG	6.8	20%	5.9	3	12	60	11.8 UJ	9 UJ	7.3 UJ	6.7 UJ	4.8 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	5.2	3.4	3.2	5.3	6.2
Barium	MG/KG	159	100%	300	0	60	60	114	59.4	73.2	43.7	72
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.9 J	0.42 J	0.35 J	0.41 J	0.73 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.74 U	0.56 U	0.46 U	0.42 U	0.47 U
Calcium	MG/KG	293000	100%	121000	3	60	60	20900	72800	**293000**	47300	4280
Chromium	MG/KG	32.7	100%	29.6	3	60	60	25.1	13.9	10.3	15.7	23.2
Cobalt	MG/KG	29.1	100%	30	0	60	60	13.3	8.8	5.9 J	9.5	11.3
Copper	MG/KG	62.8	100%	33	3	60	60	26.9	20	9.7	14.3	14.1
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0 NA	0 NA	0.48 U	0.57 U	0.52 U
Iron	MG/KG	38600	100%	36500	3	60	60	29900	18800	8770	19100	27500
Lead	MG/KG	266	95%	24.8	3	57	60	11.4 J	7.5 J	6.33	8.5	17.7 J
Magnesium	MG/KG	29100	100%	21500	2	57	57	8490	18100	**29100**	9160	4270
Manganese	MG/KG	2380	93%	1060	3	55	59	487	391	309	551	615 JR
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.06 J	0.03 UJ	0.02 U	0.02 U	0.05 J
Nickel	MG/KG	62.3	98%	49	3	59	60	42	25.2	31.6 R	23.9	27.8
Potassium	MG/KG	3160	100%	2380	4	60	60	1560	1090	1710	901	1250
Selenium	MG/KG	1.7	40%	2	0	24	60	0.24 UJ	0.14 UJ	0.13 UJ	0.26 J	0.4 J
Silver	MG/KG	0.87	4%	0.75	1	2	57	1.5 U	1.1 U	0.92 UJ	0.85 UJ	0.93 U
Sodium	MG/KG	269	83%	172	3	50	60	74.6 J	137 J	**192** J	108 J	43.8 U
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.26 UJ	0.15 UJ	0.73 U	0.17 U	0.23 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	27	13.9	12.7	14.4	28.6
Zinc	MG/KG	126	93%	110	3	56	60	80.2	57.1	283 R	90.6	79.6

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TABLE U-1
BACKGROUND SOILS DATA

Decision Document - Mini Risk Assessments
Seneca Army Depot Activity

METALs	UNIT	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	TAGM VALUE	NUMBER ABOVE TAGM	NUMBER OF DETECTS	NUMBER OF ANALYSES	SB4-1-10 VALUE (Q)	SB4-pair VALUE (Q)	SB4-1-2 VALUE (Q)	SB4-1-3 VALUE (Q)	TP57-11 VALUE (Q)
SAMPLE DATE:								12/06/93	12/06/93	12/06/93	12/06/93	11/08/93
Aluminum	MG/KG	21000	100%	19300	4	60	60	**21000**	17900	15300	19200	14600
Antimony	MG/KG	6.8	20%	5.9	3	12	60	3.8 UJ	2.15 UJ	5 UJ	2.8 UJ	11.3 UJ
Arsenic	MG/KG	21.5	93%	8.2	3	56	60	4.2	5.2	3.9	**21.5**	5.9
Barium	MG/KG	159	100%	300	0	60	60	97.7	84.85	40.4 J	81.2	120
Beryllium	MG/KG	1.4	100%	1.1	2	60	60	0.64 J	0.685 J	0.74 J	1	0.81 J
Cadmium	MG/KG	2.9	35%	2.3	3	21	60	0.37 U	0.21 U	0.49 U	0.27 U	0.71 U
Calcium	MG/KG	293000	100%	121000	3	60	60	2460	3370	30900	14400	22300
Chromium	MG/KG	32.7	100%	29.6	3	60	60	27.9	25.55	27.6	**32.7**	20.1
Cobalt	MG/KG	29.1	100%	30	0	60	60	5.9 J	8.6 J	16.5	29.1	8.8 J
Copper	MG/KG	62.8	100%	33	3	60	60	15.1	14.6	**62.8**	21.6	21.7
Cyanide	MG/KG	0.3825	2%	0.35	1	1	53	0.53 U	0.2625 U	0.53 U	0.47 U	0.54 U
Iron	MG/KG	38600	100%	36500	3	60	60	19500	23500	34300	**37900**	24900
Lead	MG/KG	266	95%	24.8	3	57	60	9.8 J	13.75 J	7.5 J	9.1 J	11.3
Magnesium	MG/KG	29100	100%	21500	2	57	57	4460	4365	7130	8040	5360
Manganese	MG/KG	2380	93%	1060	3	55	59	119 JR		337 R	0	329
Mercury	MG/KG	0.13	73%	0.1	2	44	60	0.04 J	0.045 J	0.04 J	0.04 J	0.04 J
Nickel	MG/KG	62.3	98%	49	3	59	60	25.1	26.45 J	47.6	**62.3**	25.7
Potassium	MG/KG	3160	100%	2380	4	60	60	**2490**	1870	1300	2030	1430
Selenium	MG/KG	1.7	40%	2	0	24	60	0.23 J	0.315 J	0.09 U	0.14 U	0.46 J
Silver	MG/KG	0.87	4%	0.75	1	2	57	0.74 U	0.4175 U	0.98 U	0.64 J	1.4 UJ
Sodium	MG/KG	269	83%	172	3	50	60	39.2 J	30.55 J	105 J	91.6 J	93 J
Thallium	MG/KG	1.2	18%	0.7	4	10	57	0.23 U	0.115 U	0.16 U	0.24 U	0.17 U
Vanadium	MG/KG	32.7	100%	150	0	60	60	31	29.8	22.2	29.3	27.8
Zinc	MG/KG	126	93%	110	3	56	60	72.1	75.85	102	**115**	57.9

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TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								3Q93	RI PHASE1	ESI	ESI	ESI	ROUND1
LOC ID:								MW-35	MW-35	MW11-1	MW13-1	MW13-6	MW16-1
QC CODE:								SA	SA	SA	SA	SA	SA
SAMP. DETH TOP:								NONE	NONE	NONE	NONE	NONE	3.3
SAMP. DEPTH BOT:								NONE	NONE	NONE	NONE	NONE	5.3
MATRIX:								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMP. ID:								5OB3Q93M	MW-35GW	MW11-1-1	MW13-1-1	MW13-6-1	16101
PARAMETER	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	207	7550 J	53.7 J	42400	2810	1850
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	16.8 U	55.5 U	21.4 U	33.9 J	52.7 J	2 U
Arsenic	UG/L	10	13%	10 (c)	0	4	31	1 B	3.5 U	0.8 U	9.3 J	1.4 U	2.7 U
Barium	UG/L	337	94%	1000 (b)	0	29	31	97.3 B	103 J	25.2 J	337	34.3 J	74.2
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.3 U	1.8 R	0.4 U	2.2 J	0.4 U	0.23
Cadmium	UG/L	0	0%	5 (b)	0	0	31	2.4 U	2.9 U	2.1 U	2.1 U	2.1 U	0.3 U
Calcium	UG/L	181000	100%		0	31	31	108000	94700	97500	181000	81500	157000
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	3.3 U	15.3 R	2.6 U	69.4	6.1 J	2.7
Cobalt	UG/L	34.6	45%		0	14	31	2.7 U	19.9 J	4.4 U	34.6 J	4.4 U	2.1
Copper	UG/L	32.5	48%	200 (b)	0	15	31	2.1 U	14.4 U	3.1 U	23.3 J	3.1 U	4.9
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	2.8 B	10 UJ	5 U	5 U	5 U	5 U
Iron	UG/L	69400	100%	300 (b)	22	31	31	321	10500	41.4 J	69400	4550	2400 J
Lead	UG/L	34.8	32%	25 (b)	1	10	31	2.8 B	3.3	1.1 J	34.8	1.5 J	1.7 U
Magnesium	UG/L	58200	100%		0	31	31	15600	14600	29700	50300	51500	23300
Manganese	UG/L	1120	97%	50 (a)	22	30	31	23.4	557 J	278	1120	376	210
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.1 U	0.18 R	0.04 U	0.05 J	0.04 U	0.1 U
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	8.3 U	15.9 U	4 U	99.8	8.6 J	4.7
Potassium	UG/L	10200	94%		0	29	31	1400 B	4180 J	7100	10100	6780 J	1670
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	1.2 B	1.1 J	0.7 U	3.6 J	2.3 J	2.4 U
Silver	UG/L	0.98	6%	50 (b)	0	2	31	2.6 U	9 U	4.2 U	4.2 U	4.2 U	1.3 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	13400	44100	4860 J	9350	7880	8750
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	1.2 U	3.2 U	1.2 U	1.2 U	1.2 U	4.2 U
Vanadium	UG/L	70.8	52%		0	16	31	3 U	30.3 U	3.7 U	70.8	5.9 J	3.3
Zinc	UG/L	143	84%	5000 (a)	0	26	31	72.7	58.2	21.4	143	50.6	15.6 R

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
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TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								I ROUND2	I ROUND1	I ROUND2	I ROUND1	I ROUND2	ESI
LOC ID:								MW16-1	MW17-1	MW17-1	MW25-6	MW25-6	MW26-1
QC CODE:								SA	SA	SA	SA	SA	SA
SAMP. DETH TOP:								731.5	3.4	731.1	NONE	NONE	NONE
SAMP. DEPTH BOT:								728.4	7.4	727.1	NONE	NONE	NONE
MATRIX:								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMP ID:								16152	16108	16171	MW25-6	25008	MW26-1-1
PARAMETER	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	143 U	90.4	386	162	529	188 J
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	3 U	2 U	3 U	2.2 U	2.3 U	21.5 U
Arsenic	UG/L	10	13%	10 (c)	0	4	31	4.4 U	2.7 U	4.4 U	2.1 U	3.5 U	0.8 U
Barium	UG/L	337	94%	1000 (b)	0	29	31	48.2 U	85	90.4 U	85.6	72.3	31.9 J
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.2 U	0.26	0.2 U	0.27 U	0.13 U	0.4 U
Cadmium	UG/L	0	0%	5 (b)	0	0	31	0.6 U	0.3 U	0.6 U	0.3 U	0.32 U	2.1 U
Calcium	UG/L	181000	100%		0	31	31	116000	108000	104000	133000	118000	115000
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	1 U	1 U	1 U	2.2	1.3 U	2.6 U
Cobalt	UG/L	34.6	45%		0	14	31	1.3 U	1.2 U	2 U	1.3	1.1 U	4.4 U
Copper	UG/L	32.5	48%	200 (b)	0	15	31	1.9 U	3.1	1.1 U	0.99	1.1	3.1 U
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U
Iron	UG/L	69400	100%	300 (b)	22	31	31	296	119	572 J	308	623	286
Lead	UG/L	34.8	32%	25 (b)	1	10	31	1.5 U	1.7 U	1.5 U	4.4	1.1 U	0.5 U
Magnesium	UG/L	58200	100%		0	31	31	17600	22600	22900	35900	32900	16700
Manganese	UG/L	1120	97%	50 (a)	22	30	31	64.2	21.3	9.7 U	56	22	529
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.05 J
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	2.5 U	1.8	2.5 U	2.6	1.7 U	4 U
Potassium	UG/L	10200	94%		0	29	31	998 U	472	843 U	1840 J	1420	10200
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	4.7 UJ	2.4 U	4.7 UJ	3.7 U	3.4 U	0.7 U
Silver	UG/L	0.98	6%	50 (b)	0	2	31	1.5 U	1.3 U	1.5 U	0.8 U	1.1 U	4.2 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	3870 U	9290	8190	20400 J	16500	30300
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	5.9 U	4.4	4.1 U	3 U	3.5 U	1.2 U
Vanadium	UG/L	70.8	52%		0	16	31	1.6 U	1.2 U	1.6 U	1.4	1.2 U	3.7 U
Zinc	UG/L	143	84%	5000 (a)	0	26	31	5.8 U	2.5 R	14.4 U	7.5	2.2	26.7

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								I ROUND1	I ROUND2	ESI	ESI	ESI	ESI
LOC ID:								MW26-1	MW26-1	MW4-1	MW44A-1	MW44B-1	MW57-1
QC CODE:								SA	SA	SA	SA	SA	SA
SAMP. DETH TOP:								NONE	NONE	NONE	NONE	NONE	NONE
SAMP. DEPTH BOT:								NONE	NONE	NONE	NONE	NONE	NONE
MATRIX:								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMP ID:								MW26-1	26001	MW4-1-1	MW44A-1-1	MW44B-1-1	MW57-1-1
PARAMETER	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	457	38.7	41.9 U	69 J	288 J	4200
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	2.2 U	1.4	21.6 U	1.3 U	1.3 U	44.7 J
Arsenic	UG/L	10	13%	10 (c)	0	4	31	2.1 U	4 U	2.2 J	2 U	2 U	1.4 U
Barium	UG/L	337	94%	1000 (b)	0	29	31	33.2	29.9	19.6 J	102 J	72.6 J	36.5 J
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.27 U	0.1 U	0.4 U	0.1 U	0.1 U	0.4 U
Cadmium	UG/L	0	0%	5 (b)	0	0	31	0.3 U	0.3 U	2.1 U	0.2 U	0.2 U	2.1 U
Calcium	UG/L	181000	100%		0	31	31	121000	110000	137000	92200	120000	82000
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	4.7	0.73	2.6 U	0.4 U	0.4 U	7.7 J
Cobalt	UG/L	34.6	45%		0	14	31	1.1	0.9 U	4.6 J	0.5 U	0.91 J	4.4 U
Copper	UG/L	32.5	48%	200 (b)	0	15	31	5.7	1 U	3.1 U	0.5 U	0.5 U	3.1 U
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	5 U	5 U	5 U	5 U	5 U	5 U
Iron	UG/L	69400	100%	300 (b)	22	31	31	867	58.4 J	332	114 J	666	6360
Lead	UG/L	34.8	32%	25 (b)	1	10	31	7.8	1.9 U	0.5 U	0.9 U	0.9 U	2.1 J
Magnesium	UG/L	58200	100%		0	31	31	16600	15500	57600	19000	31800	11400
Manganese	UG/L	1120	97%	50 (a)	22	30	31	27.5	2.5	346	18.2	219	245
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.02 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	6.2	1.6 U	4 U	0.7 U	0.73 J	8.2 J
Potassium	UG/L	10200	94%		0	29	31	3620	3860 J	7380	1050 J	2150 J	3860 J
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	3.7 U	3.4 U	2.1 J	2.7 U	2.7 U	0.69 U
Silver	UG/L	0.98	6%	50 (b)	0	2	31	0.8 U	1.3 U	4.2 U	0.5 U	0.68 J	4.2 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	24600	34800	11700	2310 J	7190	4080 J
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	4.3	4.7 U	1.2 U	1.9 U	4.7 J	1.2 U
Vanadium	UG/L	70.8	52%		0	16	31	1.3 J	1.1 U	3.7 U	0.5 U	0.5 U	7.6 J
Zinc	UG/L	143	84%	5000 (a)	0	26	31	20.5	3.1 J	19.1 J	3.8 J	2.2 U	57.4

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
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R = The data was rejected during the data validation process.

TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								ESI	ESI	ESI	ESI	ESI	RI PHASE2
LOC ID:								MW58-1	MW64A-1	MW64B-1	MW64C-9	MW64D-1	PT-10
QC CODE:								SA	SA	SA	SA	SA	SA
SAMP. DETH TOP:								NONE	NONE	NONE	NONE	NONE	NONE
SAMP. DEPTH BOT:								NONE	NONE	NONE	NONE	NONE	NONE
MATRIX:								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMP ID:								MW58-1-1	W64A-1-1G	W64B-1-1G	MW64C-9-1	MW64D-1-1	PT10GW1
PARAMETER	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	440	398	198 J	38.2 J	177 J	72 U
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	49.5 UJ
Arsenic	UG/L	10	13%	10 (c)	0	4	31	2 U	2 U	2 U	2 U	2 U	1.4 UJ
Barium	UG/L	337	94%	1000 (b)	0	29	31	71.9 J	42 J	104 J	20.4 J	88.6 J	193 J
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.89 U
Cadmium	UG/L	0	0%	5 (b)	0	0	31	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2.8 U
Calcium	UG/L	181000	100%		0	31	31	113000	109000	138000	121000	142000	79100
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	0.82 J	0.49 J	0.41 J	0.4 U	0.4 U	2.7 UJ
Cobalt	UG/L	34.6	45%		0	14	31	0.64 J	0.5 U	1.1 J	0.5 U	0.69 J	5.4 U
Copper	UG/L	32.5	48%	200 (b)	0	15	31	1.5 J	0.61 J	1 J	0.55 J	0.5 U	4.7 U
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	5 U	5 U	5 U	5 U	5 U	10 UJ
Iron	UG/L	69400	100%	300 (b)	22	31	31	678	773 J	400	681	440	85.6 J
Lead	UG/L	34.8	32%	25 (b)	1	10	31	0.89 U	0.89 U	0.9 U	0.9 U	0.9 U	0.79 U
Magnesium	UG/L	58200	100%		0	31	31	17300	16800	45600	49400	14800	34200
Manganese	UG/L	1120	97%	50 (a)	22	30	31	84	28.3	98.9	96	223	124
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.04 U	0.04 J	0.04 U	0.04 U	0.04 U	0.09 UJ
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	1.6 J	1 J	1.4 J	1.2 J	1.4 J	7.4 UJ
Potassium	UG/L	10200	94%		0	29	31	1460 J	1790 J	4780 J	1670 J	3340 J	2870 J
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	2.7 U	2.7 U	2.7 U	2.7 U	2.7 U	0.99 UJ
Silver	UG/L	0.98	6%	50 (b)	0	2	31	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5.4 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	4180 J	2180 J	8140	6420	12300	41100
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	1.9 U	1.9 U	1.9 U	1.9 U	2.2 J	
Vanadium	UG/L	70.8	52%		0	16	31	0.81 J	1.3 J	0.73 J	0.61 J	0.69 J	6.7 UJ
Zinc	UG/L	143	84%	5000 (a)	0	26	31	7.1 J	3.9 J	3.9 J	3.9 J	3.8 J	8.8 J

