US Army
Engineering &
Support Center
Huntsville, AL

FEASIBILITY STUDY REPORT
OPEN DETONATION GROUNDS
MUNITIONS RESPONSE ACTION
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NEW YORK

FINAL
(REV 3)

VOLUME I

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US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY

FINAL (REVISION 3)
FEASIBILITY STUDY REPORT
FOR OPEN DETONATION GROUNDS MUNITIONS RESPONSE ACTION
SENECA ARMY DEPOT ACTIVITY, ROMULUS, NEW YORK

Contract No. W912DY-08-D-0003
Task Order No. 0013
EPA Site ID# NY0213820830
NY Site ID# 8-50-006

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FINAL
(REVISION 3)

FEASIBILITY STUDY REPORT

FOR

OPEN DETONATION GROUNDS MUNITIONS RESPONSE ACTION

SENECA ARMY DEPOT ACTIVITY
ROMULUS, SENECA COUNTY, NEW YORK

Prepared for:

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LIST OF ACRONYMS

2,4-DNT	2,4-dinitrotoluene
AGC	Advanced Geophysical Classification
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirements
Army	U.S. Army
ASR	Archives Search Report
BERA	Baseline Ecological Risk Assessment
BIP	Blow in Place
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
COC	Chemical of Concern
CSM	Conceptual Site Model
CY	Cubic Yards
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DoD	Department of Defense
ECSM	Ecological Conceptual Site Model
EE/CA	Engineering Evaluation and Cost Analysis
EM	Electromagnetic
EMI	Electromagnetic Induction
EPC	Exposure Point Concentration
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESI	Expanded Site Investigation
FRTR	Federal Remediation Technologies Roundtable
FS	Feasibility Study
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters.
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HE	High Explosive
HHRA	Human Health Risk Assessment
HI	Hazard Index
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HQ	Hazard Quotients
LOAEL	Lowest-Observable Adverse Effect Level
LRA	Local Redevelopment Authority

LIST OF ACRONYMS (CONTINUED)

LTM	Long Term Monitoring
LUC	Land Use Control
MC	Munitions Constituents
MD	Munitions Debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MSL	Mean sea level
mV	Millivolt
N/A	Not Applicable
NCP	National Contingency Plan
NOAEL	No-Observed Adverse Effect Level
NYCRR	New York Code of Rules and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
OB	Open Burning
OD	Open Detonation
OE	Ordnance and Explosives
OSWER	Office of Solid Waste and Emergency Response
Parsons ES	Parsons Engineering Science, Inc.
PCB	Polychlorinated Biphenyl
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTK	Real Time Kinematic
RSL	Regional Screening Levels
SARA	Superfund Amendments and Reauthorization Act
SCIDA	Seneca County Industrial Development Agency
SCO	Soil Cleanup Objective
SEAD	Seneca Army Depot (old name)
SEDA	Seneca Army Depot Activity
SPLP	Synthetic Precipitation Leaching Procedure

LIST OF ACRONYMS (CONTINUED)

SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TBC	To Be Considered
TOI	Targets of Interest
TP	Test Pit
TPV	Total Present Value
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
USACE	United States Army Corps of Engineers
USC	United States Code
USAEHA	United States Army Environmental Hygiene Agency
USEPA	United State Environmental Protection Agency
UU/UE	unlimited use/ unlimited exposure
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

GLOSSARY OF TERMS

Anomaly	A geophysical response that deviates from the responses in the surrounding area. Anomalies may indicate the presence of metallic objects.
Applicable or Relevant and Appropriate Requirements (ARARs)	Section 121(d)(2)(A) of CERCLA incorporates into law the CERCLA compliance policy, which specifies that Superfund remedial actions meet federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs).
Blow-in-Place (BIP)	The term used to describe the detonation of an ordnance item that is deemed unsafe to move from the location where it is discovered.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)	CERCLA authorizes federal action to respond to the release or threatened release of hazardous substances into the environment or a release or threat of release of a pollutant or contaminant into the environment that may present an imminent or substantial danger to public health or welfare.
Endangered Species Act (USC Title 16 Chapter 35§1536 (a)(2))	Each federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or results in destruction or adverse modification of habitat or such species.
Geophysical Techniques	Methods used to explore subsurface conditions using quantitative physical properties. Typical properties measured include seismic wave travel time and waveform changes, electrical potential differences, magnetic and gravitational field strength, temperature, etc. For MEC investigations, electromagnetic and magnetic methods are most frequently used.
Military Munitions	Military munitions are all ammunition products and components produced for or used by the Armed Forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the U.S. Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and CAs; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components other than non-nuclear components of nuclear devices, managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) have been completed [10 USC 101(e)(4)(A) through (C)].