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								ESI	UARTERLY	ESI	ESI	ESI	ESI
LOC ID:								MW24-1	MW45-4	MW60-1	MW62-1	MW63-1	MW67-1
QC CODE:								SA	SA	SA	SA	SA	SA
SAMP. DETH TOP:								NONE	NONE	NONE	NONE	NONE	NONE
SAMP. DEPTH BOT:								NONE	NONE	NONE	NONE	NONE	NONE
MATRIX:								GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER	GROUND WATER
SAMP ID:								MW24-1	OB108	MW60-1	MW62-1	MW63-1	MW67-2
PARAMETER	UNIT	MAXIMUM	FREQUENCY OF DETECTION	CRITERIA LEVEL	NUMBER ABOVE CRITERIA	NUMBER OF DETECTS	NUMBER OF ANALYSES	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	19100	36.8 U	348	499	747	1240
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	21.5 U	2.8 U	1.3 U	1.3 U	1.3 U	1.3 U
Arsenic	UG/L	10	13%	10 (c)	0	4	31	10	3.6 U	2 U	2 U	2 U	2 U
Barium	UG/L	337	94%	1000 (b)	0	29	31	156 J	23.4	88.7 J	68.1 J	72.6 J	100 J
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.89 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium	UG/L	0	0%	5 (b)	0	0	31	2.1 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	UG/L	181000	100%		0	31	31	180000	112000	95100	91700	89400	119000
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	29.8	1.3 U	0.56 J	1.4 J	1.1 J	2 J
Cobalt	UG/L	34.6	45%		0	14	31	18.7 J	1.4 U	0.5 U	2.5 J	6.2 J	1.4 J
Copper	UG/L	32.5	48%	200 (b)	0	15	31	32.5	1.5	0.5 U	0.54 J	2.1 J	1.5 J
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	5 U		5 U	5 UJ	5 U	5 U
Iron	UG/L	69400	100%	300 (b)	22	31	31	32000	62.8	1290	797 J	1260	2270
Lead	UG/L	34.8	32%	25 (b)	1	10	31	7	2 U	0.9 U	0.89 U	1.1 J	0.9 U
Magnesium	UG/L	58200	100%		0	31	31	39800	24200	31100	58200	16400	24200
Manganese	UG/L	1120	97%	50 (a)	22	30	31	712	5 J	377	271	548	153
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.06 J	0.2 U	0.05 J	0.05 J	0.04 U	0.04 U
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	41.4	2.2	0.7 U	3.9 J	9.7 J	2.9 J
Potassium	UG/L	10200	94%		0	29	31	9220	2180	8760	7470 J	3870 J	1870 J
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	2.5 J	3.1 U	2.7 U	2.7 U	2.7 U	2.7 U
Silver	UG/L	0.98	6%	50 (b)	0	2	31	4.2 U	0.98	0.5 U	0.5 U	0.5 U	0.5 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	5950	10600	59400	18100	5710	13700
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	1.2 U	4 U	1.9 U	1.9 U	1.9 U	1.9 U
Vanadium	UG/L	70.8	52%		0	16	31	30.9 J	1.2 U	1 J	1.8 J	1.5 J	2.1 J
Zinc	UG/L	143	84%	5000 (a)	0	26	31	107	6.8	6.9 J	4.2 J	7.1 J	6.5 J

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

TABLE U-2
BACKGROUND GROUND WATER DATA

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

STUDY ID:								ESI
LOC ID:								MW70-1
QC CODE:								SA
SAMP. DETH TOP:								NONE
SAMP. DEPTH BOT:								NONE
MATRIX:								GROUND WATER
SAMP ID:			FREQUENCY		NUMBER	NUMBER	NUMBER	MW70-1
			OF	CRITERIA	ABOVE	OF	OF	
PARAMETER	UNIT	MAXIMUM	DETECTION	LEVEL	CRITERIA	DETECTS	ANALYSES	VALUE (Q)
Aluminum	UG/L	42400	87%	50 (a)	25	27	31	88.2 J
Antimony	UG/L	52.7	13%	3 (b)	3	4	31	1.3 U
Arsenic	UG/L	10	13%	10 (c)	0	4	31	2 U
Barium	UG/L	337	94%	1000 (b)	0	29	31	86.5 J
Beryllium	UG/L	2.2	13%	4 (c)	0	4	31	0.1 U
Cadmium	UG/L	0	0%	5 (b)	0	0	31	0.2 U
Calcium	UG/L	181000	100%		0	31	31	119000
Chromium	UG/L	69.4	48%	50 (b)	1	15	31	0.4 U
Cobalt	UG/L	34.6	45%		0	14	31	0.5 U
Copper	UG/L	32.5	48%	200 (b)	0	15	31	0.5 U
Cyanide	UG/L	2.8	3%	100 (b)	0	1	31	5 U
Iron	UG/L	69400	100%	300 (b)	22	31	31	213
Lead	UG/L	34.8	32%	25 (b)	1	10	31	0.9 U
Magnesium	UG/L	58200	100%		0	31	31	28100
Manganese	UG/L	1120	97%	50 (a)	22	30	31	107
Mercury	UG/L	0.06	23%	0.7 (b)	0	7	31	0.06 J
Nickel	UG/L	99.8	61%	100 (b)	0	19	31	1.5 J
Potassium	UG/L	10200	94%		0	29	31	1540 J
Selenium	UG/L	3.6	19%	10 (b)	0	6	31	2.7 U
Silver	UG/L	0.98	6%	50 (b)	0	2	31	0.5 U
Sodium	UG/L	59400	97%	20000 (b)	7	30	31	5220
Thallium	UG/L	4.7	13%	2 (c)	4	4	31	1.9 U
Vanadium	UG/L	70.8	52%		0	16	31	0.5 U
Zinc	UG/L	143	84%	5000 (a)	0	26	31	3.5 J

Notes
a) Secondary Drinking Water Regulations
b) NYS GA Groundwater Standard
c) Maximum Contaminant Level
U = The compound was not detected below this concentration.
J = The reported value is an estimated concentration.
UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
R = The data was rejected during the data validation process.

APPENDIX V
Residential Scenario

Table V-1: Summary of Residential Exposure Pathways
Table V-2: Exposure Factor Assumptions for Residential Scenario
Table V-3: Summary of Residential Risk

SEAD-9

Table V9-1: Ambient Air Exposure Point Concentrations – SEAD-9
Table V9-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-9
Table V9-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-9
Table V9-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-9
Table V9-5: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) – SEAD-9
Table V9-6: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-9
Table V9-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-9

SEAD-27

Table V27-1: Calculation of Air Concentration from Volatilization of Groundwater – SEAD-27
Table V27-2: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) – SEAD-27
Table V27-3: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-27
Table V27-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-27

SEAD-58

Table V58-1: Ambient Air Exposure Point Concentrations – SEAD-58
Table V58-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-58
Table V58-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-58
Table V58-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-58

SEAD-64A

Table V64A-1: Ambient Air Exposure Point Concentrations – SEAD-64A
Table V64A-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-64A
Table V64A-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-64A
Table V64A-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-64A
Table V64A-5: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) – SEAD-64A
Table V64A-6: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-64A
Table V64A-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-64A

SEAD-64B

Table V64B-1: Ambient Air Exposure Point Concentrations – SEAD-64B
Table V64B-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-64B
Table V64B-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-64B
Table V64B-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-64B

SEAD-64C

Table V64C-1: Ambient Air Exposure Point Concentrations – SEAD-64C
Table V64C-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-64C
Table V64C-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-64C
Table V64C-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-64C
Table V64C-5: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) – SEAD-64C
Table V64C-6: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-64C
Table V64C-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-64C

SEAD-64D

Table V64D-1: Ambient Air Exposure Point Concentrations – SEAD-64D
Table V64D-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-64D
Table V64D-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-64D
Table V64D-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-64D
Table V64D-5: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) –

SEAD-64D
Table V64D-6: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-64D
Table V64D-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-64D

SEAD-66

Table V66-1: Ambient Air Exposure Point Concentrations – SEAD-66
Table V66-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-66
Table V66-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-66
Table V66-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-66

SEAD-68

Table V68-1: Ambient Air Exposure Point Concentrations – SEAD-68
Table V68-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-68
Table V68-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-68
Table V68-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-68

SEAD-70

Table V70-1: Ambient Air Exposure Point Concentrations – SEAD-70
Table V70-2: Calculation of Intake and Risk from the Inhalation of Dust in Ambient Air – SEAD-70
Table V70-3: Calculation of Intake and Risk from the Ingestion of Soil – SEAD-70
Table V70-4: Calculation of Absorbed Dose and Risk from Dermal Contact to Soil – SEAD-70
Table V70-5: Calculation of Intake and Risk from Inhalation of Groundwater (while showering) – SEAD-70
Table V70-6: Calculation of Intake and Risk from the Ingestion of Groundwater – SEAD-70
Table V70-7: Calculation of Absorbed Dose and Risk from Dermal Contact to Groundwater (while showering) – SEAD-70

TABLE V-1
SUMMARY OF RESIDENTIAL EXPOSURE PATHWAYS
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

	RESIDENTIAL PATHWAY					
	Inhalation of Dust in Ambient Air	**Ingestion of Soil**	**Dermal Contact of Soil**	**Inhalation of Groundwater**	**Ingestion of Groundwater**	**Dermal Contact of Groundwater**
SEAD-9	X	X	X	NQ	NQ	NQ
SEAD-27	NA	NA	NA	X	X	X
SEAD-28	NA	NA	NA	ND	ND	ND
SEAD-32	NA	NA	NA	NA	NA	NA
SEAD-33	NA	NA	NA	ND	ND	ND
SEAD-34	NA	NA	NA	NA	NA	NA
SEAD-58	X	X	NQ	NA	NA	NA
SEAD-64A	X	X	NQ	NQ	X	X
SEAD-64B	X	X	NQ	NA	NA	NA
SEAD-64C	X	X	NQ	NQ	X	X
SEAD-64D	X	X	NQ	NQ	X	X
SEAD-66	X	X	X	NA	NA	NA
SEAD-68	X	X	X	ND	ND	ND
SEAD-70	X	X	X	NQ	X	X

Notes:
X = Pathway considered
ND = Pathway not considered due to lack of data.
NA = Pathway not applicable because there were no detections in data analyzed or because site levels were less than background levels.
NQ = Not quantified due to lack of toxicity data.
Dermal contact to surface water and sediment was assumed not to contribute a significant risk to the residential scenario and was therefore, not considered.
The residential scenario was evaluated at all areas where the future land use has only been potentially determined. For the prison areas, the future land use is definite, therefore, the residential scenario was not applicable.

TABLE V-2
EXPOSURE FACTOR ASSUMPTIONS FOR RESIDENTIAL SCENARIO
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME		BASIS	SOURCE
			VALUE	UNITS		
RESIDENT (ADULT)	**Inhalation of Dust in Ambient Air**	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Inhalation Rate	20	m3/day	Assumed inhalation rate for adult receptors.	USEPA, 1991, 1993.
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Ingestion Rate	100	mg soil/day	Average residential adult exposure to indoor and outdoor dirt and dust.	USEPA, 1991, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	5,800	cm2	Upper bound adult skin surface exposed to soils.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992.
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Inhalation of Groundwater	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Inhalation Rate	0.13	m3/day	Inhalation rate for sedentary adults, 0.5m3/hr for 15 minutes.	USEPA, 1997.
		Exposure Frequency	3.65	days/yr	Showers 15 min/day, 350 days/yr.	BPJ.
		Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Ingestion Rate	2	liter/day	90th percentile for adult residents.	USEPA, 1989.
		Exposure Frequency	350	days/yr	Assumes year round exposure to gw and vacation from home for 2 wks/yr.	BPJ.
		Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Groundwater	Body Weight	70	kg	Standard reference weight for adult males.	USEPA, 1991.
		Skin Contact Surface Area	23,000	cm2	Upper bound total skin surface area for adults.	USEPA, 1992.
		Exposure Time	0.25	hours/day	Upper bound of time spent in shower (15 minutes).	USEPA, 1992.
		Exposure Frequency	350	days/yr	Assumes year round exposure to gw and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	24	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	8,760	days	24 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	

TABLE V-2
EXPOSURE FACTOR ASSUMPTIONS FOR RESIDENTIAL SCENARIO
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RECEPTOR	EXPOSURE ROUTE	PARAMETER	RME VALUE	RME UNITS	BASIS	SOURCE
RESIDENT (CHILD)	**Inhalation of Dust in Ambient Air**	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991 1993.
		Inhalation Rate	8.7	m3/day	Average inhalation rate for a child 1-12 years old.	USEPA, 1997.
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
	(Air EPC Calculated from Surface Soil Only)	Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Soil	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Ingestion Rate	200	mg soil/day	Maximum IR for a child.	USEPA, 1993.
	(Soil EPC Calculated from Surface Soil Only)	Fraction Ingested	1	(unitless)	100% ingestion, conservative assumption.	BPJ.
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Soil	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Absorption Factor	Compound	Specific		
	(Soil EPC Calculated from Surface Soil Only)	Skin Contact Surface Area	2,300	cm2	Upper bound child skin surface exposed to soil.	USEPA, 1992.
		Soil to Skin Adherence Factor	1	mg/cm2	Upper bound soil to skin adherence factor.	USEPA, 1992
		Exposure Frequency	350	days/yr	Assumes year round exposure to soil and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Inhalation of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Inhalation Rate	0.08	m3/day	Inhalation rate for sedentary children ages 3-10, 0.3 m3/hr for 15 minutes.	USEPA, 1997.
		Exposure Frequency	3.65	days/yr	Showers 15 min/day, 350 days/yr.	BPJ.
		Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Ingestion of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Ingestion Rate	1	liter/day	Approximate 90th percentile value for children 1-11 years old.	USEPA, 1997.
		Exposure Frequency	350	days/yr	Assumes year round exposure to gw and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.
	Dermal Contact of Groundwater	Body Weight	15	kg	Standard reference weight for children less than 6 years old.	USEPA, 1991, 1993.
		Skin Contact Surface Area	9,180	cm2	Upper bound skin surface area for children.	USEPA, 1992.
		Exposure Time	0.25	hours/day	Upper bound bathing duration.	USEPA, 1992.
		Exposure Frequency	350	days/yr	Assumes year round exposure to gw and vacation from home for 2 wks/yr.	USEPA, 1991.
		Exposure Duration	6	years	Upper bound time in 1 residence: 6 years as a child, 24 years as an adult.	USEPA, 1991, 1993.
		Averaging Time - Nc	2,190	days	6 years.	USEPA, 1989.
		Averaging Time - Car	25,550	days	70 years, conventional human life span.	USEPA, 1989.

Notes:
RME = Reasonable Maximum Exposure
Car = Carcinogenic
Nc = Non-carcinogenic

Source References:
- BPJ: Best Professional Judgement.
- USEPA, 1988: Superfund Exposure Assessment Manual
- USEPA, 1989: Risk Assessment Guidance for Superfund, Volume I (RAGS)
- USEPA, 1991: Supplemental Guidance, Standard Default Exposure Factors
- USEPA, 1992: Dermal Exposure Assessment, Principles and Applications
- USEPA, 1993: Superfund's Standard Default Exposure for the Central Tendency and Reasonable Maximum Exposure
- USEPA, 1997: Exposure Factors Handbook, Update to 1990 handbook

TABLE V-3
SUMMARY OF RESIDENTIAL RISK
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

RESIDENTIAL PATHWAY

	Inhalation of Dust in Ambient Air			Ingestion of Soil			Dermal Contact of Soil			Inhalation of Groundwater			Ingestion of Groundwater			Dermal Contact of Groundwater			TOTALS		
	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk	Adult HQ	Child HQ	Cancer Risk
SEAD-9	6E-06	1E-05	4E-10	1E-02	1E-01	2E-05	4E-02	7E-02	7E-07	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	NQ	5E-02	2E-01	2E-05
SEAD-27	NA	NA	NA	NA	NA	NA	NA	NA	NA	7E-07	5E-07	1E-07	2E+00	5E+00	2E-05	5E-02	2E+00	1E-06	2E+00	7E+00	2E-05
SEAD-58	3E-10	7E-10	3E-13	2E-05	2E-04	6E-09	NQ	NQ	NQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	2E-05	2E-04	6E-09
SEAD-64A	2E-06	4E-06	4E-10	2E-03	2E-02	1E-04	NQ	NQ	NQ	NQ	NQ	NQ	1E+00	3E+00	NQ	1E-01	2E-01	NQ	1E+00	3E+00	1E-04
SEAD-64B	4E-10	7E-10	3E-11	2E-04	2E-03	5E-07	NQ	NQ	NQ	NA	NA	NA	NA	NA	NA	NA	NA	NA	2E-04	2E-03	5E-07
SEAD-64C	NQ	NQ	2E-10	7E-04	7E-03	2E-07	NQ	NQ	NQ	NQ	NQ	NQ	1E-04	3E-04	NQ	8E-06	1E-05	NQ	9E-04	7E-03	2E-07
SEAD-64D	2E-07	3E-07	1E-14	1E-04	9E-04	2E-06	NQ	NQ	NQ	NQ	NQ	NQ	1E+01	3E+01	NQ	5E-01	1E+00	NQ	1E+01	3E+01	2E-06
SEAD-66	4E-07	8E-07	3E-08	1E-01	1E+00	2E-05	2E-02	4E-02	4E-07	NA	NA	NA	NA	NA	NA	NA	NA	NA	1E-01	1E+00	2E-05
SEAD-68	1E-06	3E-06	2E-10	1E-03	1E-02	1E-05	6E-07	1E-06	1E-09	ND	ND	ND	ND	ND	ND	ND	ND	ND	1E-03	1E-02	1E-05
SEAD-70	NQ	NQ	3E-06	4E-01	4E+00	2E-04	3E-01	5E-01	7E-05	NQ	NQ	NQ	3E-03	7E-03	NQ	1E-05	2E-05	NQ	7E-01	4E+00	3E-04

Notes:
NQ = Not quantified due to lack of toxicity data.
Dermal contact to surface water and sediment was assumed not to contribute a significant risk to the residential scenario and was therefore, not considered.
The residential scenario was evaluated at all areas where the future land use has only been potentially determined. For the prison areas, the future land use is definite, therefore, the residential scenario was not applicable.

SEAD-9

TABLE V9-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = CSsurf x PM10 x CF

Variables:
CSsurf = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM10 = Average Measured PM10 Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)
Volatile Organics		
Toluene	ND	ND
Chlorobenzene	ND	ND
Ethylbenzene	ND	ND
Total Xylenes	ND	ND
Semivolatile Organics		
Naphthalene	3.20E-02	5.44E-10
2-Methylnaphthalene	2.70E-02	4.59E-10
Acenaphthylene	2.90E-02	4.93E-10
Acenaphthene	1.30E-01	2.21E-09
Dibenzofuran	3.90E-02	6.63E-10
Fluorene	8.70E-02	1.48E-09
Phenanthrene	1.20E+00	2.04E-08
Anthracene	2.60E-01	4.42E-09
Carbazole	2.40E-01	4.08E-09
Di-n-butylphthalate	5.60E-02	9.52E-10
Fluoranthene	2.50E+00	4.25E-08
Pyrene	2.40E+00	4.08E-08
Benzo(a)anthracene	1.20E+00	2.04E-08
Chrysene	1.20E+00	2.04E-08
bis(2-Ethylhexyl)phthalate	9.50E-02	1.62E-09
Benzo(b)fluoranthene	0.00E+00	0.00E+00
Benzo(a)pyrene	9.90E-01	1.68E-08
Indeno(1,2,3-cd)pyrene	5.70E-01	9.69E-09
Dibenz(a,h)anthracene	2.90E-01	4.93E-09
Benzo(g,h,i)perylene	4.60E-01	7.82E-09
Benzo(k)fluoranthene	1.10E-01	1.87E-09
Chrysene	1.50E-01	2.55E-09
Dibenz(a,h)anthracene	2.80E-02	4.76E-10
Fluoranthene	3.50E-01	5.95E-09
Indeno(1,2,3-cd)pyrene	6.40E-02	1.09E-09
Phenanthrene	3.30E-01	5.61E-09
Pyrene	3.80E-01	6.46E-09
bis(2-Ethylhexyl)phthalate	4.20E-02	7.14E-10
Pesticides		
delta-BHC	9.40E-04	1.60E-11
gamma-BHC (Lindane)	ND	ND
Heptachlor	ND	ND
Aldrin	2.40E-03	4.08E-11
Heptachlor epoxide	ND	ND
Dieldrin	3.00E-03	5.10E-11
4,4'-DDE	5.50E-02	9.35E-10
4,4'-DDD	1.60E-02	2.72E-10
4,4'-DDT	7.30E-02	1.24E-09
alpha-Chlordane	8.00E-03	1.36E-10
gamma-Chlordane	1.70E-03	2.89E-11
Aroclor-1254	1.40E-01	2.38E-09
Metals		
Lead	8.51E+01	1.45E-06
Mercury	1.00E-01	1.70E-09

ND = Compound was not detected.

TABLE V9-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Toluene	1.14E-01	NA	ND									
Chlorobenzene	5.70E-03	NA	ND									
Ethylbenzene	2.86E-01	NA	ND									
Total Xylenes	NA	NA	ND									
Semivolatile Organics												
Naphthalene	8.60E-04	NA	5.44E-10	1.49E-10		2E-07		3.03E-10		4E-07		
2-Methylnaphthalene	NA	NA	4.59E-10									
Acenaphthylene	NA	NA	4.93E-10									
Acenaphthene	NA	NA	2.21E-09									
Dibenzofuran	NA	NA	6.63E-10									
Fluorene	NA	NA	1.48E-09									
Phenanthrene	NA	NA	2.04E-08									
Anthracene	NA	NA	4.42E-09									
Carbazole	NA	NA	4.08E-09									
Di-n-butylphthalate	NA	NA	9.52E-10									
Fluoranthene	NA	NA	4.25E-08									
Pyrene	NA	NA	4.08E-08									
Benzo(a)anthracene	NA	NA	2.04E-08									
Chrysene	NA	NA	2.04E-08									
bis(2-Ethylhexyl)phthalate	NA	NA	1.62E-09									
Benzo(b)fluoranthene	NA	NA										
Benzo(a)pyrene	NA	NA	1.68E-08									
Indeno(1.2.3-cd)pyrene	NA	NA	9.69E-09									
Dibenz(a.h)anthracene	NA	NA	4.93E-09									
Benzo(ghi)perylene	NA	NA	7.82E-09									
Pesticides												
delta-BHC	NA	NA	1.60E-11									
gamma-BHC (Lindane)	NA	NA	ND									
Heptachlor	NA	4.55E+00	ND									
Aldrin	NA	1.72E+01	4.08E-11		3.83E-12		7E-11		1.94E-12		3E-11	1E-10
Heptachlor epoxide	NA	9.10E+00	ND									
Dieldrin	NA	1.61E+01	5.10E-11		4.79E-12		8E-11		2.43E-12		4E-11	1E-10
4,4'-DDE	NA	NA	9.35E-10									
4,4'-DDD	NA	NA	2.72E-10									
4,4'-DDT	NA	3.40E-01	1.24E-09		1.17E-10		4E-11		5.92E-11		2E-11	6E-11
alpha-Chlordane	2.00E-04	3.50E-01	1.36E-10	3.73E-11	1.28E-11	2E-07	4E-12	7.56E-11	6.48E-12	4E-07	2E-12	7E-12
gamma-Chlordane	2.00E-04	3.50E-01	2.89E-11	7.92E-12	2.71E-12	4E-08	1E-12	1.61E-11	1.38E-12	8E-08	5E-13	1E-12
Aroclor-1254	NA	4.00E-01	2.38E-09		2.24E-10		9E-11		1.13E-10		5E-11	1E-10
Metals												
Lead	NA	NA	1.45E-06									
Mercury	8.57E-05	NA	1.70E-09	4.66E-10		5E-06		9.45E-10		1E-05		
Total Hazard Quotient and Cancer Risk:						**6E-06**				**1E-05**		**4E-10**

Assumptions for Resident (Adult)	
CA =	EPC Surface Only
BW =	70 kg
IR =	20 m3/day
EF =	350 days/year
ED =	24 years
AT (Nc) =	8,760 days
AT (Car) =	25,550 days

Assumptions for Resident (Child)	
CA =	EPC Surface Only
BW =	15 kg
IR =	8.7 m3/day
EF =	350 days/year
ED =	6 years
AT (Nc) =	2,190 days
AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V9-1 for calculation of Air EPCs
NA= Information not available.

TABLE V9-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Toluene	2.00E-01	NA	ND									
Chlorobenzene	2.00E-02	NA	ND									
Ethylbenzene	1.00E-01	NA	ND									
Total Xylenes	2.00E+00	NA	ND									
Semivolatile Organics												
Naphthalene	2.00E-02	NA	3.20E-02	4.38E-08		2E-06		4.09E-07		2E-05		
2-Methylnaphthalene	4.00E-02	NA	2.70E-02	3.70E-08		9E-07		3.45E-07		9E-06		
Acenaphthylene	NA	NA	2.90E-02									
Acenaphthene	6.00E-02	NA	1.30E-01	1.78E-07		3E-06		1.66E-06		3E-05		
Dibenzofuran	NA	NA	3.90E-02									
Fluorene	4.00E-02	NA	8.70E-02	1.19E-07		3E-06		1.11E-06		3E-05		
Phenanthrene	NA	NA	1.20E+00									
Anthracene	3.00E-01	NA	2.60E-01	3.56E-07		1E-06		3.32E-06		1E-05		
Carbazole	NA	2.00E-02	2.40E-01		1.13E-07		2E-09		2.63E-07		5E-09	8E-09
Di-n-butylphthalate	1.00E-01	NA	5.60E-02	7.67E-08		8E-07		7.16E-07		7E-06		
Fluoranthene	4.00E-02	NA	2.50E+00	3.42E-06		9E-05		3.20E-05		8E-04		
Pyrene	3.00E-02	NA	2.40E+00	3.29E-06		1E-04		3.07E-05		1E-03		
Benzo(a)anthracene	NA	7.30E-01	1.20E+00		5.64E-07		4E-07		1.32E-06		1E-06	1E-06
Chrysene	NA	7.30E-03	1.20E+00		5.64E-07		4E-09		1.32E-06		1E-08	1E-08
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	9.50E-02	1.30E-07	1.46E-08	7E-06	6E-10	1.21E-06	1.04E-07	6E-05	1E-09	2E-09
Benzo(b)fluoranthene	NA	7.30E-01	ND									
Benzo(a)pyrene	NA	7.30E+00	9.90E-01		4.65E-07		3E-06		1.08E-06		8E-06	1E-05
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	5.70E-01		2.68E-07		2E-07		6.25E-07		5E-07	7E-07
Dibenz(a,h)anthracene	NA	7.30E+00	2.90E-01		1.36E-07		1E-06		3.18E-07		2E-06	3E-06
Benzo(ghi)perylene	NA	NA	4.60E-01									
Pesticides/PCBs												
delta-BHC	NA	NA	9.40E-04									
gamma-BHC (Lindane)	3.00E-04	1.30E+00	ND									
Heptachlor	5.00E-04	4.50E+00	ND									
Aldrin	3.00E-05	1.70E+01	2.40E-03	3.29E-09	1.13E-09	1E-04	2E-08	3.07E-08	2.63E-09	1E-03	4E-08	6E-08
Heptachlor epoxide	1.30E-05	9.10E+00	ND									
Dieldrin	5.00E-05	1.60E+01	3.00E-03	4.11E-09	1.41E-09	8E-05	2E-08	3.84E-08	3.29E-09	8E-04	5E-08	8E-08
4,4'-DDE	NA	3.40E-01	5.50E-02		2.58E-08		9E-09		6.03E-08		2E-08	3E-08
4,4'-DDD	NA	2.40E-01	1.60E-02		7.51E-09		2E-09		1.75E-08		4E-09	6E-09
4,4'-DDT	5.00E-04	3.40E-01	7.30E-02	1.00E-07	3.43E-08	2E-04	1E-08	9.33E-07	8.00E-08	2E-03	3E-08	4E-08
alpha-Chlordane	5.00E-04	3.50E-01	8.00E-03	1.10E-08	3.76E-09	2E-05	1E-09	1.02E-07	8.77E-09	2E-04	3E-09	4E-09
gamma-Chlordane	5.00E-04	3.50E-01	1.70E-03	2.33E-09	7.98E-10	5E-06	3E-10	2.17E-08	1.86E-09	4E-05	7E-10	9E-10
Aroclor-1254	2.00E-05	2.00E+00	1.40E-01	1.92E-07	6.58E-08	1E-02	1E-07	1.79E-06	1.53E-07	9E-02	3E-07	4E-07
Metals												
Lead	NA	NA	8.51E+01									
Mercury	3.00E-04	NA	1.00E-01	1.37E-07		5E-04		1.28E-06		4E-03		
Total Hazard Quotient and Cancer Risk:						**1E-02**				**1E-01**		**2E-05**

Assumptions for Resident (Adult)

CF =	1E-06 kg/mg
CS =	EPC Surface Only
BW =	70 kg
IR =	100 mg soil/day
FI =	1 unitless
EF =	350 days/year
ED =	24 years
AT (Nc) =	8,760 days
AT (Car) =	25,550 days

Assumptions for Resident (Child)

CF =	1E-06 kg/mg
CS =	EPC Surface Only
BW =	15 kg
IR =	200 mg soil/day
FI =	1 unitless
EF =	350 days/year
ED =	6 years
AT (Nc) =	2,190 days
AT (Car) =	25,550 days

TABLE V9-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD 9
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) =

$$\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD	Carc. Slope Dermal	Absorption Factor*	EPC Surface Soil	Resident (Adult)				Resident (Child)				Resident
					Intake (mg/kg-day)		Hazard Quotient	Contribution to Lifetime Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Contribution to Lifetime Cancer Risk	Total Lifetime Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(unitless)	(mg/kg)	(Nc)	(Car)			(Nc)	(Car)			
Volatile Organics													
Toluene	2.00E-01	NA	NA	ND									
Chlorobenzene	NA	NA	NA	ND									
Ethylbenzene	NA	NA	NA	ND									
Total Xylenes	1.80E+00	NA	NA	ND									
Semivolatile Organics													
Naphthalene	2.00E-02	NA	NA	3.20E-02									
2-Methylnaphthalene	4.00E-02	NA	NA	2.70E-02									
Acenaphthylene	NA	NA	NA	2.90E-02									
Acenaphthene	6.00E-02	NA	NA	1.30E-01									
Dibenzofuran	NA	NA	NA	3.90E-02									
Fluorene	4.00E-02	NA	NA	8.70E-02									
Phenanthrene	NA	NA	NA	1.20E+00									
Anthracene	3.00E-01	NA	NA	2.60E-01									
Carbazole	NA	2.00E-02	NA	2.40E-01									
Di-n-butylphthalate	9.00E-02	NA	NA	5.60E-02									
Fluoranthene	4.00E-02	NA	NA	2.50E+00									
Pyrene	3.00E-02	NA	NA	2.40E+00									
Benzo(a)anthracene	NA	7.30E-01	NA	1.20E+00									
Chrysene	NA	7.30E-03	NA	1.20E+00									
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	9.50E-02									
Benzo(b)fluoranthene	NA	7.30E-01	NA										
Benzo(a)pyrene	NA	1.46E+01	NA	9.90E-01									
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	5.70E-01									
Dibenz(a,h)anthracene	NA	7.30E+00	NA	2.90E-01									
Benzo(ghi)perylene	NA	NA	NA	4.60E-01									
Pesticides/PCBs													
delta-BHC	NA	NA	NA	9.40E-04									
gamma-BHC (Lindane)	3.00E-04	1.80E+00	NA	ND									
Heptachlor	5.00E-04	4.50E+00	NA	ND									
Aldrin	1.50E-05	3.40E+01	NA	2.40E-03									
Heptachlor epoxide	1.30E-05	9.10E+00	NA	ND									
Dieldrin	2.50E-05	3.20E+01	NA	3.00E-03									
4,4'-DDE	NA	1.70E+00	NA	5.50E-02									
4,4'-DDD	NA	1.20E+00	NA	1.60E-02									
4,4'-DDT	1.00E-04	1.70E+00	NA	7.30E-02									
alpha-Chlordane	5.00E-04	3.50E-01	NA	8.00E-03									
gamma-Chlordane	5.00E-04	3.50E-01	NA	1.70E-03									
Aroclor-1254	1.80E-05	2.22E+00	6.00E-02	1.40E-01	6.67E-07	2.29E-07	4E-02	5E-07	1.24E-06	1.06E-07	7E-02	2E-07	7E-07
Metals													
Lead	NA	NA	NA	8.51E+01									
Mercury	3.00E-06	NA	NA	1.00E-01									
Total Hazard Quotient and Cancer Risk:							4E-02				7E-02		7E-07

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	15 kg
SA =	5,800 cm2	SA =	2,300 cm2
AF =	1 mg/cm2	AF =	1 mg/cm2
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

TABLE V9-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V9-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e.oral RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V9-7
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-9

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. dermal RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

SEAD-27

TABLE V27-1
CALCULATION OF AIR CONCENTRATION IN SHOWER
FROM VOLATILIZATION OF GROUNDWATER (DAILY)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Analyte	EPC Air All-Site Wells (mg/m^3)	Time of Shower -Ts (min)	Flow Rate of Shower - Fw (L/min)	EPC - RME Groundwater (mg/l)	Flow Rate of Air in Shower-Fa (m^3/min)	Volume of Bathroom-Vb (m^3)	Henry Laws Constant-H (m^3-atm/mol)	Asymptotic Air Conc.-Cinf (mg/m^3)	Rate Constant-K (L/min)	Efficiency of Release-E (unitless)	Efficiency of Release for TCE E-TCE	Henry Laws Constant-TCE (m^3-atm/mol)	Fraction Emitted* (percent)	Cderm** (Water) (mg/l)
Volatile Organics														
1,1-Dichloroethane	5.89E-02	15	19	3.83E-02	2.4	12	4.31E-03	8.62E-02	0.20	2.84E-01	0.6	0.0091	19.42%	3.09E-02
1,1,2,2-Tetrachloroethane	1.03E-03	15	19	7.60E-03	2.4	12	3.81E-04	1.51E-03	0.20	2.51E-02	0.6	0.0091	1.72%	7.47E-03
Acetone	1.78E-02	15	19	2.00E+00	2.4	12	2.50E-05	2.61E-02	0.20	1.65E-03	0.6	0.0091	0.11%	2.00E+00
Total Xylenes	2.76E-02	15	19	1.10E-02	2.4	12	7.04E-03	4.04E-02	0.20	4.64E-01	0.6	0.0091	31.72%	7.51E-03
Semivolatile Organics														
Methylnaphthalene	2.02E-02	15	19	1.10E-01	2.4	12	5.14E-04	2.95E-02	0.20	3.39E-02	0.6	0.0091	2.32%	1.07E-01
Naphthalene	3.90E-01	15	19	9.50E-01	2.4	12	1.15E-03	5.70E-01	0.20	7.58E-02	0.6	0.0091	5.18%	9.01E-01
Metals														
Chromium	0.00E+00	15	19	4.12E-02	2.4	12	NA	0.00E+00	0.20	0.00E+00	0.6	0.0091	0.00%	4.12E-02

Concentration in Air (mg/m^3) = Cinf[1+(1/(kTs)(exp(-kTs)-1)]

Asymptotic Air Conc. - Cinf (mg/m^3) = [(E)(Fw)(Ct)]/Fa

Rate Constant - k (L/min) = Fa/Vb

Efficiency of Release - E (unitless) = (E-tce)(H)/(H-tce)

* **Fraction Emitted (fe) = (EPCair x Fa) / (EPCgw x Fw)**

** **Cderm = EPCgw x (1 - fe)**

Variables:

CA = Chemical Concentration in Air (mg/m^3)
Ts = Time of Shower (minutes)
Fw = Flow Rate of Shower (L/min)
Fa = Flow Rate of Air in Shower (m^3/min)
Vb = Volume of Bathroom (m^3)

Assumptions:

EPC - Groundwater Data - RME
15 (RME default)
19 (Estimated RME)
2.4 (Average Air Flow)
12 (Average Bathroom Volume)

TABLE V27-2

CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA =Chemical Concentration in Air
IR = Inhalation Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	EPC* Air (mg/m³)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
1,1-Dichloroethane	4.0E-02	NA	5.89E-02	1.09E-04		3E-03		3.14E-04		8E-03		
1,1,2,2-Tetrachloroethane	NA	2.0E-01	1.03E-03		6.58E-07		1E-07		4.72E-07		1E-07	2E-07
Acetone	NA	NA	1.78E-02									
Total Xylenes	NA	NA	2.76E-02									
Semivolatile Organics												
Methylnaphthalene	NA	NA	2.02E-02									
Naphthalene	8.6E-04	NA	3.90E-01	7.24E-04		8E-01		2.08E-03		2E+00		
Total Hazard Quotient and Cancer Risk:							**7E-07**				**5E-07**	**1E-07**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
BW =	70	kg	BW =	15	kg
IR =	0.13	m3/day	IR =	0.08	m3/day
EF =	365	days/year	EF =	365	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* EPC air is the concentration of chemical available for inhalation after accounting for partitioning between the air and water in the shower. The calculation of the EPC air is shown in Table V27-1.