GLOSSARY OF TERMS (CONTINUED)

Munitions Constituents (MC)	Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(4))
Munitions Debris (MD)	Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.
Munitions and Explosives of Concern (MEC)	This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: (1) unexploded ordnance (UXO) as defined in 10 USC. 101(e)(5)(A) through (C), (2) discarded military munitions (DMM) as defined in 10 U.S.C. 2710(e)(2), or (3) munitions constituents (e.g., TNT, RDX) as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard.
Material Potentially Presenting an Explosive Hazard (MPPEH)	Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially contaminated with a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, ventilation ducts) associated with munitions production, demilitarization or disposal operations. Excluded from MPPEH are munitions within DOD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.
National Oil and Hazardous Substance Pollution Contingency Plan (NCP)	Revised in 1990, the NCP provides the regulatory framework for responses under CERCLA. The NCP designates the Department of Defense as the removal response authority for ordnance and explosives hazards.
Stakeholder	Community organizations, property owners, and others having a personal interest or involvement or having a monetary or commercial involvement in the real property that is to undergo a munitions response action.
Superfund Amendments and Reauthorization Act (SARA)	Superfund Amendments and Reauthorization Act of 1986 (see CERCLA).
Unexploded Ordnance (UXO)	Military munitions that (1) have been primed, fuzed, armed, or otherwise prepared for action, (2) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material, and (3) remain unexploded either by malfunction, design, or any other cause [10 USC 101(e)(5)(A) through (C)].

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EXECUTIVE SUMMARY

This Feasibility Study (FS) Report addresses the Open Detonation (OD) Grounds (SEAD-006-R-01) (alias SEAD-45 and SEAD-115) located at the Seneca Army Depot Activity (SEDA) in Romulus, New York. Multiple prior investigations and remedial activities conducted at the OD Grounds, including the *Expanded Site Investigation (ESI), Ordnance and Explosives (OE) Engineering Evaluation/Cost Analysis (EE/CA), Phase I and Phase II OE Removal, Supplemental Munitions Response, and Munitions Response Activities (2012-2014)*, have confirmed the presence of munitions and explosives of concern (MEC) and munitions constituents (MC)/chemicals of potential concern (COPCs) at the site. This FS is required to evaluate possible remedial alternatives that will mitigate the risks to human health and the environment posed by MEC and MC/COPCs.

This report is part of the Remedial Investigation/Feasibility Study (RI/FS) process required for compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (SARA) of 1986. SEDA has officially been closed by the Department of Defense (DoD) and the Army since its historic mission was ceased in 2000.

The OD Grounds are a 403-acre parcel located in the northwestern corner of the SEDA and were historically used to conduct disposal of munitions by detonation. For purposes of this FS, two different portions of the OD Grounds Site are identified: the "OD Hill" and the "Kickout Area." The OD Hill is an area of elevated topography at the center of the OD Grounds where OD operations occurred. The Kickout Area is the portion of the site surrounding the OD Hill in which blast fragments emanating from OD operations might be found. The Seneca County Industrial Development Agency has sold the property that includes and encompasses the OD Grounds parcel to a private party for use as a conservation area, so the planned future use for the OD Grounds is conservation and passive recreation. "Passive recreation" refers to a use of the land where there is a limited activity and reduced potential for subsurface soil contact (i.e., does not include playgrounds or ballparks, but includes seasonal hunting and hiking on nature trails).

Multiple investigations and MEC removals have been completed at the OD Grounds starting with an initial investigation conducted in 1995. Based on these investigations, the data was evaluated and a conceptual site model (CSM) for the OD Grounds was developed and is presented in the Compilation of Site Characterization Report (included as **Appendix E**); the CSM indicates that MEC, in the form of unexploded ordnance (UXO) and discarded military munitions (DMM), is present in soil throughout the site. These UXO and DMM result from a wide variety of munitions items that were disposed of at the OD Grounds, including bombs, projectiles, rockets, mines, and fuzes. These UXO and DMM are concentrated around the OD Hill but have also been found in the Kickout Area around the OD Hill. The vertical CSM for the site demonstrates that the majority of the UXO, DMM, and non-hazardous munitions debris (MD) is found in the top two feet of soil at the OD Grounds. A MEC risk assessment conducted to evaluate these explosive hazards indicates that unacceptable MEC risk conditions are present in the Kickout Area under both current and planned future land use conditions. The MEC risk assessment also showed that, while MEC risk conditions are acceptable at the OD Hill under current land use conditions, the risk from explosives hazards is unacceptable under the planned future land use conditions.

The CSM indicates that MC/COPCs are present in soil in some areas and also in the shallow groundwater underlying the site. A human health risk assessment evaluated the risks from these MC/COPCs and concluded there are no unacceptable risks under current or anticipated future conditions. However, based on a hypothetical scenario of future residential land use, the risk assessment found there would be an unacceptable noncarcinogenic hazard to a hypothetical child resident associated with exposure to soil at the OD Hill, primarily as a result of Aroclor-1254 and cadmium in soil. The conclusions of the risk assessment also indicated there would be an unacceptable noncarcinogenic hazard to a hypothetical child resident associated with exposure to soil in the Kickout Area as a result of cobalt in soil. If drinking water wells were installed at the site, the groundwater would present both a carcinogenic risk and noncarcinogenic hazard to hypothetical future residents, future park workers, and current and future recreational users who might use groundwater as a source of potable water. Carcinogenic risk associated with exposure to groundwater is driven primarily by the observed concentrations of arsenic in the groundwater. Noncarcinogenic hazards are driven by the presence of aluminum, antimony, arsenic, chromium, cobalt, lead, manganese, thallium, and vanadium. However, groundwater at the OD Grounds is not currently used as drinking water, and the generally poor water quality and very low transmissivity makes future use of groundwater unlikely.