TABLE V27-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
1,1-Dichloroethane	1.00E-01	NA	3.83E-02	1.05E-03		1E-02		2.45E-03		2E-02		
1,1,2,2-Tetrachloroethane	NA	2.00E-01	7.60E-03		7.14E-05		1E-05		4.16E-05		8E-06	2E-05
Acetone	1.00E-01	NA	2.00E+00	5.48E-02		5E-01		1.28E-01		1E+00		
Total Xylenes	2.00E+00	NA	1.10E-02	3.01E-04		2E-04		7.03E-04		4E-04		
Semivolatile Organics												
Methylnaphthalene	4.00E-02	NA	1.10E-01	3.01E-03		8E-02		7.03E-03		2E-01		
Naphthalene	2.00E-02	NA	9.50E-01	2.60E-02		1E+00		6.07E-02		3E+00		
Metals												
Chromium*	1.50E+00	NA	4.12E-02	1.13E-03		8E-04		2.63E-03		2E-03		
Total Hazard Quotient and Cancer Risk:						**2E+00**				**5E+00**		**2E-05**

Assumptions for Resident (Adult)

BW =	70	kg
IR =	2	liters/day
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

BW =	15	kg
IR =	1	liters/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
*Oral Rfd for Chromium III was used in this assessment.

TABLE V27-4
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-27
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA).

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC - Cderm* Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics															
1,1-Dichloroethane	1 00E-01	NA	8.90E-03	3 50E-01	3 09E-02	2 25E-07	2 83E-06		3E-05		1.32E-04		1E-03		
1,1,2,2-Tetrachloroethane	NA	2 00E-01	9 00E-03	9 20E-01	7 47E-03	8 91E-08		3 85E-07		8E-08		4 48E-06		9E-07	1E-06
Acetone	1 00E-01	NA	5.70E-04	2 00E-01	2 00E+00	7 04E-07	8 87E-06		9E-05		4.13E-04		4E-03		
Total Xylenes	1 80E+00	NA	8.00E-02	3 90E-01	7.51E-03	5 19E-07	6 54E-06		4E-06		3 04E-04		2E-04		
Semivolatile Organics															
Methylnaphthalene	4.00E-02	NA	2.15E-01	6.40E-01	1.07E-01	2.56E-05	3.22E-04		8E-03		1.50E-02		4E-01		
Naphthalene	2 00E-02	NA	6.90E-02	5 30E-01	9 01E-01	6.25E-05	7 88E-04		4E-02		3 67E-02		2E+00		
Metals															
Chromium	6.00E-05	NA	1 00E-03	NA	4 12E-02	1 03E-08	1 30E-07		2E-03		6.04E-06		1E-01		
Total Hazard Quotient and Cancer Risk:									**5E-02**				**2E+00**		**1E-06**

Assumptions for Resident (Adult)		
CF =	0.001	l/cm3
BW =	70	kg
SA =	23,000	cm2
ET =	0.25	hours/day
EF =	14	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)		
CF =	0.001	l/cm3
BW =	15	kg
SA =	9,180	cm2
ET =	0.25	hours/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
t* values in hours are as follows: 1,1-dichloroethane (0.84), 1,1,2,2-tetrachloroethane (2.2), acetone (0.47), total xylenes (1.4), methylnaphthalene (4.45), naphthalene (2.2) (EPA, 1992)
* Cderm is the concentration of chemical available for dermal absorption after accounting for partitioning between the air and water in the shower The calculation of Cderm is shown in Table ???

SEAD-58

TABLE V58-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Volatile Organics		
Methylene chloride	6.40E-02	1.09E-09
Semivolatile Organics		
Bis(2-Ethylhexyl)phthalate	2.60E-01	4.42E-09
Chrysene	1.80E-02	3.06E-10
Di-n-octylphthalate	ND	ND
Fluoranthene	2.60E-02	4.42E-10
Pyrene	2.20E-02	3.74E-10
Pesticides/PCBs		
Endosulfan I	1.30E-03	2.21E-11

ND = Compound was not detected.

TABLE V58-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fact
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Methylene chloride	8.57E-01	1.65E-03	1.09E-09	2.98E-10	1.02E-10	3E-10	2E-13	6.05E-10	5.19E-11	7E-10	9E-14	3E-13
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	NA	NA	4.42E-09									
Chrysene	NA	NA	3.06E-10									
Di-n-octylphthalate	NA	NA	ND									
Fluoranthene	NA	NA	4.42E-10									
Pyrene	NA	NA	3.74E-10									
Pesticides/PCBs												
Endosulfan I	NA	NA	2.21E-11									
Total Hazard Quotient and Cancer Risk:						**3E-10**				**7E-10**		**3E-13**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CA =	EPC Surface Only	CA =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	20 m3/day	IR =	8.7 m3/day
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V58-1 for calculation of Air EPCs
NA= Information not available.

TABLE V58-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) =

$$\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Methylene chloride	6.00E-02	7.50E-03	6.40E-02	8.77E-08	3.01E-08	1E-06	2E-10	8.18E-07	7.01E-08	1E-05	5E-10	8E-10
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	2.60E-01	3.56E-07	1.22E-07	2E-05	2E-09	3.32E-06	2.85E-07	2E-04	4E-09	6E-09
Chrysene	NA	7.30E-03	1.80E-02		8.45E-09		6E-11		1.97E-08		1E-10	2E-10
Di-n-octylphthalate	2.00E-02	NA	ND									
Fluoranthene	4.00E-02	NA	2.60E-02	3.56E-08		9E-07		3.32E-07		8E-06		
Pyrene	3.00E-02	NA	2.20E-02	3.01E-08		1E-06		2.81E-07		9E-06		
Pesticides/PCBs												
Endosulfan I	6.00E-03	NA	1.30E-03	1.78E-09		3E-07		1.66E-08		3E-06		
Total Hazard Quotient and Cancer Risk:						**2E-05**				**2E-04**		**6E-09**

Assumptions for Resident (Adult)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.

TABLE V58-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-58

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

SEAD-64A

TABLE V64A-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil. from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Volatile Organics		
Benzene	2.00E-03	3.40E-11
Toluene	2.00E-03	3.40E-11
Trichloroethene	1.00E-03	1.70E-11
Semivolatile Organics		
2-Methylnaphthalene	1.50E-01	2.55E-09
Acenaphthene	2.50E-01	4.25E-09
Acenaphthylene	4.00E-01	6.80E-09
Anthracene	1.10E+00	1.87E-08
Benzo(a)anthracene	5.60E+00	9.52E-08
Benzo(a)pyrene	5.40E+00	9.18E-08
Benzo(b)fluoranthene	9.60E+00	1.63E-07
Benzo(ghi)perylene	4.00E+00	6.80E-08
Benzo(k)fluoranthene	5.50E-01	9.35E-09
Bis(2-Ethylhexyl)phthalate	1.30E+01	2.21E-07
Carbazole	7.20E-01	1.22E-08
Chrysene	4.80E+00	8.16E-08
Di-n-butylphthalate	2.90E-01	4.93E-09
Dibenz(a,h)anthracene	1.50E+00	2.55E-08
Dibenzofuran	1.20E-01	2.04E-09
Fluoranthene	6.90E+00	1.17E-07
Fluorene	3.50E-01	5.95E-09
Indeno(1,2,3-cd)pyrene	3.50E+00	5.95E-08
Naphthalene	3.40E-01	5.78E-09
Phenanthrene	2.70E+00	4.59E-08
Phenol	4.40E-02	7.48E-10
Pyrene	5.40E+00	9.18E-08
Pesticides		
4,4'-DDD	3.70E-03	6.29E-11
4,4'-DDE	9.00E-03	1.53E-10
4,4'-DDT	2.40E-02	4.08E-10
Alpha-Chlordane	6.30E-03	1.07E-10
Dieldrin	7.50E-03	1.28E-10
Endosulfan I	3.30E-02	5.61E-10
Endosulfan sulfate	5.00E-03	8.50E-11
Heptachlor epoxide	1.90E-03	3.23E-11
Metals		
Lead	3.91E+02	6.65E-06

TABLE 64A-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fact
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Benzene	1.71E-03	2.73E-02	3.40E-11	9.32E-12	3.19E-12	5E-09	9E-14	1.89E-11	1.62E-12	1E-08	4E-14	1E-13
Toluene	1.14E-01	NA	3.40E-11	9.32E-12		8E-11		1.89E-11		2E-10		
Trichloroethene	NA	6.00E-03	1.70E-11		1.60E-12		1E-14		8.10E-13		5E-15	1E-14
Semivolatile Organics												
2-Methylnaphthalene	NA	NA	2.55E-09									
Acenaphthene	NA	NA	4.25E-09									
Acenaphthylene	NA	NA	6.80E-09									
Anthracene	NA	NA	1.87E-08									
Benzo(a)anthracene	NA	NA	9.52E-08									
Benzo(a)pyrene	NA	NA	9.18E-08									
Benzo(b)fluoranthene	NA	NA	1.63E-07									
Benzo(ghi)perylene	NA	NA	6.80E-08									
Benzo(k)fluoranthene	NA	NA	9.35E-09									
bis(2-Ethylhexyl)phthalate	NA	NA	2.21E-07									
Carbazole	NA	NA	1.22E-08									
Chrysene	NA	NA	8.16E-08									
Di-n-butylphthalate	NA	NA	4.93E-09									
Dibenz(a,h)anthracene	NA	NA	2.55E-08									
Dibenzofuran	NA	NA	2.04E-09									
Fluoranthene	NA	NA	1.17E-07									
Fluorene	NA	NA	5.95E-09									
Indeno(1,2,3-cd)pyrene	NA	NA	5.95E-08									
Naphthalene	8.60E-04	NA	5.78E-09	1.58E-09		2E-06		3.21E-09		4E-06		
Phenanthrene	NA	NA	4.59E-08									
Phenol	NA	NA	7.18E-10									
Pyrene	NA	NA	9.18E-08									
Pesticides												
4,4'-DDD	NA	NA	6.29E-11									
4,4'-DDE	NA	NA	1.53E-10									
4,4'-DDT	NA	3.40E-01	4.08E-10		3.83E-11		1E-11		1.94E-11		7E-12	2E-11
alpha-Chlordane	2.00E-04	3.50E-01	1.07E-10	2.93E-11	1.01E-11	1E-07	4E-12	5.96E-11	5.11E-12	3E-07	2E-12	5E-12
Dieldrin	NA	1.61E+01	1.28E-10		1.20E-11		2E-10		6.08E-12		1E-10	3E-10
Endosulfan I	NA	NA	5.61E-10									
Endosulfan sulfate	NA	NA	8.50E-11									
Heptachlor epoxide	NA	9.10E+00	3.23E-11		3.03E-12		3E-11		1.54E-12		1E-11	4E-11
Metals												
Lead	NA	NA	6.65E-06									
Total Hazard Quotient and Cancer Risk:						**2E-06**				**4E-06**		**4E-10**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CA =	EPC Surface Only	CA =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	20 m3/day	IR =	8.7 m3/day
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

* left blank due to a lack of toxicity data.

TABLE V64A-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Benzene	3.00E-03	2.90E-02	2.00E-03	2.74E-09	9.39E-10	9E-07	3E-11	2.56E-08	2.19E-09	9E-06	6E-11	9E-11
Toluene	2.00E-01	NA	2.00E-03	2.74E-09		1E-08		2.56E-08		1E-07		
Trichloroethene	NA	1.10E-02	1.00E-03		4.70E-10		5E-12		1.10E-09		1E-11	2E-11
Semivolatile Organics												
2-Methylnaphthalene	4.00E-02	NA	1.50E-01	2.05E-07		5E-06		1.92E-06		5E-05		
Acenaphthene	6.00E-02	NA	2.50E-01	3.42E-07		6E-06		3.20E-06		5E-05		
Acenaphthylene	NA	NA	4.00E-01									
Anthracene	3.00E-01	NA	1.10E+00	1.51E-06		5E-06		1.41E-05		5E-05		
Benzo(a)anthracene	NA	7.30E-01	5.60E+00		2.63E-06		2E-06		6.14E-06		4E-06	6E-06
Benzo(a)pyrene	NA	7.30E+00	5.40E+00		2.54E-06		2E-05		5.92E-06		4E-05	6E-05
Benzo(b)fluoranthene	NA	7.30E-01	9.60E+00		4.51E-06		3E-06		1.05E-05		8E-06	1E-05
Benzo(ghi)perylene	NA	NA	4.00E+00									
Benzo(k)fluoranthene	NA	7.30E-02	5.50E-01		2.58E-07		2E-08		6.03E-07		4E-08	6E-08
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.30E+01	1.78E-05	6.11E-06	9E-04	9E-08	1.66E-04	1.42E-05	8E-03	2E-07	3E-07
Carbazole	NA	2.00E-02	7.20E-01		3.38E-07		7E-09		7.89E-07		2E-08	2E-08
Chrysene	NA	7.30E-03	4.80E+00		2.25E-06		2E-08		5.26E-06		4E-08	5E-08
Di-n-butylphthalate	1.00E-01	NA	2.90E-01	3.97E-07		4E-06		3.71E-06		4E-05		
Dibenz(a,h)anthracene	NA	7.30E+00	1.50E+00		7.05E-07		5E-06		1.64E-06		1E-05	2E-05
Dibenzofuran	NA	NA	1.20E-01									
Fluoranthene	4.00E-02	NA	6.90E+00	9.45E-06		2E-04		8.82E-05		2E-03		
Fluorene	4.00E-02	NA	3.50E-01	4.79E-07		1E-05		4.47E-06		1E-04		
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	3.50E+00		1.64E-06		1E-06		3.84E-06		3E-06	4E-06
Naphthalene	2.00E-02	NA	3.40E-01	4.66E-07		2E-05		4.35E-06		2E-04		
Phenanthrene	NA	NA	2.70E+00									
Phenol	6.00E-01	NA	4.40E-02	6.03E-08		1E-07		5.63E-07		9E-07		
Pyrene	3.00E-02	NA	5.40E+00	7.40E-06		2E-04		6.90E-05		2E-03		
Pesticides/PCBs												
4,4'-DDD	NA	2.40E-01	3.70E-03		1.74E-09		4E-10		4.05E-09		1E-09	1E-09
4,4'-DDE	NA	3.40E-01	9.00E-03		4.23E-09		1E-09		9.86E-09		3E-09	5E-09
4,4'-DDT	5.00E-04	3.40E-01	2.40E-02	3.29E-08	1.13E-08	7E-05	4E-09	3.07E-07	2.63E-08	6E-04	9E-09	1E-08
alpha-Chlordane	5.00E-04	3.50E-01	6.30E-03	8.63E-09	2.96E-09	2E-05	1E-09	8.05E-08	6.90E-09	2E-04	2E-09	3E-09
Dieldrin	5.00E-05	1.60E+01	7.50E-03	1.03E-08	3.52E-09	2E-04	6E-08	9.59E-08	8.22E-09	2E-03	1E-07	2E-07
Endosulfan I	6.00E-03	NA	3.30E-02	4.52E-08		8E-06		4.22E-07		7E-05		
Endosulfan sulfate	6.00E-03	NA	5.00E-03	6.85E-09		1E-06		6.39E-08		1E-05		
Heptachlor epoxide	1.30E-05	9.10E+00	1.90E-03	2.60E-09	8.92E-10	2E-04	8E-09	2.43E-08	2.08E-09	2E-03	2E-08	3E-08
Metals												
Lead	NA	NA	3.91E+02									
Total Hazard Quotient and Cancer Risk:						**2E-03**				**2E-02**		**1E-04**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	100 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-?

TABLE V64A-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE V64A-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A

Decision Document- Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V64A-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Contribution to Lifetime Cancer Risk
Metals												
Manganese	5.00E-02	NA	2.04E+00	5.59E-02		1E+00		1.30E-01		3E+00		
Total Hazard Quotient and Cancer Risk:						**1E+00**				**3E+00**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
BW =	70	kg	BW =	15	kg
IR =	2	liters/day	IR =	1	liters/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Planned Warehouse Land provided in Table V-2.

TABLE V64A-7
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64A
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient *Kp* (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Metals															
Manganese	1.50E-03	NA	1.00E-03	NA	2.04E+00	5.10E-07	1.61E-04		1E-01		2.99E-04		2E-01		
Total Hazard Quotient and Cancer Risk:									**1E-01**				**2E-01**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	0.001	l/cm3	CF =	0.001	l/cm3
BW =	70	kg	BW =	15	kg
SA =	23,000	cm2	SA =	9,180	cm2
ET =	0.25	hours/day	ET =	0.25	hours/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions defined on Table V-2.

SEAD-64B

TABLE V64B-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m³) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m³
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m³)
Volatile Organics		
Acetone	5.70E-02	9.69E-10
Carbon disulfide	ND	ND
Methyl ethyl ketone	2.20E-02	3.74E-10
Methylene chloride	ND	ND
Semivolatile Organics		
Benzo(a)anthracene	3.80E-02	6.46E-10
Benzo(a)pyrene	3.40E-02	5.78E-10
Benzo(b)fluoranthene	2.80E-02	4.76E-10
Benzo(ghi)perylene	2.00E-02	3.40E-10
Benzo(k)fluoranthene	3.60E-02	6.12E-10
Bis(2-Ethylhexyl)phthalate	9.60E-02	1.63E-09
Chrysene	4.00E-02	6.80E-10
Di-n-butylphthalate	1.20E-01	2.04E-09
Fluoranthene	3.50E-02	5.95E-10
Indeno(1,2,3-cd)pyrene	ND	ND
Phenanthrene	3.00E-02	5.10E-10
Pyrene	3.60E-02	6.12E-10
Pesticides		
4,4'-DDE	2.60E-03	4.42E-11
4,4'-DDT	2.60E-03	4.42E-11
Aldrin	ND	ND
Heptachlor epoxide	1.40E-03	2.38E-11

ND = Compound was not detected.