To address the identified risks at the OD Grounds posed by UXO/DMM in soil and MC/COPCs in soil and groundwater, remedial alternatives were developed for each contaminant identified. Site-specific remedial action objectives (RAOs) were developed to address UXO/DMM and MC/COPCs based on current and future conditions, the explosive safety hazards, and the potential risks identified. More detailed RAOs are described in this FS Report in **Section 2.0**, but simplified RAOs are summarized below:

- Reduce unacceptable risks due to the presence of UXO/DMM in soil to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved.
- Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.
- Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.
- Restore the property to a condition that is suitable to transfer for the given current and future use.

Remedial action alternatives were developed in accordance with the Guidance for Conducting RI/FS under CERCLA (United States Environmental Protection Agency [USEPA]/540/G-89/004, 1988). A range of remedial technologies were evaluated against the RAOs, and the technologies considered effective, implementable, and practical in terms of cost were assembled into remedial alternatives. Six alternatives were developed to address UXO/DMM in soil and MC/COPCs in soil and groundwater at the OD Grounds. These alternatives are summarized in **Table ES-1**.

Table ES-1
Summary of Remedial Alternatives and Elements

Alternative	Contaminant	Key Components
Alternative 1: No Action	N/A	None
Alternative 2: Land Use Controls (LUCs) only, including groundwater use restrictions	UXO/DMM	• Restrict the site to non-residential land use • Require MEC construction support for intrusive activities • Implement educational awareness for workers and visitors • Maintain the perimeter fence to control access • Conduct annual LUC inspections
	MC/COPCs	• Restrict the site to non-residential land use • Prohibit groundwater use as potable source
Alternative 3: Consolidate and cap with surface and subsurface clearance outside the cap and LUCs	UXO/DMM	• Consolidate soil with high densities of metallic debris at the OD Hill beneath an engineered cap • Conduct surface and subsurface MEC removal outside the cap • Prohibit intrusive activity within the cap footprint • Implement LUCs from Alternative 2
	MC/COPCs	• Consolidate contaminated soil at the OD Hill beneath the engineered cap and install low permeability barrier wall to prevent groundwater movement • Conduct long-term groundwater monitoring • Implement LUCs from Alternative 2
Alternative 4: Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC at the OD Hill • Conduct surface and subsurface MEC removal outside the OD Hill • Implement LUCs from Alternative 2
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated • Implement LUCs from Alternative 2
Alternative 5: Excavate entire site to 1 foot below grade and perform surface/subsurface clearance	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC across the whole site to 1 foot below grade • Conduct surface and subsurface MEC removal across the whole site following mechanical separation and sorting operation • Implement LUCs from Alternative 2
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated • Implement LUCs from Alternative 2
Alternative 6: Excavate entire site and process for off-site disposal	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC across the whole site to greater than 3 feet bgs
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated

These remedial alternatives were then screened, and the alternatives considered effective, implementable, and practical in terms of cost were retained for detailed analysis. Reduction of toxicity, mobility, or volume of contaminants was also taken into account during the screening step. Although Alternative 1 does not meet the effectiveness requirements, it was required to be retained for further evaluation for comparative purposes. Of the remaining remedial alternatives, Alternatives 2 through 5 were all considered effective, implementable, and practical with respect to cost. While Alternative 6 would be effective, it was not

considered implementable due to the excavation of over 1.8 million cubic yards of soil, which would cause significant impacts to the site and the habitat at this planned conservation area. The estimated costs of this alternative (over $200 million) was also considered excessive. For this reason, Alternative 6 was screened out at this stage and was not carried forward to the detailed analysis.

Following the screening step, the remaining remedial alternatives were analyzed in detail with respect to seven evaluation criteria:

1. Overall protection of human health and the environment;
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs);
3. Long-term effectiveness and permanence;
4. Reduction of toxicity, mobility, or volume of contaminants;
5. Short-term effectiveness;
6. Implementability; and
7. Cost.

The detailed comparative analysis of alternatives was conducted using the current CSM, which is based on the present state of knowledge concerning potential contamination and both current and reasonably anticipated future land use. If new information arises concerning contamination conditions at the site or if land uses change beyond what has been assumed, the evaluation of these remedial alternatives may need to be revisited. Required five-year reviews provide a formal mechanism to assess possible changes, evaluate whether implemented remedies remain sufficiently protective of human health and the environment, and recommend further steps to be taken if they are not.

Table ES-2 summarizes the detailed evaluation of the five remaining alternatives for reducing the risks from UXO/DMM in soil and MC/COPCs in soil and groundwater at the OD Grounds. Alternatives 1 and 2 would not be protective of human health and the environment and would not comply with ARARs, so neither are acceptable remedial alternatives for the OD Grounds. While the LUCs included in Alternative 2 would be effective at mitigating risks from UXO/DMM and MC/COPCs, the potential presence of UXO/DMM on the ground surface means that the LUCs on their own would not provide appropriate protection of human health and the environment under the planned future land use conditions. However, the LUCs included in Alternative 2 would be protective of human health when used in conjunction with the other measures included in Alternatives 3, 4 and 5.

Alternatives 3, 4 and 5 all are protective of human health and the environment, and comply with ARARs, so they satisfy the threshold criteria. Alternatives 4 and 5 are similar levels regarding long-term effectiveness and implementability; however, Alternative 5 has lower short-term effectiveness and higher cost. Alternative 4 ranks higher than Alternative 3 with regard to the five balancing criteria, with Alternative 3 being less effective over the long-term due to the need for maintenance of the engineered cap, providing less reduction of toxicity, mobility, or volume of wastes, having less favorable short-term effectiveness due to the compaction of soils with potential UXO/DMM, being less implementable due to

the permitting and legal framework of establishing an engineered cap, and having a higher cost than Alternative 4.

Based on a comparison of the evaluation criteria, the highest ranked remedial alternative for the OD Grounds is Alternative 4, including excavation of the OD Hill and surface and subsurface MEC clearance over the entire site to remove the source of explosive hazards, and implementation of LUCs to manage risks from residual explosive hazards and MC/COPCs in soil and groundwater. Based on the analyses of remedial alternatives conducted in this FS, a proposed plan should be developed for the OD Grounds to recommend preferred alternatives for implementation to address the various media. These preferred alternatives should comprise the remedial alternatives favored by the project stakeholders to address UXO/DMM in soil and the risks posed by MC/COPCs in soil and groundwater.

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Remedial Action Alternative	(1)	Total Score	Overall Ranking
Alternative 1: **No-Further Action**		Does not Meet Threshold Criteria	Excluded
Alternative 2: **LUCs Only, including groundwater restrictions**	680	Does not Meet Threshold Criteria	Excluded
Alternative 3: **Consolidate and Cap with Surface and Subsurface Clearance Outside the Cap and LUCs**	4,249	7	#3
Alternative 4: **Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs**	6,296	12	#1
Alternative 5: **Excavate entire site to 1 foot below grade and perform surface/subsurface clearance**	0,588	8	#2

(1) Costs shown are 30-year costs with dix D.
(2) See the "Decision Logic to Assess
(3) Alternatives were scored 0 to 3 for
(4) The total score of all subcategories ive.
(5) Shading shows alternative desirabi

1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION OF REPORT

This Feasibility Study (FS) Report for the Open Detonation (OD) Grounds located at the Seneca Army Depot Activity (SEDA) in Romulus, New York. The purpose of this FS is to identify and evaluate remedial alternatives to address Munitions and Explosions of Concern (MEC) and Munitions Constituents (MC) risks identified at the OD Grounds and to make the site suitable for its future use as a conservation area. This report is part of the Remedial Investigation/Feasibility Study (RI/FS) process required for compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA). The RI/FS at OD Grounds is being performed under the guidance of the United State Environmental Protection Agency (USEPA), USEPA Region II, and the New York State Department of Environmental Conservation (NYSDEC).

Several characterization efforts and investigations to evaluate explosive hazards and impacted media were conducted at the OD Grounds and were summarized in the following documents:

- Expanded Site Investigation (ESI) for Seven High Priority Solid Waste Management Units (SWMU) SEAD 1, 16, 17, 24, 25, 26, 45, Seneca Army Depot (Engineering Science, Inc, December 1995);
- Final Ordnance and Explosives (OE) Engineering Evaluation/Cost Analysis Report (EE/CA), Seneca Army Depot (Parsons ES, February 2004);
- Final Site-Specific Project Report Seneca Army Depot (old name) (SEAD) 45/115 OD Grounds OE Removal Phase I Geophysical Survey and Cost Estimate, Seneca Army Depot (Weston, March 2005);
- Draft Phase II OE Removal Report (Weston, March 2006);
- Additional Munitions Response Site (MRS) Investigation Report, Seneca Army Depot (Parsons, May 2010); and
- Draft Completion Report Munitions Response Action at the OD Grounds (SEAD-45) Seneca Army Depot Activity. (Parsons, 2016).

These reports serve as the basis of the characterization of the nature and extent of operational impacts presented in this report, and these previous activities provided the data to develop the assessment of risks to human health and environment at the OD Grounds. A MEC risk assessment, human health risk assessment (HHRA), and ecological risk assessment were completed as part of this FS, and are used to evaluate the existing and residual risk at this site. This FS considers the nature and extent of impacts that were characterized in the above documents and evaluates remedial action alternatives as potential remedies for mitigating risks at the OD Grounds. This report is organized in accordance with the Guidance for Conducting RI/FSs under CERCLA (USEPA, 1988).

Section 1 provides a brief overview of the characterization efforts, including background information, nature and extent of contamination, a summary of the HHRA and ecological risk assessment, and a summary of the MEC risk assessment. **Section 2** presents the remedial action objectives (RAO) for each

medium of concern and considers remedial response processes that meet the remedial objectives. **Section 3** evaluates the alternatives for each medium by preliminary screening to determine their relative merits for use in the remedial action. **Section 4** evaluates the remedial action alternatives in detail and provides the basis for selection of the remedy for the OD Grounds.

1.2 OD GROUNDS BACKGROUND

1.2.1 OD Grounds Description

The SEDA is located approximately 40 miles south of Lake Ontario, near Romulus, New York as shown in **Figure 1-1**. The facility is located in an uplands area, at an elevation of approximately 600 feet mean sea level (MSL), that forms a divide separating two of the New York Finger Lakes; Cayuga Lake on the east and Seneca Lake on the west. Sparsely populated farmland covers most of the surrounding area. New York State (NYS) Highways 96 and 96A adjoin SEDA on the east and west boundaries, respectively.