TABLE V64B-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Facto

Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Resident (Adult) Intake (mg/kg-day)		Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day)		Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)			
Volatile Organics												
Acetone	NA	NA	9.69E-10									
Carbon disulfide	2.00E-01	NA	ND									
Methyl ethyl ketone	2.86E-01	NA	3.74E-10	1.02E-10		4E-10		2.08E-10		7E-10		
Methylene chloride	8.57E-01	1.65E-03	ND									
Semivolatile Organics												
Benzo(a)anthracene	NA	NA	6.46E-10									
Benzo(a)pyrene	NA	NA	5.78E-10									
Benzo(b)fluoranthene	NA	NA	4.76E-10									
Benzo(ghi)perylene	NA	NA	3.40E-10									
Benzo(k)fluoranthene	NA	NA	6.12E-10									
bis(2-Ethylhexyl)phthalate	NA	NA	1.63E-09									
Chrysene	NA	NA	6.80E-10									
Di-n-butylphthalate	NA	NA	2.04E-09									
Fluoranthene	NA	NA	5.95E-10									
Indeno(1,2,3-cd)pyrene	NA	NA	ND									
Phenanthrene	NA	NA	5.10E-10									
Pyrene	NA	NA	6.12E-10									
Pesticides												
4,4'-DDE	NA	NA	4.42E-11									
4,4'-DDT	NA	3.40E-01	4.42E-11		4.15E-12		1E-12		2.11E-12		7E-13	2.13E-12
Aldrin	NA	1.72E+01	ND									
Heptachlor epoxide	NA	9.10E+00	2.38E-11		2.24E-12		2E-11		1.13E-12		1E-11	3.07E-11
Total Hazard Quotient and Cancer Risk:						**4E-10**				**7E-10**		**3E-11**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CA =	EPC Surface Only		CA =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
IR =	20	m3/day	IR =	8.7	m3/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V64B-1 for calculation of Air EPCs
NA = Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64B-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Acetone	1.00E-01	NA	5.70E-02	7.81E-08		8E-07		7.29E-07		7E-06		
Carbon disulfide	1.00E-01	NA	ND									
Methyl ethyl ketone	6.00E-01	NA	2.20E-02	3.01E-08		5E-08		2.81E-07		5E-07		
Methylene chloride	6.00E-02	7.50E-03	ND									
Semivolatile Organics												
Benzo(a)anthracene	NA	7.30E-01	3.80E-02		1.78E-08		1E-08		4.16E-08		3E-08	4E-08
Benzo(a)pyrene	NA	7.30E+00	3.40E-02		1.60E-08		1E-07		3.73E-08		3E-07	4E-07
Benzo(b)fluoranthene	NA	7.30E-01	2.80E-02		1.32E-08		1E-08		3.07E-08		2E-08	3E-08
Benzo(ghi)perylene	NA	NA	2.00E-02									
Benzo(k)fluoranthene	NA	7.30E-02	3.60E-02		1.69E-08		1E-09		3.95E-08		3E-09	4E-09
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	9.60E-02	1.32E-07	4.51E-08	7E-06	6E-10	1.23E-06	1.05E-07	6E-05	1E-09	2E-09
Chrysene	NA	7.30E-03	4.00E-02		1.88E-08		1E-10		4.38E-08		3E-10	5E-10
Di-n-butylphthalate	1.00E-01	NA	1.20E-01	1.64E-07		2E-06		1.53E-06		2E-05		
Fluoranthene	4.00E-02	NA	3.50E-02	4.79E-08		1E-06		4.47E-07		1E-05		
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	ND									
Phenanthrene	NA	NA	3.00E-02									
Pyrene	3.00E-02	NA	3.60E-02	4.93E-08		2E-06		4.60E-07		2E-05		
Pesticides/PCBs												
4,4'-DDE	NA	3.40E-01	2.60E-03		1.22E-09		4E-10		2.85E-09		1E-09	1E-09
4,4'-DDT	5.00E-04	3.40E-01	2.60E-03	3.56E-09	1.22E-09	7E-06	4E-10	3.32E-08	2.85E-09	7E-05	1E-09	1E-09
Aldrin	3.00E-05	1.70E+01	ND									
Heptachlor epoxide	1.30E-05	9.10E+00	1.40E-03	1.92E-09	6.58E-10	1E-04	6E-09	1.79E-08	1.53E-09	1E-03	1E-08	2E-08
Total Hazard Quotient and Cancer Risk:						**2E-04**				**2E-03**		**5E-07**

Assumptions for Resident (Adult)

CF = 1E-06 kg/mg
CS = EPC Surface Only
BW = 70 kg
IR = 100 mg soil/day
FI = 1 unitless
EF = 350 days/year
ED = 24 years
AT (Nc) = 8,760 days
AT (Car) = 25,550 days

Assumptions for Resident (Child)

CF = 1E-06 kg/mg
CS = EPC Surface Only
BW = 15 kg
IR = 200 mg soil/day
FI = 1 unitless
EF = 350 days/year
ED = 6 years
AT (Nc) = 2,190 days
AT (Car) = 25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA = Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64B-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64B

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

SEAD-64C

TABLE V64C-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Semivolatile Organics		
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.87E-08
Di-n-butylphthalate	3.90E-02	6.63E-10
Pesticides/PCBs		
Dieldrin	4.70E-03	7.99E-11
Heptachlor	2.60E-03	4.42E-11
Metals		
Selenium	1.90E+00	3.23E-08

TABLE V64C-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fac
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	NA	NA	1.87E-08									
Di-n-butylphthalate	NA	NA	6.63E-10									
Pesticides/PCBs												
Dieldrin	NA	1.61E+01	7.99E-11		7.51E-12		1E-10		3.81E-12		6E-11	2E-10
Heptachlor	NA	4.55E+00	4.42E-11		4.15E-12		2E-11		2.11E-12		1E-11	3E-11
Metals												
Selenium	NA	NA	3.23E-08									
Total Hazard Quotient and Cancer Risk:												**2E-10**

Assumptions for Resident (Adult)

CA =	EPC Surface Only	
BW =	70	kg
IR =	20	m3/day
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V64C-1 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64C-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.10E+00	1.51E-06	5.17E-07	8E-05	7E-09	1.41E-05	1.21E-06	7E-04	2E-08	2E-08
Di-n-butylphthalate	1.00E-01	NA	3.90E-02	5.34E-08		5E-07		4.99E-07		5E-06		
Pesticides/PCBs												
Dieldrin	5.00E-05	1.60E+01	4.70E-03	6.44E-09	2.21E-09	1E-04	4E-08	6.01E-08	5.15E-09	1E-03	8E-08	1E-07
Heptachlor	5.00E-04	4.50E+00	2.60E-03	3.56E-09	1.22E-09	7E-06	5E-09	3.32E-08	2.85E-09	7E-05	1E-08	2E-08
Metals												
Selenium	5.00E-03	NA	1.90E+00	2.60E-06		5E-04		2.43E-05		5E-03		
Total Hazard Quotient and Cancer Risk:						**7E-04**				**7E-03**		**2E-07**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	100 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64C-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE V64C-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V64C-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Semivolatile Organics												
Diethyl phthalate	8.00E-01	NA	7.00E-04	1.92E-05		2E-05		4.47E-05		6E-05		
Phenol	6.00E-01	NA	2.00E-03	5.48E-05		9E-05		1.28E-04		2E-04		
Total Hazard Quotient and Cancer Risk:						**1E-04**				**3E-04**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
BW =	70	kg	BW =	15	kg
IR =	2	liters/day	IR =	1	liters/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64C-7
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64C
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = DA x SA x EF x ED / BW x AT

Variables (Assumptions for Each Receptor are Listed at the Bottom)
DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics:

For inorganics DA = Kp x CW x ET x CF

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Semivolatile Organics															
Diethyl phthalate	8.00E-01	NA	4.80E-03	2.00E+00	7.00E-04	6.57E-09	2.07E-06		3E-06		3.85E-06		5E-06		
Phenol	5.40E-01	NA	5.50E-03	3.30E-01	2.00E-03	8.73E-09	2.75E-06		5E-06		5.12E-06		9E-06		
Total Hazard Quotient and Cancer Risk:									**8E-06**				**1E-05**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	0.001	l/cm3	CF =	0.001	l/cm3
BW =	70	kg	BW =	15	kg
SA =	23,000	cm2	SA =	9,180	cm2
ET =	0.25	hours/day	ET =	0.25	hours/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

SEAD-64D

TABLE V64D-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Volatile Organics		
Methyl ethyl ketone	8.00E-03	1.36E-10
Methylene chloride	3.00E-03	5.10E-11
Toluene	ND	ND
Semivolatile Organics		
2-Methylnaphthalene	4.90E-02	8.33E-10
Benzo(a)anthracene	8.60E-02	1.46E-09
Benzo(a)pyrene	7.70E-02	1.31E-09
Benzo(b)fluoranthene	1.60E-01	2.72E-09
Benzo(ghi)perylene	6.80E-02	1.16E-09
Benzo(k)fluoranthene	1.10E-01	1.87E-09
Bis(2-Ethylhexyl)phthalate	1.10E+00	1.87E-08
Chrysene	1.10E-01	1.87E-09
Di-n-butylphthalate	7.70E-02	1.31E-09
Di-n-octylphthalate	7.50E-02	1.28E-09
Dibenz(a,h)anthracene	4.00E-02	6.80E-10
Fluoranthene	2.40E-01	4.08E-09
Indeno(1,2,3-cd)pyrene	6.10E-02	1.04E-09
Naphthalene	3.10E-02	5.27E-10
Phenanthrene	1.00E-01	1.70E-09
Phenol	4.20E-02	7.14E-10
Pyrene	1.60E-01	2.72E-09

ND = Compound was not detected.

TABLE V64D-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD	Carc. Slope Inhalation	Air EPC* from Surface Soil	Resident (Adult)				Resident (Child)				Resident
				Intake (mg/kg-day)		Hazard Quotient	Contribution to Lifetime Cancer Risk	Intake (mg/kg-day)		Hazard Quotient	Contribution to Lifetime Cancer Risk	Total Lifetime Cancer Risk
	(mg/kg-day)	(mg/kg-day)-1	(mg/m3)	(Nc)	(Car)			(Nc)	(Car)			
Volatile Organics												
Methyl ethyl ketone	2.86E-01	NA	1.36E-10	3.73E-11		1E-10		7.56E-11		3E-10		
Methylene chloride	8.57E-01	1.65E-03	5.10E-11	1.40E-11	4.79E-12	2E-11	8E-15	2.84E-11	2.43E-12	3E-11	4E-15	1E-14
Toluene	1.14E-01	NA	ND									
Semivolatile Organics												
2-Methylnaphthalene	NA	NA	8.33E-10									
Benzo(a)anthracene	NA	NA	1.46E-09									
Benzo(a)pyrene	NA	NA	1.31E-09									
Benzo(b)fluoranthene	NA	NA	2.72E-09									
Benzo(ghi)perylene	NA	NA	1.16E-09									
Benzo(k)fluoranthene	NA	NA	1.87E-09									
bis(2-Ethylhexyl)phthalate	NA	NA	1.87E-08									
Chrysene	NA	NA	1.87E-09									
Di-n-butylphthalate	NA	NA	1.31E-09									
Di-n-octylphthalate	NA	NA	1.28E-09									
Dibenz(a,h)anthracene	NA	NA	6.80E-10									
Fluoranthene	NA	NA	4.08E-09									
Indeno(1,2,3-cd)pyrene	NA	NA	1.04E-09									
Naphthalene	8.60E-04	NA	5.27E-10	1.44E-10		2E-07		2.93E-10		3E-07		
Phenanthrene	NA	NA	1.70E-09									
Phenol	NA	NA	7.14E-10									
Pyrene	NA	NA	2.72E-09									
Total Hazard Quotient and Cancer Risk:						**2E-07**				**3E-07**		**1E-14**

Assumptions for Resident (Adult)

CA =	EPC Surface Only	
BW =	70	kg
IR =	20	m3/day
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CA =	EPC Surface Only	
BW =	15	kg
IR =	8.7	m3/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V64D-1 for calculation of Air EPCs
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64D-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested

EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Methyl ethyl ketone	6.00E-01	NA	8.00E-03	1.10E-08		2E-08		1.02E-07		2E-07		
Methylene chloride	6.00E-02	7.50E-03	3.00E-03	4.11E-09	1.41E-09	7E-08	1E-11	3.84E-08	3.29E-09	6E-07	2E-11	4E-11
Toluene	2.00E-01	NA	ND									
Semivolatile Organics												
2-Methylnaphthalene	4.00E-02	NA	4.90E-02	6.71E-08		2E-06		6.26E-07		2E-05		
Benzo(a)anthracene	NA	7.30E-01	8.60E-02		4.04E-08		3E-08		9.42E-08		7E-08	1E-07
Benzo(a)pyrene	NA	7.30E+00	7.70E-02		3.62E-08		3E-07		8.44E-08		6E-07	9E-07
Benzo(b)fluoranthene	NA	7.30E-01	1.60E-01		7.51E-08		5E-08		1.75E-07		1E-07	2E-07
Benzo(ghi)perylene	NA	NA	6.80E-02									
Benzo(k)fluoranthene	NA	7.30E-02	1.10E-01		5.17E-08		4E-09		1.21E-07		9E-09	1E-08
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.10E+00	1.51E-06	5.17E-07	8E-05	7E-09	1.41E-05	1.21E-06	7E-04	2E-08	2E-08
Chrysene	NA	7.30E-03	1.10E-01		5.17E-08		4E-10		1.21E-07		9E-10	1E-09
Di-n-butylphthalate	1.00E-01	NA	7.70E-02	1.05E-07		1E-06		9.84E-07		1E-05		
Di-n-octylphthalate	2.00E-02	NA	7.50E-02	1.03E-07		5E-06		9.59E-07		5E-05		
Dibenz(a,h)anthracene	NA	7.30E+00	4.00E-02		1.88E-08		1E-07		4.38E-08		3E-07	5E-07
Fluoranthene	4.00E-02	NA	2.40E-01	3.29E-07		8E-06		3.07E-06		8E-05		
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	6.10E-02		2.86E-08		2E-08		6.68E-08		5E-08	7E-08
Naphthalene	2.00E-02	NA	3.10E-02	4.25E-08		2E-06		3.96E-07		2E-05		
Phenanthrene	NA	NA	1.00E-01									
Phenol	6.00E-01	NA	4.20E-02	5.75E-08		1E-07		5.37E-07		9E-07		
Pyrene	3.00E-02	NA	1.60E-01	2.19E-07		7E-06		2.05E-06		7E-05		
Total Hazard Quotient and Cancer Risk:						**1E-04**				**9E-04**		**2E-06**

Assumptions for Resident (Adult)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64D-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans, and pentachlorophenol, since absorption factors are not available for other chemicals of concern. Since these compounds were not found, risks from this pathway were not quantified.

TABLE V64D-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D

Decision Document- Mini Risk Assessment

Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V64D-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document- Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Metals												
Aluminum	1.00E+00	NA	3.01E+01	8.25E-01		8E-01		1.92E+00		2E+00		
Barium	7.00E-02	NA	6.93E-01	1.90E-02		3E-01		4.43E-02		6E-01		
Beryllium	2.00E-03	NA	3.10E-03	8.49E-05		4E-02		1.98E-04		1E-01		
Cadmium	5.00E-04	NA	1.30E-03	3.56E-05		7E-02		8.31E-05		2E-01		
Calcium	NA	NA	9.02E+02									
Cobalt	6.00E-02	NA	8.23E-02	2.25E-03		4E-02		5.26E-03		9E-02		
Copper	4.00E-02	NA	4.13E-02	1.13E-03		3E-02		2.64E-03		7E-02		
Iron	3.00E-01	NA	6.58E+01	1.80E+00		6E+00		4.21E+00		1E+01		
Lead	NA	NA	7.16E-02									
Manganese	5.00E-02	NA	8.25E+00	2.26E-01		5E+00		5.27E-01		1E+01		
Nickel	2.00E-02	NA	1.08E-01	2.96E-03		1E-01		6.90E-03		3E-01		
Zinc	3.00E-01	NA	3.05E-01	8.36E-03		3E-02		1.95E-02		6E-02		
Total Hazard Quotient and Cancer Risk:						**1E+01**				**3E+01**		

Assumptions for Resident (Adult)		
BW =	70	kg
IR =	2	liters/day
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)		
BW =	15	kg
IR =	1	liters/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V64D-7
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-64D
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg- $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
DA = Absorbed Dose per Event   ED = Exposure Duration
SA = Surface Area Contact   BW = Bodyweight
EF = Exposure Frequency   AT = Averaging Time

Equation for Absorbed Dose per Event (DA):

For organics: $$DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm   CF = Conversion Factor
ET = Exposure Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Facto
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient *Kp* (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Metals															
Aluminum	NA	NA	1.00E-03	NA	3.01E+01	7.53E-06									
Barium	3.50E-02	NA	1.00E-03	NA	6.93E-01	1.73E-07	5.46E-05		2E-03		1.02E-04		3E-03		
Beryllium	2.00E-05	NA	1.00E-03	NA	3.10E-03	7.75E-10	2.44E-07		1E-02		4.55E-07		2E-02		
Cadmium	5.00E-05	NA	1.00E-03	NA	1.30E-03	3.25E-10	1.02E-07		2E-03		1.91E-07		4E-03		
Calcium	NA	NA	1.00E-03	NA	9.02E+02	2.26E-04									
Cobalt	NA	NA	4.00E-04	NA	8.23E-02	8.23E-09									
Copper	2.40E-02	NA	1.00E-03	NA	4.13E-02	1.03E-08	3.25E-06		1E-04		6.06E-06		3E-04		
Iron	6.00E-02	NA	1.00E-03	NA	6.58E+01	1.65E-05	5.18E-03		9E-02		9.65E-03		2E-01		
Lead	NA	NA	4.00E-06	NA	7.16E-02	7.16E-11									
Manganese	1.50E-03	NA	1.00E-03	NA	8.25E+00	2.06E-06	6.50E-04		4E-01		1.21E-03		8E-01		
Nickel	8.00E-04	NA	1.00E-03	NA	1.08E-01	2.70E-08	8.51E-06		1E-02		1.58E-05		2E-02		
Zinc	7.50E-02	NA	6.00E-04	NA	3.05E-01	4.58E-08	1.44E-05		2E-04		2.68E-05		4E-04		
Total Hazard Quotient and Cancer Risk:									**5E-01**				**1E+00**		