The SEDA previously occupied approximately 10,600 acres of land located in the Towns of Varick and Romulus in Seneca County, New York. The former military facility was owned by the U.S. Government and operated by the Army between 1941 and approximately 2000, when the SEDA military mission ceased. The historic military mission at the SEDA included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives, and special weapons. In 1995, the SEDA was designated for closure under the Department of Defense (DoD) Base Realignment and Closure (BRAC) process. The base closure process subsequently transfers property for reuse. The overall objective is to remediate the OD Grounds site, suitable for its future use, and as discussed below, the intended future use of the OD Grounds is as a conservation area.

The OD Grounds site is located in the northwestern corner of the Depot in Seneca County, New York and is also known as SEAD-006-R-01 (alias SEAD-45 and SEAD-115). The site, shown in **Figure 1-2**, is largely meadow with some wooded and heavily brushed areas. The OD Grounds was used to perform OD of munitions. The retained parcel that contains the OD Grounds is 403 acres. As defined in historical studies for the use of assigning work areas, the OD Grounds was assigned a series of radii (500ft, 1,000ft, 1,500ft, 2,000ft, and 2,500ft) centered on the OD Hill. The general area (421 acres) of greatest impact is defined by the 2,500-foot radius. Note that the Open Burning (OB) Grounds (also known as SEAD-23; 30.2 acres) is a separate site that was previously addressed and is not included in the calculation of the OD Grounds acreage. For purposes of this FS, two different portions of the OD Grounds site are identified: the "Kickout Area" and the "OD Hill". The OD Hill comprises the immediate location of demolition activities (i.e., the elevated topography at the center of the OD Grounds). The Kickout Area is the area in which blast fragments emanating from the OD Hill activity might be found, which is estimated as a 2,500-foot radius from the demolition site. The boundaries of these two areas are defined on **Figure 1-2.**

Access into the greater OD Grounds demolition area is possible via a paved road that enters the area from the southeast and roughly parallels the path of Reeder Creek along its western bank. The unnamed access road branches off North-South Baseline Road near Building 2104, which is located in the southeastern corner of the OD Grounds (**Figure 1-2**). Building 2104 was built in 1951 and is described as "Change House (OB/OD Grounds)". The building is not included in any lists of structures with potential unexploded

ordnance (UXO) hazards or in which potentially hazardous materials were stored (Woodward-Clyde, 1997). A change house is a location for military personnel to change clothes and uniforms.

1.2.2 Future Land Uses

CERCLA guidance, Land Use in the CERCLA Remedy Selection Process, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-04, directs decision makers to achieve cleanup levels associated with the reasonably anticipated future land use over as much of the site as possible. In 2005, the Seneca County Industrial Development Agency (SCIDA) revised the planned future use of property within the former Depot and added Institutional Training, Residential/Resort, Green Energy, Development Reserve, Training Area, and Utility uses. Currently the OD Grounds is within an Army retained parcel, under this revised future use plan, the OD Grounds is located in the "Conservation/Recreation" parcel of the former Depot (**Figure 1-3**).

The SCIDA has subsequently sold the property surrounding the OD Grounds parcel to a private party for use as a conservation area. The planned future use for OD Grounds is for conservation and passive recreation. "Passive recreation" refers to a use of the land where there is a limited activity and reduced potential for subsurface soil contact (i.e., does not include playgrounds or ballparks, but may include seasonal hunting and hiking on nature trails). Anticipated future land use may include access for groundwater monitoring, hunting, planting, and access for maintenance (e.g., roads and mowing fire breaks). In addition to the consideration of future land use during the remedy selection process, NYS regulations, New York Code of Rules and Regulations (NYCRR) Title 6, Chapter IV, Subchapter B, Part 375, Subpart 375-2.8 Remedial Program, requires evaluation of remedies that will restore the site conditions to "pre-disposal conditions to the extent feasible" (NYSDEC, 2013a).

1.2.3 Geological Setting

The Finger Lakes uplands area is underlain by a broad north-to-south trending series of rock terraces mantled by glacial till. As part of the Appalachian Plateau, the region is underlain by a tectonically undisturbed sequence of Paleozoic rocks consisting of shales, sandstones, conglomerates, limestones and dolostones. In the vicinity of SEDA, Devonian age (approximately 385 million years ago) rocks of the Hamilton Group are monoclinally folded and dip gently to the south. No evidence of faulting or folding is present. The Hamilton Group is a sequence of limestones, calcareous shales, siltstones, and sandstones.

SEDA geology is characterized by gray Devonian shale with a thin weathered zone where it contacts the overlying mantle of Pleistocene glacial till. This stratigraphy is consistent over the entire SEDA facility. The predominant surficial geologic unit present at the site is dense glacial till. The till is distributed across the entire facility and ranges in thickness from less than 2 feet to as much as 15 feet although it is generally only a few feet thick. The 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 ripped-up clasts removed by the active glacier.