Assumptions for Resident (Adult)

CF =	0.001	l/cm3
BW =	70	kg
SA =	23,000	cm2
ET =	0.25	hours/day
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CF =	0.001	l/cm3
BW =	15	kg
SA =	9,180	cm2
ET =	0.25	hours/day
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

SEAD-66

TABLE V66-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-66
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = CS_{surf} x PM_{10} x CF

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Pesticides/PCBs		
4,4'-DDD	5.60E-01	9.52E-09
4,4'-DDE	8.70E+00	1.48E-07
4,4'-DDT	3.60E+01	6.12E-07
alpha-Chlordane	1.60E-02	2.72E-10
Aroclor-1254	8.00E-02	1.36E-09
Endosulfan I	9.40E-03	1.60E-10
Endosulfan II	4.80E-02	8.16E-10
gamma-BHC (Lindane)	3.90E-02	6.63E-10

TABLE V66-2

CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air. Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fact

Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Pesticides/PCBs												
4.4'-DDD	NA	NA	9.52E-09									
4.4'-DDE	NA	NA	1.48E-07									
4.4'-DDT	NA	3.40E-01	6.12E-07		5.75E-08		2E-08		2.92E-08		1E-08	3E-08
alpha-Chlordane	2.00E-04	3.50E-01	2.72E-10	7.45E-11	2.55E-11	4E-07	9E-12	1.51E-10	1.30E-11	8E-07	5E-12	1E-11
Aroclor-1254	NA	4.00E-01	1.36E-09		1.28E-10		5E-11		6.48E-11		3E-11	8E-11
Endosulfan I	NA	NA	1.60E-10									
Endosulfan II	NA	NA	8.16E-10									
gamma-BHC (Lindane)	NA	NA	6.63E-10									
Total Hazard Quotient and Cancer Risk:						**4E-07**				**8E-07**		**3E-08**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CA =	EPC Surface Only		CA =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
IR =	20	m3/day	IR =	8.7	m3/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V66-1 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V66-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Report - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Pesticides/PCBs												
4,4'-DDD	NA	2.40E-01	5.60E-01		2.63E-07		6E-08		6.14E-07		1E-07	2E-07
4,4'-DDE	NA	3.40E-01	8.70E+00		4.09E-06		1E-06		9.53E-06		3E-06	5E-06
4,4'-DDT	5.00E-04	3.40E-01	3.60E+01	4.93E-05	1.69E-05	1E-01	6E-06	4.60E-04	3.95E-05	9E-01	1E-05	2E-05
alpha-Chlordane	5.00E-04	3.50E-01	1.60E-02	2.19E-08	7.51E-09	4E-05	3E-09	2.05E-07	1.75E-08	4E-04	6E-09	9E-09
Aroclor-1254	2.00E-05	2.00E+00	8.00E-02	1.10E-07	3.76E-08	5E-03	8E-08	1.02E-06	8.77E-08	5E-02	2E-07	3E-07
Endosulfan I	6.00E-03	NA	9.40E-03	1.29E-08		2E-06		1.20E-07		2E-05		
Endosulfan II	6.00E-03	NA	4.80E-02	6.58E-08		1E-05		6.14E-07		1E-04		
gamma-BHC (Lindane)	3.00E-04	1.30E+00	3.90E-02	5.34E-08	1.83E-08	2E-04	2E-08	4.99E-07	4.27E-08	2E-03	6E-08	8E-08
Total Hazard Quotient and Cancer Risk:						**1E-01**				**1E+00**		**2E-05**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	1E-06	kg/mg	CF =	1E-06	kg/mg
CS =	EPC Surface Only		CS =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
IR =	100	mg soil/day	IR =	200	mg soil/day
FI =	1	unitless	FI =	1	unitless
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V66-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-66
Decision Report - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Pesticides/PCBs													
4,4'-DDD	NA	1.20E+00	NA	5.60E-01									
4,4'-DDE	NA	1.70E+00	NA	8.70E+00									
4,4'-DDT	1.00E-04	1.70E+00	NA	3.60E+01									
alpha-Chlordane	5.00E-04	3.50E-01	NA	1.60E-02									
Aroclor-1254	1.80E-05	2.22E+00	6.00E-02	8.00E-02	3.81E-07	1.31E-07	2E-02	3E-07	7.06E-07	6.05E-08	4E-02	1E-07	4E-07
Endosulfan I	6.00E-03	NA	NA	9.40E-03									
Endosulfan II	6.00E-03	NA	NA	4.80E-02									
gamma-BHC (Lindane)	3.00E-04	1.80E+00	NA	3.90E-02									
Total Hazard Quotient and Cancer Risk:							**2E-02**				**4E-02**		**4E-07**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	1E-06	kg/mg	CF =	1E-06	kg/mg
CS =	EPC Surface Only		CS =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
SA =	5,800	cm2	SA =	2,300	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

SEAD-68

TABLE V68-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil, from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Volatile Organics		
Benzene	ND	ND
Chloroform	ND	ND
Tetrachloroethene	8.00E-03	1.36E-10
Toluene	3.00E-02	5.10E-10
Total Xylenes	2.00E-03	3.40E-11
Trichloroethene	ND	ND
Semivolatile Organics		
2-Methylnaphthalene	3.10E-01	5.27E-09
Acenaphthene	4.90E-02	8.33E-10
Anthracene	9.70E-02	1.65E-09
Benzo(a)anthracene	9.00E-01	1.53E-08
Benzo(a)pyrene	7.70E-01	1.31E-08
Benzo(b)fluoranthene	9.40E-01	1.60E-08
Benzo(ghi)perylene	4.20E-01	7.14E-09
Benzo(k)fluoranthene	8.30E-01	1.41E-08
bis(2-Ethylhexyl)phthalate	1.50E-01	2.55E-09
Butylbenzylphthalate	1.80E-02	3.06E-10
Carbazole	8.00E-02	1.36E-09
Chrysene	1.00E+00	1.70E-08
Di-n-butylphthalate	ND	ND
Di-n-octylphthalate	1.80E-02	3.06E-10
Dibenz(a,h)anthracene	2.20E-01	3.74E-09
Dibenzofuran	4.30E-02	7.31E-10
Fluoranthene	1.50E+00	2.55E-08
Fluorene	3.40E-02	5.78E-10
Indeno(1,2,3-cd)pyrene	4.00E-01	6.80E-09
Naphthalene	7.80E-02	1.33E-09
Pentachlorophenol	2.40E-02	4.08E-10
Phenanthrene	4.80E-01	8.16E-09
Pyrene	1.50E+00	2.55E-08
Pesticides/PCBs		
4,4'-DDE	2.60E-01	4.42E-09
4,4'-DDT	1.30E-01	2.21E-09
alpha-Chlordane	2.10E-02	3.57E-10
gamma-Chlordane	2.30E-02	3.91E-10
Heptachlor epoxide	4.00E-03	6.80E-11
Herbicides		
2,4,5-T	2.50E-02	4.25E-10
2,4-DB	9.00E-02	1.53E-09

ND = Compound was not detected.

TABLE V68-2

CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR

REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68

Decision Document - Mini Risk Assessment

Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):

CA = Chemical Concentration in Air, Calculated from Air EPC Data

IR = Inhalation Rate

EF = Exposure Frequency

ED = Exposure Duration

BW = Bodyweight

AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fa

Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Benzene	1.71E-03	2.73E-02	ND									
Chloroform	NA	8.05E-02	ND									
Tetrachloroethene	NA	2.00E-03	1.36E-10		1.28E-11		3E-14		6.48E-12		1E-14	4E-14
Toluene	1.14E-01	NA	5.10E-10	1.40E-10		1E-09		2.84E-10		2E-09		
Total Xylenes	NA	NA	3.40E-11									
Trichloroethene	NA	6.00E-03	ND									
Semivolatile Organics												
2-Methylnaphthalene	NA	NA	5.27E-09									
Acenaphthene	NA	NA	8.33E-10									
Anthracene	NA	NA	1.65E-09									
Benzo(a)anthracene	NA	NA	1.53E-08									
Benzo(a)pyrene	NA	NA	1.31E-08									
Benzo(b)fluoranthene	NA	NA	1.60E-08									
Benzo(ghi)perylene	NA	NA	7.14E-09									
Benzo(k)fluoranthene	NA	NA	1.41E-08									
bis(2-Ethylhexyl)phthalate	NA	NA	2.55E-09									
Butylbenzylphthalate	NA	NA	3.06E-10									
Carbazole	NA	NA	1.36E-09									
Chrysene	NA	NA	1.70E-08									
Di-n-butylphthalate	NA	NA	ND									
Di-n-octylphthalate	NA	NA	3.06E-10									
Dibenz(a,h)anthracene	NA	NA	3.74E-09									
Dibenzofuran	NA	NA	7.31E-10									
Fluoranthene	NA	NA	2.55E-08									
Fluorene	NA	NA	5.78E-10									
Indeno(1,2,3-cd)pyrene	NA	NA	6.80E-09									
Naphthalene	8.60E-04	NA	1.33E-09	3.63E-10		4E-07		7.37E-10		9E-07		
Pentachlorophenol	NA	NA	4.08E-10									
Phenanthrene	NA	NA	8.16E-09									
Pyrene	NA	NA	2.55E-08									
Pesticides/PCBs												
4,4'-DDE	NA	NA	4.42E-09									
4,4'-DDT	NA	3.40E-01	2.21E-09		2.08E-10		7E-11		1.05E-10		4E-11	1E-10
alpha-Chlordane	2.00E-04	3.50E-01	3.57E-10	9.78E-11	3.35E-11	5E-07	1E-11	1.99E-10	1.70E-11	1E-06	6E-12	2E-11
gamma-Chlordane	2.00E-04	3.50E-01	3.91E-10	1.07E-10	3.67E-11	5E-07	1E-11	2.17E-10	1.86E-11	1E-06	7E-12	2E-11
Heptachlor epoxide	NA	9.10E+00	6.80E-11		6.39E-12		6E-11		3.24E-12		3E-11	9E-11
Herbicides												
2,4,5-T	NA	NA	4.25E-10									
2,4-DB	NA	NA	1.53E-09									
Total Hazard Quotient and Cancer Risk:						**1E-06**				**3E-06**		**2E-10**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CA =	EPC Surface Only	CA =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	20 m3/day	IR =	8.7 m3/day
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.

* See TABLE V68-1 for calculation of Air EPCs.

NA= Information not available.

Exposure Factor Assumptions used for Residential Scenario provided in Table V-2

TABLE V68-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Benzene	3.00E-03	2.90E-02	ND									
Chloroform	1.00E-02	6.10E-03	ND									
Tetrachloroethene	1.00E-02	5.20E-02	8.00E-03	1.10E-08	3.76E-09	1E-06	2E-10	1.02E-07	8.77E-09	1E-05	5E-10	7E-10
Toluene	2.00E-01	NA	3.00E-02	4.11E-08		2E-07		3.84E-07		2E-06		
Total Xylenes	2.00E+00	NA	2.00E-03	2.74E-09		1E-09		2.56E-08		1E-08		
Trichloroethene	NA	1.10E-02										
Semivolatile Organics												
2-Methylnaphthalene	4.00E-02	NA	3.10E-01	4.25E-07		1E-05		3.96E-06		1E-04		
Acenaphthene	6.00E-02	NA	4.90E-02	6.71E-08		1E-06		6.26E-07		1E-05		
Anthracene	3.00E-01	NA	9.70E-02	1.33E-07		4E-07		1.24E-06		4E-06		
Benzo(a)anthracene	NA	7.30E-01	9.00E-01		4.23E-07		3E-07		9.86E-07		7E-07	1E-06
Benzo(a)pyrene	NA	7.30E+00	7.70E-01		3.62E-07		3E-06		8.44E-07		6E-06	9E-06
Benzo(b)fluoranthene	NA	7.30E-01	9.40E-01		4.41E-07		3E-07		1.03E-06		8E-07	1E-06
Benzo(ghi)perylene	NA	NA	4.20E-01									
Benzo(k)fluoranthene	NA	7.30E-02	8.30E-01		3.90E-07		3E-08		9.10E-07		7E-08	9E-08
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	1.50E-01	2.05E-07	7.05E-08	1E-05	1E-09	1.92E-06	1.64E-07	1E-04	2E-09	3E-09
Butylbenzylphthalate	2.00E-01	NA	1.80E-02	2.47E-08		1E-07		2.30E-07		1E-06		
Carbazole	NA	2.00E-02	8.00E-02		3.76E-08		8E-10		8.77E-08		2E-09	3E-09
Chrysene	NA	7.30E-03	1.00E+00		4.70E-07		3E-09		1.10E-06		8E-09	1E-08
Di-n-butylphthalate	1.00E-01	NA	ND									
Di-n-octylphthalate	2.00E-02	NA	1.80E-02	2.47E-08		1E-06		2.30E-07		1E-05		
Dibenz(a,h)anthracene	NA	7.30E+00	2.20E-01		1.03E-07		8E-07		2.41E-07		2E-06	3E-06
Dibenzofuran	NA	NA	4.30E-02									
Fluoranthene	4.00E-02	NA	1.50E+00	2.05E-06		5E-05		1.92E-05		5E-04		
Fluorene	4.00E-02	NA	3.40E-02	4.66E-08		1E-06		4.35E-07		1E-05		
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	4.00E-01		1.88E-07		1E-07		4.38E-07		3E-07	5E-07
Naphthalene	2.00E-02	NA	7.80E-02	1.07E-07		5E-06		9.97E-07		5E-05		
Pentachlorophenol	3.00E-02	1.20E-01	2.40E-02	3.29E-08	1.13E-08	1E-06	1E-09	3.07E-07	2.63E-08	1E-05	3E-09	5E-09
Phenanthrene	NA	NA	4.80E-01									
Pyrene	3.00E-02	NA	1.50E+00	2.05E-06		7E-05		1.92E-05		6E-04		
Pesticides/PCBs												
4,4'-DDE	NA	3.40E-01	2.60E-01		1.22E-07		4E-08		2.85E-07		1E-07	1E-07
4,4'-DDT	5.00E-04	3.40E-01	1.30E-01	1.78E-07	6.11E-08	4E-04	2E-08	1.66E-06	1.42E-07	3E-03	5E-08	7E-08
alpha-Chlordane	5.00E-04	3.50E-01	2.10E-02	2.88E-08	9.86E-09	6E-05	3E-09	2.68E-07	2.30E-08	5E-04	8E-09	1E-08
gamma-Chlordane	5.00E-04	3.50E-01	2.30E-02	3.15E-08	1.08E-08	6E-05	4E-09	2.94E-07	2.52E-08	6E-04	9E-09	1E-08
Heptachlor epoxide	1.30E-05	9.10E+00	4.00E-03	5.48E-09	1.88E-09	4E-04	2E-08	5.11E-08	4.38E-09	4E-03	4E-08	6E-08
Herbicides												
2,4,5-T	1.00E-02	NA	2.50E-02	3.42E-08		3E-06		3.20E-07		3E-05		
2,4-DB	8.00E-03	NA	9.00E-02	1.23E-07		2E-05		1.15E-06		1E-04		
Total Hazard Quotient and Cancer Risk:						**1E-03**				**1E-02**		**1E-05**

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CF =	1E-06 kg/mg	CF =	1E-06 kg/mg
CS =	EPC Surface Only	CS =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	100 mg soil/day	IR =	200 mg soil/day
FI =	1 unitless	FI =	1 unitless
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V68-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-68
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics													
Benzene	2.85E-03	3.05E-02	NA	ND									
Chloroform	1.00E-02	6.10E-03	NA	ND									
Tetrachloroethene	1.00E-02	5.20E-02	NA	8.00E-03									
Toluene	2.00E-01	NA	NA	3.00E-02									
Total Xylenes	1.80E+00	NA	NA	2.00E-03									
Trichloroethene	NA	1.22E-02											
Semivolatile Organics													
2-Methylnaphthalene	4.00E-02	NA	NA	3.10E-01									
Acenaphthene	6.00E-02	NA	NA	4.90E-02									
Anthracene	3.00E-01	NA	NA	9.70E-02									
Benzo(a)anthracene	NA	7.30E-01	NA	9.00E-01									
Benzo(a)pyrene	NA	1.46E+01	NA	7.70E-01									
Benzo(b)fluoranthene	NA	7.30E-01	NA	9.40E-01									
Benzo(ghi)perylene	NA	NA	NA	4.20E-01									
Benzo(k)fluoranthene	NA	7.30E-02	NA	8.30E-01									
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	1.50E-01									
Butylbenzylphthalate	2.00E-01	NA	NA	1.80E-02									
Carbazole	NA	2.00E-02	NA	8.00E-02									
Chrysene	NA	7.30E-03	NA	1.00E+00									
Di-n-butylphthalate	9.00E-02	NA	NA	ND									
Di-n-octylphthalate	NA	NA	NA	1.80E-02									
Dibenz(a,h)anthracene	NA	7.30E+00	NA	2.20E-01									
Dibenzofuran	NA	NA	NA	4.30E-02									
Fluoranthene	4.00E-02	NA	NA	1.50E+00									
Fluorene	4.00E-02	NA	NA	3.40E-02									
Indeno(1,2,3-cd)pyrene	NA	7.30E-01	NA	4.00E-01									
Naphthalene	2.00E-02	NA	NA	7.80E-02									
Pentachlorophenol	3.00E-02	1.20E-01	1.00E-02	2.40E-02	1.91E-08	6.54E-09	6E-07	8E-10	3.53E-08	3.02E-09	1E-06	4E-10	1E-09
Phenanthrene	NA	NA	NA	4.80E-01									
Pyrene	3.00E-02	NA	NA	1.50E+00									
Pesticides/PCBs													
4,4'-DDE	NA	1.70E+00	NA	2.60E-01									
4,4'-DDT	1.00E-04	1.70E+00	NA	1.30E-01									
alpha-Chlordane	5.00E-04	3.50E-01	NA	2.10E-02									
gamma-Chlordane	5.00E-04	3.50E-01	NA	2.30E-02									
Heptachlor epoxide	1.30E-05	9.10E+00	NA	4.00E-03									
Herbicides													
2,4,5-T	1.00E-02	NA	NA	2.50E-02									
2,4-DB	8.00E-03	NA	NA	9.00E-02									
Total Hazard Quotient and Cancer Risk:							6E-07				1E-06		1E-09

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	1E-06	kg/mg	CF =	1E-06	kg/mg
CS =	EPC Surface Only		CS =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
SA =	5,800	cm2	SA =	2,300	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

SEAD-70

TABLE V70-1
AMBIENT AIR EXPOSURE POINT CONCENTRATIONS - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Air EPC from Surface Soil (mg/m^3) = $CS_{surf} \times PM_{10} \times CF$

Variables:
CS_{surf} = Chemical Concentration in Surface Soil. from EPC data (mg/kg)
PM_{10} = Average Measured PM_{10} Concentration = 17 ug/m^3
CF = Conversion Factor = 1E-9 kg/ug

Analyte	EPC Data for Surface Soil (mg/kg)	Calculated Air EPC Surface Soil (mg/m^3)
Volatile Organics		
Acetone	6.20E-02	1.05E-09
Methyl ethyl ketone	ND	ND
Toluene	ND	ND
Semivolatile Organics		
Bis(2-Ethylhexyl)phthalate	5.50E-01	9.35E-09
Di-n-butylphthalate	5.40E-02	9.18E-10
Di-n-octylphthalate	ND	ND
Fluoranthene	2.90E-02	4.93E-10
Pyrene	2.60E-02	4.42E-10
Metals		
Arsenic	8.85E+01	1.50E-06

ND = Compound was not detected.