The bedrock underlying the site is composed of the Ludlowville Formation of the Devonian age, Hamilton Group. Merin (1992) also cites three prominent vertical joint directions of northeast, north-northwest, and

east-northeast in outcrops of the Genesee Formation 30 miles southeast of SEDA near Ithaca, New York. Three predominant joint directions, N60E, N30W, and N20E are present within this unit (Mozola, 1951). These joints are primarily vertical. The Hamilton Group is gray-black, calcareous shale that is fissile and exhibits parting (or separation) along bedding planes.

1.2.4 Regional Hydrogeology

Regionally, four distinct hydrologic units were identified within Seneca County (Mozola, 1951). These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift. Overall, the groundwater in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water.

The water table aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake can be found in Mozola (1951) and Crain (1974). The geologic cross-sections suggest that a groundwater divide exists approximately half-way between the two Finger Lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be primarily westward towards Seneca Lake. Except for local variations in the hydrogeology, the SEDA hydrogeology is overall consistent with the regional hydrogeology.

Mozola (1951) suggests that three geologic units have been used to produce water for both domestic and agricultural purposes in the region. These units include: 1) a bedrock aquifer, which in this area is predominantly shale; 2) an overburden aquifer, which includes Pleistocene deposits (glacial till); and 3) a deep aquifer present within beds of limestone interbedded with the underlying shale.

Water derived from the limestone aquifer occurs to the north of the Depot and is not hydraulically connected to groundwater at the OD Grounds. At the time of the Mozola (1951) study, wells installed in the overburden aquifer (Pleistocene till) were found to have low yields (7.5 gpm) while the upper bedrock aquifer was found to have slightly better yields of 15 gpm. Limited transmissivity within the two upper aquifers was found to be a result of the relatively impermeable of the shales in this region (i.e., absorbing, transmitting, and yielding water very slowly). Joints and other openings in the shales are generally very narrow or are filled with fine silt and clay. This impermeability tends to inhibit downward seepage of water from the surficial deposits. Second, the slope of the bedrock and the land surfaces toward the Finger Lakes favors rapid drainage of surface water. Third, the overlying glacial drift is considered too thin to hold large quantities of water for gradual recharge of the bedrock.

1.2.5 Groundwater

Groundwater wells were installed at the OD Grounds in 1994 to determine groundwater flow direction and to sample for hazardous constituents; however, the hydrogeology of the OD Grounds was not investigated in detail. Numerous wells were installed during a RI at the OB Grounds site. The upper aquifer at both sites (OD and OB) was found to be comprised of till and weathered bedrock. The OB site is located approximately 600 ft southeast of the OD Grounds (OD Hill) and is surrounded by the portion of the OD Grounds referred to as the Kickout area. The conclusions determined in the OB Grounds RI about the hydrogeologic conditions are applicable to conditions at the OD Grounds.

Based on the groundwater investigation conducted at the OB Grounds during the RI, it is assumed that groundwater flow directions at the OD Grounds are similar to those at the OB Grounds (Parsons, 1994). Based on six rounds of groundwater elevation measurements at OB Grounds, the groundwater flow direction in the till/weathered shale aquifer was determined to be towards the east-northeast. One round of groundwater elevations was collected at OD Grounds. The April 4, 1994 contour surface for groundwater elevations collected at OB and OD Grounds is shown on **Figure 1-4**. Yearly groundwater elevations in six wells collected between 2007 and 2017 at OB Grounds confirms that the general groundwater flow direction is northeast towards Reeder Creek. The 1994 groundwater elevations suggest an approximately North-Northwest – South-Southeast trending groundwater divide through the western portion of the Open Burning Grounds (Parsons, 1994). Groundwater east of the divide flows to the northeast while groundwater west of the divide flows to the southwest. Groundwater elevations measured at the OD Grounds in April 1994 during the ESI agree with the groundwater flow direction determined during the OB RI and suggests a northeasterly direction of groundwater flow in the OD Hill area (**Figure 1-4**) (Parsons, 1995).

As described in the ESI, the distribution of groundwater in the till aquifer is characterized by moist soil (till) with water-saturated soil located within coarse-grained lenses. The deeper weathered shale horizons were saturated. The conditions of the till were confirmed in June 2018 during installation of replacement wells for the perchlorate sampling. Hydrogeologic conditions determined during the OB Grounds RI calculated a horizontal gradient of 0.013 ft/ft for the weathered shale unit. A similar value (0.011 ft/ft) was determined for the glacial till unit (Parsons, 1994). The RI concluded that one upper aquifer exists and is comprised of the overburden (till) and weathered shale. Average hydraulic conductivity for wells in the till unit was calculated to be 6.61×10^{-4} cm/sec and 1.27×10^{-3} cm/sec for wells in the weathered shale. For the till/weathered shale aquifer on the entire OB Grounds the average linear velocity was calculated to be 32.8 ft/year using the overall average conductivity of the till/weathered shale aquifer of 8.721×10^{-4} cm/sec, a horizontal gradient of 0.012 ft/ft, and an effective porosity of 30 percent.

In general, groundwater depths are shallow. Seasonal depths range between 2 and 7 ft below ground surface (bgs) (Parsons 1994; 2017; 2018). Groundwater sampling is difficult at Seneca due to slow recharge rates in the till/weathered bedrock aquifer and the potential for high turbidities. Given the factors discussed above (shallow aquifer, poor yield, and limited transmissivity), the groundwater in the aquifer at the OD Grounds is not considered a viable source of water to be used for domestic or agricultural purposes.