TABLE V70-2
CALCULATION OF INTAKE AND RISK FROM INHALATION OF DUST IN AMBIENT AIR
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CA \times IR \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CA = Chemical Concentration in Air, Calculated from Air EPC Data
IR = Inhalation Rate
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Fac

Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Inhalation RfD (mg/kg-day)	Carc. Slope Inhalation (mg/kg-day)-1	Air EPC* from Surface Soil (mg/m3)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Acetone	NA	NA	1.05E-09									
Methyl ethyl ketone	2.86E-01	NA	ND									
Toluene	1.14E-01	NA	ND									
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	NA	NA	9.35E-09									
Di-n-butylphthalate	NA	NA	9.18E-10									
Di-n-octylphthalate	NA	NA	ND									
Fluoranthene	NA	NA	4.93E-10									
Pyrene	NA	NA	4.42E-10									
Metals												
Arsenic	NA	1.51E+01	1.50E-06		1.41E-07		2E-06		7.17E-08		1E-06	3E-06
Total Hazard Quotient and Cancer Risk:												3E-06

Assumptions for Resident (Adult)		Assumptions for Resident (Child)	
CA =	EPC Surface Only	CA =	EPC Surface Only
BW =	70 kg	BW =	15 kg
IR =	20 m3/day	IR =	8.7 m3/day
EF =	350 days/year	EF =	350 days/year
ED =	24 years	ED =	6 years
AT (Nc) =	8,760 days	AT (Nc) =	2,190 days
AT (Car) =	25,550 days	AT (Car) =	25,550 days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
* See TABLE V70-1 for calculation of Air EPCs.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V70-3
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\dfrac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, Calculated from Soil EPC Data
IR = Ingestion Rate
CF = Conversion Factor
FI = Fraction Ingested
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)'	Carc. Slope Oral (mg/kg-day)-1	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Acetone	1.00E-01	NA	6.20E-02	8.49E-08		8E-07		7.93E-07		8E-06		
Methyl ethyl ketone	6.00E-01	NA	ND									
Toluene	2.00E-01	NA	ND									
Semivolatile Organics												
bis(2-Ethylhexyl)phthalate	2.00E-02	1.40E-02	5.50E-01	7.53E-07	2.58E-07	4E-05	4E-09	7.03E-06	6.03E-07	4E-04	8E-09	1E-08
Di-n-butylphthalate	1.00E-01	NA	5.40E-02	7.40E-08		7E-07		6.90E-07		7E-06		
Di-n-octylphthalate	2.00E-02	NA	ND									
Fluoranthene	4.00E-02	NA	2.90E-02	3.97E-08		1E-06		3.71E-07		9E-06		
Pyrene	3.00E-02	NA	2.60E-02	3.56E-08		1E-06		3.32E-07		1E-05		
Metals												
Arsenic	3.00E-04	1.50E+00	8.85E+01	1.21E-04	4.16E-05	4E-01	6E-05	1.13E-03	9.70E-05	4E+00	1E-04	2E-04
Total Hazard Quotient and Cancer Risk:						**4E-01**				**4E+00**		**2E-04**

Assumptions for Resident (Adult)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	70	kg
IR =	100	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	24	years
AT (Nc) =	8,760	days
AT (Car) =	25,550	days

Assumptions for Resident (Child)

CF =	1E-06	kg/mg
CS =	EPC Surface Only	
BW =	15	kg
IR =	200	mg soil/day
FI =	1	unitless
EF =	350	days/year
ED =	6	years
AT (Nc) =	2,190	days
AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V70-4
CALCULATION OF ABSORBED DOSE AND RISK FROM DERMAL CONTACT TO SOIL
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CS = Chemical Concentration in Soil, from Soil EPC Data
CF = Conversion Factor
SA = Surface Area Contact
AF = Adherence Factor
ABS = Absorption Factor
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Lifetime Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Absorption Factor* (unitless)	EPC Surface Soil (mg/kg)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics													
Acetone	1.00E-01	NA	NA	6.20E-02									
Methyl ethyl ketone	6.00E-01	NA	NA	ND									
Toluene	2.00E-01	NA	NA	ND									
Semivolatile Organics													
bis(2-Ethylhexyl)phthalate	1.00E-02	2.80E-02	NA	5.50E-01									
Di-n-butylphthalate	9.00E-02	NA	NA	5.40E-02									
Di-n-octylphthalate	NA	NA	NA	ND									
Fluoranthene	4.00E-02	NA	NA	2.90E-02									
Pyrene	3.00E-02	NA	NA	2.60E-02									
Metals													
Arsenic	2.40E-04	1.88E+00	1.00E-02	8.85E+01	7.03E-05	2.41E-05	3E-01	5E-05	1.30E-04	1.12E-05	5E-01	2E-05	7E-05
Total Hazard Quotient and Cancer Risk:							**3E-01**				**5E-01**		**7E-05**

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	1E-06	kg/mg	CF =	1E-06	kg/mg
CS =	EPC Surface Only		CS =	EPC Surface Only	
BW =	70	kg	BW =	15	kg
SA =	5,800	cm2	SA =	2,300	cm2
AF =	1	mg/cm2	AF =	1	mg/cm2
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
* USEPA Region 2 recommends quantifying dermal exposure only for cadmium, arsenic, PCBs, dioxins/furans and pentachlorophenol, since absorption factors are not available for other chemicals of concern.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V70-5
CALCULATION OF INTAKE AND RISK FROM INHALATION OF GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70

Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Based on a lack of toxicity data (i.e. inhalation RfDs and carcinogenic slope factors for the analytes detected) risks from this pathway were not quantified.

TABLE V70-6
CALCULATION OF INTAKE AND RISK FROM THE INGESTION OF GROUNDWATER
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{CW \times IR \times EF \times ED}{BW \times AT}$

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Variables (Assumptions for Each Receptor are Listed at the Bottom):
CW = Chemical Concentration in Groundwater, from Groundwater EPC Data
IR = Ingestion Rate
EF = Exposure Frequency
ED=Exposure Duration
BW=Bodyweight
AT=Averaging Time

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Oral RfD (mg/kg-day)	Carc. Slope Oral (mg/kg-day)-1	EPC Groundwater (mg/liter)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics												
Acetone	1.00E-01	NA	1.10E-02	3.01E-04		3E-03		7.03E-04		7E-03		
Total Hazard Quotient and Cancer Risk:						**3E-03**				**7E-03**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
BW =	70	kg	BW =	15	kg
IR =	2	liters/day	IR =	1	liters/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

TABLE V70-7
CALCULATION OF INTAKE AND RISK FROM DERMAL CONTACT TO GROUNDWATER (WHILE SHOWERING)
REASONABLE MAXIMUM EXPOSURE (RME) - SEAD-70
Decision Document - Mini Risk Assessment
Seneca Army Depot Activity

Equation for Intake (mg/kg-day) = $\frac{DA \times SA \times EF \times ED}{BW \times AT}$

Variables (Assumptions for Each Receptor are Listed at the Bottom)

DA = Absorbed Dose per Event
SA = Surface Area Contact
EF = Exposure Frequency
ED = Exposure Duration
BW = Bodyweight
AT = Averaging Time

Equation for Absorbed Dose per Event (DA)

For organics: $DA = 2Kp \times CW \sqrt{\frac{6 \times \tau \times ET}{\pi}} \times CF$

For inorganics: $DA = Kp \times CW \times ET \times CF$

Kp = Permeability Coefficient
CW = EPC Cderm
ET = Exposure Time
τ = Lag Time
CF = Conversion Factor

Equation for Hazard Quotient = Chronic Daily Intake (Nc)/Reference Dose

Equation for Contribution to Cancer Risk = Chronic Daily Intake (Car) x Slope Factor
Equation for Total Lifetime Cancer Risk = Adult Contribution + Child Contribution

Analyte	Dermal RfD (mg/kg-day)	Carc. Slope Dermal (mg/kg-day)-1	Permeability Coefficient Kp (cm/hr)	Tau (hours)	EPC Groundwater (mg/liter)	Absorbed Dose/Event (mg-cm²/event)	Resident (Adult) Intake (mg/kg-day) (Nc)	Resident (Adult) Intake (mg/kg-day) (Car)	Resident (Adult) Hazard Quotient	Resident (Adult) Contribution to Lifetime Cancer Risk	Resident (Child) Intake (mg/kg-day) (Nc)	Resident (Child) Intake (mg/kg-day) (Car)	Resident (Child) Hazard Quotient	Resident (Child) Contribution to Lifetime Cancer Risk	Resident Total Lifetime Cancer Risk
Volatile Organics															
Acetone	1.00E-01	NA	5.70E-04	2.00E-01	1.10E-02	3.87E-09	1.22E-06		1E-05		2.27E-06		2E-05		
Total Hazard Quotient and Cancer Risk:									**1E-05**				**2E-05**		

Assumptions for Resident (Adult)			Assumptions for Resident (Child)		
CF =	0.001	l/cm3	CF =	0.001	l/cm3
BW =	70	kg	BW =	15	kg
SA =	23,000	cm2	SA =	9,180	cm2
ET =	0.25	hours/day	ET =	0.25	hours/day
EF =	350	days/year	EF =	350	days/year
ED =	24	years	ED =	6	years
AT (Nc) =	8,760	days	AT (Nc) =	2,190	days
AT (Car) =	25,550	days	AT (Car) =	25,550	days

Note: Cells in this table were intentionally left blank due to a lack of toxicity data.
NA= Information not available.
Exposure Factor Assumptions used for Residential Scenario provided in Table V-2.

Response to the Comments from US Environmental Protection Agency, Region 2

Subject: Draft Decision Document- Mini Risk Assessment for SEAD-9, 27, 28, 32, 33, 34, 43, 44A, 44B, 52, 56, 58, 62, 64A, 648, 64C, 64D, 66, 68, 69, 72, and 120B Seneca Army Depot, Romulus, New York

Comments Dated: August 7, 2000

Date of Comment Response: February 2, 2001

US EPA Comments:

Introductory Comment:

This is in reference to the above subject document dated April 2000. EPA reviewed the subject document and submits the following comments.

GENERAL COMMENTS - Human Health

Comment 1:

There were no toxicological profiles provided for the COCs selected. Although references for the toxicological profiles were provided, the document would be more complete if toxicological profiles were included as an appendix to the document.

Response:

The Army acknowledges that toxicological profiles are needed to document the potential impacts of chemicals on human and ecological populations. However, the Army does not believe that it is necessary or appropriate to include the profiles in each report that contains discussions of human health and ecological risk assessments. To do so, would add up to 300 to 500 pages to the appendices of each report. The addition of this amount of paper to each report does not seem to be consistent with another recurrent comment from all parties involved in the Seneca Army Depot Activity Program that all of the reports are too voluminous, and that the Army should endeavor to streamline each report to the fullest extent possible.

Therefore, if the US EPA strongly believes that the availability of hard-copy toxicological profiles is necessary, the Army would consider issuing a separate document that would contain toxicological profiles for the chemicals that have been commonly found at the Depot. This stand-alone document would then serve as a global, background reference for all subsequent submissions containing discussions on human health and ecological risk assessment. As necessary, data and information contained in the separate toxicological profile addendum would be updated to reflect changes that are occurring in continuing toxicological research. This approach would be less costly overall, and it would reduce the size of all subsequently submitted reports containing discussions on risk assessment. If the US EPA does not strongly believe that the hard-copy is needed, the Army would submit that the references currently provided in the document are adequate to address the source of the information.

Comment 2:

Analytical results tables in Appendices have shaded cells. These cells are difficult to read and should be made lighter.

Response:

Agree/Concur. The tables have been regenerated using a lighter shading to highlight the specific sample concentrations that exceed a comparative criteria value.

Comment 3:

To facilitate cross-checking of parameters, the risk tables found in Chapter 3 and the risk calculation tables found in the Appendices should have references to the appropriate parameters table (Tables 3.3-1 through 3.3-5).

Response:

Agree/Concur. Cross references have been added to the appendix table to assist the reader in determining the basis for the Exposure Factor parameters that have been used.

Comment 4:

Many of the Intake and Risk from Inhalation of Dust in Ambient Air tables located in the Appendices have references to tables that are not found in this document. Please verify that the appropriate tables are referenced for calculation of Air EPCs.

Response:

Agree/Concur. Table references for Air Exposure Point Concentration calculations have been reviewed, corrected and verified. New appendix tables with the proper table references have been provided in this revised draft.

MAJOR CONCERNS - Human Health

There were a number of major concerns identified during the human health review of the Draft Decision Document – Mini-Risk Assessment: SEAD: 9, 27, 28, 32, 33, 34,43, 44A, 44B, 52,56, 58, 62, 64A, 64B, 64C, 64D, 66, 68,69, 72 and 120B, Seneca Army Depot.

Comment 1:

For the Conservation and Recreation future land use areas, the Child Visitor was the only receptor presented. The inhalation rate for an Adult Visitor is higher than the inhalation rate for the Child Visitor. This would increase the risk calculated for the inhalation intake and affect the final result for risks calculated for the Conservation and Recreation future land use areas. Therefore, use of an Adult Visitor should also be evaluated.

Response:

Disagree. Even though the inhalation rate for an adult male is larger that that of a child between the ages of 1 and 12, the difference is (i.e., 14.7 m^3/day for adult versus 8.7 m^3/day for child) insufficient to offset the difference in average weight (i.e., 70 kg for adult male versus 15 kg for average child). If the intake equation is reviewed (see below), it becomes clear that despite the increase in the adults inhalation rate, the result of the combined term inhalation rate/body weight actually decreases from 0.58 for a child to 0.21 for an adult. As this term is a multiplier, the results of the exposure will also drop by a factor of over 2.75 resulting in less potential risk to adult if all other factors remain the same.

$$\text{Intake} = \frac{(\text{chemical conc in air}) \times \textbf{\textit{(inhalation rate)}} \times (\text{exposure frequency}) \times (\text{exposure duration})}{\textbf{\textit{(body weight)}} \times (\text{averaging time})}$$

To verify that the child visitor is the more sensitive receptor, the following table is provided to summarize an adult visitor's exposure via inhalation of dust in ambient air for each of the four SEADs (i.e., SEAD-58, 64B, 64D, and 70) that are located in the conservation/recreation portion of SEDA. The results of these computations are summarized below.

Species	**Child**		**Adult**	
SEAD	Hazard Quotient	Cancer Risk	Hazard Quotient	Cancer Risk
SEAD-58	3E-11	3E-15	1E-11	1E-15
SEAD-64B	3E-11	4E-13	1E-11	1E-13
SEAD-64D	1E-8	1E-16	5E-9	5E-17
SEAD-70	NQ	4E-8	NQ	1E-8

Comment 2:

For Dermal Contact to Soil calculations found in Table A-9 (SEAD 9), the incorrect surface area was used for the Day Care Center Child. The surface area used was higher than the surface area parameter listed in Table 3.3-1. The value used in the calculation, while not correct, would result in a higher calculated intake for dermal exposure than the surface area specified in the parameters table.

Response:

Agree/Concur. The correct surface area value (i.e., 2,190 cm^2) replaced the incorrect value (i.e., 5,800 cm^2) and new values for hazard quotients and cancer risks were calculated. The corrected table is inserted into the revised report.

Comment 3:

For Inhalation of Dust on the Construction Worker scenario at SEADs 43, 56 and 69 (Tables G-9 and G-10), the incorrect Exposure Frequency was used. The Exposure Frequency listed in Table G-9 for inhalation of dust for the Construction Worker is 24.25 days/year. The Exposure Frequency found in Table 3.3-5 for the Construction Worker 250 days/year. This large difference between the two exposure frequencies could result in an inhalation risk from dusts for the Construction Worker that might be at least 10 times greater than what was presented in the risk evaluation presented in this Decision Document.

Response:

Disagree. The proper exposure frequency for the construction worker in SEADs 43, 56 and 69 is 24.25 days. This number was derived using the assumption that the duration of the entire construction project for the prison site would be 1 year, or 250 workdays. During the overall construction project, it was assumed that the construction worker would spend time in each of the SEADs encompassed by the proposed project on a proportionate basis. To estimate the amount of time that the construction worker would spend in each SEAD, the ratio of the area of the individual SEAD to the total area encompassed by the eight SEADs (excluding SEAD-64C) was computed. This details and results of this evaluation are presented below.

Site	Area (sq. foot)	Percent of Total Area	Exposure Frequency (days)
SEAD-120B	33,750	0.6	1.5
SEAD-43,56,69	540,000	9.7	24.25
SEAD-44A	715,000	12.8	32
SEAD-44B	70,000	1.3	3.25
SEAD-52	280,000	5.0	12.5
SEAD-62	3,934,000	70.7	176.5
TOTAL AREA	5,572,750*	100	250

Based on these calculations and assumptions the proper exposure frequency for a construction worker in SEADs-43, 56 and 69 is 24.25 days, as is reflected in the Tables presented in Appendix G.

The discussion of this component of the construction worker scenario was omitted from the draft section that establishes and defines the exposure scenarios in Chapter 3. This discussion and these results have also been added to the draft final in Section 3.3.5.2 and Table 3.3-6.

Comment 4:

Calculations presented in Appendix H for SEAD 44A include the risk for the Construction Worker. The exposure frequency for the risk of ingestion of soil found in Table 3.3-5 is 250 days/year. The exposure frequency used for calculations presented in Table H-10 was 32 days/year. This large difference between the two exposure frequencies presents could result in a risk calculation for ingestion of soil for the Construction Worker at SEAD 44A was underestimated by a factor of 10 in this Decision Document.

Response:

Disagree. See discussion provided in response to Comment 3 under Major Concerns – Human Health, above. The identified exposure frequency for SEAD-44A is based on the construction worker exposure of 32 days/year. The discussion of this component of the construction worker scenario was omitted from the draft section that establishes and defines the exposure scenarios in Chapter 3. This discussion has been added to the draft final. This factor was used in the Tables provided in Appendix H.

Comment 5:

Calculations for the Construction Workers risk from soil ingestion and dermal contact at SEAD 44B may also be underestimated. This is due to the use of an incorrect exposure frequency which was not specified for the Construction Worker on Prison Land scenario found in Table 3.3-5. The exposure frequency used in the calculation was 3.25 days/year. The exposure frequency found in Table 3.3-5 is 250 days/year.

Response:

Disagree. See discussion provided in response to Comment 3 under Major Concerns – Human Health, above. The identified exposure frequency for SEAD-44B is based on the construction worker exposure of 3.25 days/year. The discussion of this component of the construction worker scenario was omitted from the draft section that establishes and defines the exposure scenarios in Chapter 3. This discussion has been added to the draft final. This factor was used in the Tables provided in Appendix I.

Comment 6:

For SEAD 52, Appendix J, the exposure frequency for ingestion of soil for the construction worker is 12.5 days/year. Table 3.3-5 indicates that the correct exposure frequency for ingestion of soil for the Construction Worker is 250 days/year. The risks for the Construction Worker at SEAD 52 may be underestimated.

Response:

Disagree. See discussion provided in response to Comment 3 under Major Concerns – Human Health, above. The identified exposure frequency for SEAD-52 is based on the construction worker exposure of 12.5 days/year. The discussion of this component of the construction worker scenario was omitted from the draft section that establishes and defines the exposure scenarios in Chapter 3. This discussion has been added to the draft final. This factor was used in the Tables provided in Appendix J.

Comment 7:

For SEAD 62, the exposure frequency for the Construction Worker is listed as 176.5 days/year. Table 3.3-5 indicates that the appropriate exposure frequency for the Construction Worker on Prison land is 250 days/year. Additionally, the ingestion rate of groundwater for the Prison Worker is not consistent with the appropriate ingestion rate listed in Table 3.3-5. The risk assessor should verify that these assumptions are valid and present the rationale for selection of exposure parameters that differ from those presented in Section 3.0 of this Decision Document. The risks to the Construction Worker at SEAD 62 may be underestimated.

Response:

Disagree. See discussion provided in response to Comment 3 under Major Concerns – Human Health, above. The identified exposure frequency for SEAD-62 is based on the construction worker exposure of 176.5 days/year. The discussion of this component of the construction worker scenario was omitted from the draft section that establishes and defines the exposure scenarios in Chapter 3. This discussion has been added to the draft final. This factor was used in the Tables provided in Appendix L.

For the residential scenarios presented in Appendix V, the following Exposure Factors do not correspond to those presented in Table V-2:

Comment 8:

Table V27-4: Exposure Frequency for Dermal Contact to Groundwater – Adult 14 days/year should be 350 days/year.

Table V64A-7: Exposure Frequency for Dermal Contact to Groundwater – Adult 14 days/year should be 350 days/year.

Table V64C-7: Exposure Frequency for Dermal Contact to Groundwater – Adult 14 days/year should be 350 days/year.

Table V64D-7: Exposure Frequency for Dermal Contact to Groundwater – Adult 14 days/year should be 350 days/year.

Table V70-7: Exposure Frequency for Dermal Contact to Groundwater - Adult 14 days/year should be

350 days/year.

Response:

Agree/Concur. The appropriate change (i.e., 14 days/year changed to 350 day/year) has been made to all of the identified tables.

SPECIFIC COMMENTS – Human Health

Comment: Page 2-11, Section 2.3.4, SEAD-27, Summary of Analytical Results. Paragraph 4, Sentence 1. This sentence states "The T-sump groundwater samples were not considered to be representative of conditions resulting from the accumulation pit and were therefore, excluded from this analysis." It is not clear if groundwater samples are excluded from further risk evaluation or analytical evaluation.

Response:

The T-sump was a secondary containment device that was located under the cleaning operation. Available information indicates that it does not leak, and it is therefore isolated from the surrounding environment. A sample of material found in the sump was collected during the 1995 closure process and tested. Analytical results are available for the T-sump sample but have not been used with the other groundwater samples to describe the environmental conditions that were present at the site. The results of the other groundwater samples were considered in the risk assessment.

Comment: Page 2-12, Section 2.4.2, SEAD-28, Summary of Historic Operations. Paragraph 1, Sentence 4. This sentence states "Both tanks passed." This sentence is vague and it is not clear what both tanks passed means.

Response:

The sentence "Both tanks passed" was intended to indicate that both tanks were found to be in compliance with the integrity testing leakage limitations (i.e., leakage rate of 0.050 gallons per hour or less). This sentence has been modified to provide the actual results of the tests versus the integrity test limitation.

Comment: Page 2-21, Section 2.8.1, SEADs-43, 56 and 69, Site Description. Paragraph 2, Sentence 3. The following sentence is unclear: "There are no signs of stained soil or stressed vegetation and the area is relatively flat and grassy sloping off the road accesses about 2-3 feet for drainage purposes."

Response:

The sentence has been changed and expanded to be more descriptive. The original thought is now conveyed as "The area of SEAD-69 beyond the access roadway is relatively flat and covered by vegetation (grass). An elevation difference of roughly 3 feet exists between the surface of the road (higher elevation) and the grass cover land. There are no signs of stained soil or stressed vegetation present in the grass area."

Comment: Page 2-30, Section 2.9.4, SEAD-44A, Summary of Analytical Results. Paragraph 2, Sentence 2. Please define the "very low" concentrations of semivolatile organic compounds in the surface soil samples.

Response:

Analytical data for surface soil substantiating the term "very low" were provided in the appendices of the Decision Document Report in Table H-1. In summary, 15 total soil samples were collected, including six from the 0 to 0.2 foot below grade surface horizon (i.e., surface soil samples), and nine from depths of 3 feet or more below grade surface (i.e., subsurface soil samples). A total of 12 semivolatile organic compounds were detected in the six surface soil samples. Seven of the detected semivolatile organic compounds were found in only one sample each; four of the detected semivolatile organic compounds were detected in two samples each; while one compound [Bis(2-ethylhexyl)phthalate] was found in three separate surface soil samples. All measured concentrations reported for semivolatile organic compounds in the surface soil samples were qualified as "J" or estimated, and of the reported concentrations the highest reported "estimated" concentration was 250 J ug/Kg for the compound 4-methylphenol. The only measured concentration for a semivolatile organic compound in surface soil that approached its TAGM value was a 49 J measured for Benzo(a)pyrene (TAGM value is 61 ug/Kg).

Nevertheless, the sentence has been modified to be more descriptive. The sentence now reads "Twelve were detected in the six surface soil samples collected, but none were found at levels exceeding TAGM levels. All measured SVOC concentrations were reported as estimated values (i.e., "J" qualifier)."

Comment: Page 2-68, Section 2.17.3, SEAD-64D, Summary of Field Investigations, Soil Gas Survey. Paragraph 1. Please specify the instrumentation utilized in the soil gas survey.

Response:

An "active" soil gas survey was performed for SEAD-64D using a Photovac 1050S gas chromatograph. Samples were collected from the soil sampling point through a septum (one per sample location) using a 3-mL gas tight syringe and this sample was injected into the calibrated chromatograph for analysis.

Comment: Page 2-69, Section 2.17.3, SEAD-64D, Summary of Field Investigations, Soils. Paragraph 2. Sentence 1. Please clarify the following sentence: TP64D-1 was excavated exposed two layers of municipal waste occurring to a depth of 4 feet.

Response:

Agree/Concur. The referenced sentence has been revised and expanded to provide clarity. The following material has been inserted into the text.

"A two foot layer of municipal waste inter-mixed with a some fill was found in TP64-1 at a depth of 2 and 4 feet below grade. Field measurements indicated that VOC levels in the headspace above the waste were 3 ppm. The lens of municipal was overlain ill containing some municipal waste and underlain by silt."

Comment: Page 2-70, Section 2.17.4, SEAD-64D, Summary of Analytical Results, Soil. The first sentence of this section indicates that 36 soil samples were collected for this SEAD. The introduction to this section indicates that only 35 samples were collected. Reconcile this discrepancy.

Response:

Agree/Concur. The correct number of soil samples is 36. The sentences have been reconciled.

Comment: Page 2-72, Figure 2-16; SEAD-66, Map. Please identify and display buildings 5 and 6 on map.

Response:

Agree/Concur. The approximate locations of buildings 5 and 6 have been identified on Figure 2-16. However, since the map for this area is not to scale, the extent of the buildings is only estimated.

Comment: Page 3-13, Section 3.3.3.1, Current Land Use. Paragraph 1, Sentence 2. This sentence indicates that the sites in this study are abandoned and no longer in use. Information for SEAD-52, found on page 2-37, indicates that SEAD-52 "has been an active site from the mid 1950s to the present time." Please indicate which statement is valid.

Response:

Sites included in this study are abandoned and no longer in use. The text found on page 2-37 has been modified to indicate that site operations conducted in SEAD-52 were terminated in the late 1990s.

Comment: Page 3-93, Section 3.5.3, Risk Characterization for Lead. Paragraph 1, Sentence 3. The sentence "The median blood lead levels at each age predicted for day care exposure were shown to be 625 ppm lead in soil" is unclear. Please clarify this statement.

Response:

The paragraph has been revised and new tables and figures have been added to clarify the though that is being conveyed.

Comment: Page 4-16, Table 4.16-1, Effect of turbidity of groundwater, concentration of iron in soil on concentration of iron in groundwater at SEAD 64D. Please reference the footnote to this table where applicable. Additionally, the footnote should be rephrased to clearly indicate that the nearest soil boring was compared to each groundwater sample. This footnote should also be rephrased for Table 4.16-2.

Response:

Agree/Concur. Appropriate cross-references to Tables 4.16-1 and 4.16-2 have been added. The footnote on both tables has been revised to be more informative.

Comment: Appendix A, Table A-10, Calculation of Intake and, Risk from the Ingestion of Groundwater. The notes on this table indicate that because of a lack of inhalation RfDs, the ingestion of groundwater risk could not be calculated. The "inhalation" should be changed to "oral."

Response:

Agree/Concur. The suggested edit has been made.

Comment: Appendix L, Table L-7, Calculation of Intake and Risk from Inhalation of Dust in Ambient Air. According to Table 3.3-5, the inhalation rate listed for the Prison Inmate should be 15.2, not 15.3 as listed in this Table.

Response:

Agree/Concur. The correction has been made.

Comment: Appendix T, Analytical Results. The data qualifiers are not defined for the analytical result tables found in this Appendix.

Response:

Analytical results reported directly from the laboratory were initially used in this mini risk assessment. Since the issuance of the draft document, the data has been validated and more traditional data qualifiers have been assigned to the data. The new data qualifiers are the same as those used throughout the report. The validation of the data did not alter any of the values that were used in the mini risk assessment. A new copy of Table T-1 is provided in this version of the report.

Comment: Appendix T, Tables T–4, T--5. The titles for these tables should be corrected to indicate that this is a Decision Document and not a Completion Report.

Response:

Agree/Concur. The suggested corrections have been made to the identified Tables. Additionally, the same correction has been made on other tables in this appendix.

Comment: Appendix V, Table V9-6, Calculation of Intake and Risk from the Ingestion of Groundwater. The reference to the inhalation RfD should be changed to the oral RfD.

Response:

Agree/Concur. The suggested correction has been made to this table.

Comment: Appendix V, Table V27-4, Calculation of Intake and Risk from Dermal Contact to Groundwater while Showering. The footnote for *Cderm on this table has question marks at the end of a statement. Please complete the reference to the Cderm calculation table.

Response:

Agree/Concur. Table V27-5 was omitted from the draft version of this report. It is included in the draft final version.

GENERAL COMMENTS -Ecological Risk Assessment

<u>Comment 1:</u>

It is unclear why a screening level ecological risk assessment (SLERA) was not performed as part of this ERA. Performing a SLERA (Steps 1 and 2 as presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, USEPA 1997 (Process Document) could help to reduce the number of COPCs, therefore potentially reducing the amount of effort needed for further analysis. For future ERAs, it is recommended that a SLERA be performed.

Response:

Agree/Concur. SLERAs have BEEN, and will continue to be, considered during future ecological risk assessments.

<u>Comment 2:</u>

Assessment Endpoint 2 is stated in Table 3.6-1 as "No substantial adverse effect on populations of small mammals." It is unclear why foraging birds are not included in this assessment endpoint. Although the home ranges of birds are typically much larger than small mammals, birds can be much more sensitive to some chemicals (such as pesticides) than mammals. As a result, some toxicity reference values (TRVs) may be much lower for birds than for mammals resulting in potentially higher hazard quotients (HQs). It is recommended that Assessment Endpoint 2 be revised to include "no substantial adverse effect on populations of foraging birds." It is also recommended that a foraging bird species, such as the American robin, be included in the food chain modeling performed in the ERA.

Response:

Agree/Concur. An American Robin has been added as a foraging bird species within the ERA. Assessment Endpoint 2 has been modified as indicated.

<u>Comment 3:</u>

The food chain modeling was performed using only the most conservative parameters available such as maximum concentrations, NOAELs, and a site foraging factor (SFF) of one for both of the species being modeled. If HQs of greater than one were calculated, the uncertainties involved in using only the most conservative parameters in the food chain model were discussed along with how the use of less conservative, more realistic parameters would most likely result in lower HQ values. Additional food chain modeling should be performed to quantitatively show that the use of less conservative parameters would result in lower HQs. Simply speculating that HQ values would be below one if less conservative food chain modeling parameters were used does not provide adequate justification for excluding constituents from consideration as COCs. It is recommended that Section 3.6.4.1 be revised to include calculated HQ values using average concentrations, NOAELs, and more realistic SFFs where appropriate.

Response:

Agree/Concur. All food chain modeling continues to be conducted using the maximum measured concentration in a SEAD as the EPC. Site-specific site foraging factors have been developed for each ecological receptor (i.e., shrew, mouse, and robin) and SEAD, and these are derived from information that is provided in the Wildlife Exposures Handbook. If a COPC is determined to represent a potential threat to one or more of the receptors in a specific SEAD, the average concentration for the COPC has been subsequently determined and carried through the process. These data and the results of the calculations are summarized in the discussions presented in Section 3.6.4 for each of the SEADs.

SPECIFIC COMMENTS -Ecological Risk Assessment

Comment: Section 3.6.2, Page 3-98. This section discusses the problem formulation step of the ERA process. Five bulleted items are presented as the key elements of the problem formulation process. According to the Process Document, fate and transport and the ecological effects of contaminants are also part of the problem formulation process. These two additional items should be discussed in Section 3.6.2.

Response:

Agree/Concur. The two identified topics have been added to the steps of the Problem Formulation Process and discussions of each have been added.

Comment: Section 3.6.2.3, Page 100. This section discusses ecological assessment endpoints. The 1994 version of the Process Document is cited in the first sentence of this section. It is unclear why the most recent version (June, 1997) of the Process Document was not used in developing this ERA. An effort should be made to use the most recent version of all documents used in the development of this ERA.

Response:

The June 1997 version of the Process Document was used as the basis for developing this ERA. References to the Process Document were not correctly listed at the time of document preparation.

Comment: Section 3.6.2.3, Page 101. Three criteria are presented on page 101 to be considered in the selection of assessment endpoints. The criteria are: ecological relevance, susceptibility to the contaminant(s), and representation of management goals. According to the Process Document. mechanisms of toxicity and potential for complete exposure pathways should also be considered when selecting assessment endpoints. A brief discussion of these two additional topics should be presented in this section.

Response:

Disagree. The three criteria cited are the three criteria that are discussed in detail in the document Guidelines for Ecological Risk Assessment which is the cited reference.

Comment: Figure 3-7. Figure 3-7 presents the ecological conceptual site model (CSM) for the Seneca Army Depot Activity. Ingestion of surface soil is the only pathway marked for quantitative evaluation. Since ingestion of biota is included in the food chain model as a potential route of exposure, it should also be marked in the CSM as a principal pathway for quantitative evaluation. Figure 3-7 should be revised accordingly.

Response:

Comment: Section 3.6.2.4, Page 107. This section discusses the analysis plan for the ERA. The first sentence of this section states that the analysis plan is the final stage of problem formulation. According to the Process Document, the analysis plan is not part of problem formulation (Step 3) but is part of Step 4, Study Design and Data Quality Objectives Process. Section 3.6.2.4 should be revised to state that the analysis plan is part of the study design process, not problem formulation.

Response:

Disagree. The following is a direct quote from the EPA's document "Guidance for Ecological Risk Assessment" (Final, April 1998, EPA 630/R-95/002F) --- "***The analysis plan is the final stage of problem formulation.***" (page 41, Section 3.5) This document is issued as Final versus the Interim Final status of the Process Document. It also is issued after the Process Document, so it would seem to be logical that it represents the more recent state-of-the-art.

Comment: Table 3.6.2. Table 3.6-2 presents the wildlife intake rates used in the food chain modeling. Two problems were noted with this table.

It is unclear why a surface water ingestion rate is provided for the short-tailed shrew if surface water ingestion is not part of the food chain model. The surface water column should be removed from Table 3.6-2.

It is unclear why a soil ingestion rate is not provided for the short-tailed shrew. Since incidental soil ingestion is part of the food chain model, a soil ingestion rate should be provided for the short-tailed shrew.

Response:

Agree. The surface water ingestion rate has been removed from table discussing the food chain model for the shrew.

Disagree. The soil ingestion rate for the shrew is assumed to be zero. We are using this species to model the potential uptake of site chemicals by invertebrates which form the major component of its diet. This is stated in the text provided in Section 3.6.3.3. Soil intake rates have been assumed for both the deer mouse (2% of diet) and the robin (10.4%), so this path of exposure is considered under these species. An incidental soil intake rate of 2% (i.e., equivalent of that of the mouse) could have been assumed for the shrew, but this was believed to be redundant.