1.2.6 Surface Water

Surface drainage from SEDA flows to five primary creeks. In the southern portion of the Depot, the surface drainage flows through man-made drainage ditches and streams into Indian and Silver Creeks. These creeks then merge and flow into Seneca Lake just south of the former SEDA airfield. The central part and administration area of the SEDA drain into Kendaia Creek. Kendaia Creek flows in a predominant westerly direction, and discharges into Seneca Lake at a location north of Pontius Point and the SEDA's former Lake Shore Housing Area. The majority of the northwestern and north-central portion of the SEDA drains into Reeder Creek. Reeder Creek flows predominantly northwesterly and leaves the Depot at a point that is north of the OD Area (i.e., SEAD-45) and west of the former Weapons Storage Area or the "Q" (i.e., SEAD-12) before it turns to the west and flows into Seneca Lake. The northeastern portion of the Depot, which includes

a marshy area called the Duck Pond, drains into Kendig Creek and then flows north into the Cayuga-Seneca Canal and to Cayuga Lake. Other minor creeks are also present and drain portions of the Depot.

Surface water flow from precipitation events at OD Grounds is controlled by local topography which slopes gently to the east-northeast, as there is little relief on-site other than the demolition mound. In general, surface water flows east making its way into a network of drainage swales throughout the site that eventually lead into Reeder Creek, a sustained surface water body with non-precipitation event flow that is approximately 4 inches deep and 3 feet wide near the OD Grounds. Reeder Creek is approximately 800 ft northeast of OD Hill and flows to the north-northwest.

1.2.7 Site History

The OD Grounds was used to destroy excess, obsolete, or unserviceable munitions. Operations at the OD Grounds began circa 1941 when the Depot was first constructed and continued at regular intervals until circa 2000 when the military mission of the Depot ceased. This facility operated under Interim Status as a Subpart X Miscellaneous Unit for OB and OD of explosives, propellants and pyrotechnics and other unserviceable ammunition under 40 Code of Federal Regulations (CFR) Part 265 and NYCRR 373-1. Due to the closure of the Base, the Resource Conservation and Recovery Act (RCRA) permit was not finalized as Final Status. RCRA Closure requirements and RCRA Corrective Action requirements were deferred to the CERCLA program through the Federal Facility Agreement between the USEPA, NYSDEC, and the Army. Under this agreement and coordination with NYSDEC and USEPA, and after the closure of the ammunition mission in 1999, the Army was permitted to dispose of munitions via OB and OD for only those items recovered from site investigations and removals at this site.

During operations, munitions were placed in a hole created in the hill with additional demolition material, covered with a minimum of 8 feet of soil, and detonated remotely. After demolition was completed, explosively displaced portions of the mound were reconstructed by bulldozing displaced and native soils back into the central earthen mound.

The historic operations resulted in MEC (UXO and/or DMM) and munitions debris (MD) being expelled from the demolition location to the surrounding area. The investigations confirmed the area encompassing 1,000 feet to 2,500 feet from the OD Hill received "kickouts" from the demolition operation (**Figure 1-2**). UXO found on this range were items moved to this range for distruction.

1.2.8 Previous Investigations and Activities

This section provides a summary of the past investigations and removal actions conducted at the OD Grounds, and the discussion is organized by study in chronological order. The subsequent section, **Section 1.3**, synthesizes the data and presents a comprehensive nature and extent and conceptual site model (CSM).

Several investigations and MEC removals have been completed at the OD Grounds. **Table 1-1** lists the previous investigations. This section summarizes the studies that were completed, and the general scope of the work performed. To assign specific work areas to each study, the OD Grounds were divided into areas based on the radius around the center of the demolition berm. Over time the site was expanded to account for MD and UXO/DMM found outside the original 1,800-foot boundary (as defined in the Archives Search Report [ASR]). Each investigation covers a specific area of the site reported as a circle or ring with the

inner and outer radius specified. Additional detail for each project including the results of the investigation or findings of the removal actions is presented in **Section 2**.

Table 1-1
Summary of Previous Investigations
OD Grounds, SEDA, Romulus, NY

Previous Investigation	Year	Summary
United States Army Environmental Hygiene Agency (USAEHA) Study	1979-1982	Groundwater samples were analyzed for conventional pollutants and explosives and soil samples were analyzed for EP Toxicity and explosives.
ESI (Engineering Science, Inc., 1995)	1993-1994	Geophysics, test pitting, groundwater and surface water sampling conducted.
Archives Search Report (USACE, 1998)	1998	Site inspection, archives search and employee interviews to document previous military use and potential environmental contamination that could remain at the Seneca Army Depot.
OE EE/CA (Parsons ES, 2004)	2000	Characterized the nature and extent of MEC at the OD Ground using geophysical survey techniques and intrusive investigations.
Phase I Geophysical Investigation (Weston, 2005)	2003	Geophysical surveys collected using EM61 MK2 towed-array system to identify 14,700 anomalies within open areas between the 1,000 ft. and 1,500 ft. radius of OD Hill.
Phase II OE Removal Activities (Weston, 2006)	2003-2005	Reacquired, removed, and disposed of approximately 8,500 MEC/UXO and MD items located between the 1,500 ft. and 2,500 ft. radius from the OD Hill to a depth of 4 ft.
Additional Munitions Response Site Investigation (Parsons, 2010)	2010	Topographic and geophysical surveys of portions of the OD Grounds and the collection and analysis of soil samples from test pits (TP) and surface locations.
Munitions Response Action (Parsons, 2016)	2012-2014	Reacquired, and investigated 14,688 anomalies; used analog methods to remove UXO/DMM, and dispose of 15,885 munitions related items located between the 1,500 ft. and 2,500 ft. radius from the OD Hill to a depth of 4 ft.
MEC Clearance at OD Grounds	2012	Prior to early termination of contract, Digital Geophysical Mapping (DGM) survey of inner 1,000 feet completed.
Perchlorate Sampling	2018	Perchlorate sampling in soil, groundwater, ditch soil, and surface water.

Note Concerning Munitions Terminology: As shown in **Table 1-1**, multiple investigations have been conducted at the OD Grounds since the 1990s. Since that time, munitions terminology has changed from referring to "ordnance and explosives," or "OE" (i.e., explosively hazardous munitions items) and "OE scrap" (i.e., non-explosively hazardous pieces of expended munitions) to using the terms MEC (e.g., UXO and DMM), Material Potentially Presenting an Explosive Hazard (MPPEH), and MD (the definitions of these terms are presented in the Glossary). In addition, reports for the OD Grounds have sometimes used the more general term "MPPEH" to describe MEC and MD. For purposes of this report, correct terminology has been used wherever possible – i.e., the terms "MEC," "UXO," and "DMM" have been used in place of the terms "OE" and "MPPEH" wherever possible. However, the outdated terms may still be used if it is not possible to infer from the context of the original document which of the newer terms should be used. In these cases, the original terms will be presented in quotation marks.

1.2.8.1 United States Army Environmental Hygiene Agency Study

According to the ESI (ES, 1995) monitoring Wells MW-1 through MW-5 were sampled in 1979 for conventional pollutants and explosives. The explosive compound 4-amino-2,6-dinitrotoluene was detected in groundwater from wells MW-1 to MW-4 and from Reeder Creek. In 1982, USAEHA analyze soil samples at eight locations for EP Toxicity (As, Ba, Cd, Cr, Hg, Pb, Se, and Ag) and explosives. Cadmium and explosives were detected in all samples.

1.2.8.2 Expanded Site Investigation for Seven High Priority SWMUs

Engineering Science, Inc. (ES) completed an ESI at SWMUs that were designated as Areas of Concern (AOCs) within the SEDA, including the OD Grounds (ES, 1995). During the ESI, surface soil, subsurface soil, groundwater, surface water, and sediment samples were collected. The nature and extent of contamination based on the sample results is discussed in **Section 1.3**. In addition, ground penetrating radar (GPR) and Geonics Electromagnetic (EM) terrain conductivity meter (EM-31) surveys were performed, and anomalies were removed. The area for the surveys focused on an approximately 800- by 900-ft grid directly centered over the OD Hill. Five detailed GPR grids were conducted to further characterize several anomalies identified by the EM-31 survey. Ten test pits were excavated to identify the sources of various EM-31 anomalies.

Based on the ESI EM-31 surveys anomalies in test pits TP45-3, TP45-4, TP45-5, TP45-6 and TP45-10 were attributed to pipes, blasting wires, and conduit wires. The other test pits encountered a variety of material, including munitions fragments, wood, ash, wire, nails, etc., all of which may have contributed to the observed EM-31 anomalies. Parsons collected 14 soil samples and submitted them for laboratory analysis for volatile organic compounds (VOC), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyl (PCB), metals, cyanide, explosives, herbicides, and nitrates (**Figure 1-5**). The results of the soil investigations are summarized in the nature and extent discussion in **Section 1.3.2** below.

1.2.8.3 Ordnance and Explosives Engineering Evaluation and Cost Analysis (OE EE/CA)

Parsons ES completed the field work for the EE/CA in 2000 and prepared the final report in 2004 (Parsons ES, 2004). The purpose of the EE/CA was to characterize the nature and extent of "Ordnance and Explosives" (OE) (now referred to as "MEC"), identify potential safety problems associated with MEC, and study risk management alternatives at the various Areas of Interest (AOIs). This objective was accomplished by characterizing MEC presence and developing and analyzing risk management alternatives.

The EE/CA fieldwork used geophysical survey techniques and intrusive investigations to estimate the density of the ordnance in different areas, which was then compared with the current and future activities and anticipated users. Data collected from this characterization project were also used to develop alternatives designed to reduce the risk of possible exposure to explosive hazards within the AOIs, which included the OD Grounds. These alternatives were then evaluated to determine their effectiveness, implementability, and cost.

Grid Investigation

As part of the OE EE/CA, fifty-seven (57) 100-foot by 100-foot grids were surveyed at the OD Grounds using an EM61 (**Figure 1-6**). Six grids in heavily wooded areas were also investigated by "mag and flag" surveys. In the majority of the grids surveyed with the EM61, a high density of buried metal was detected. Of the 1,337 anomalies identified in the EM61 surveyed grids, 86% were intrusively investigated.

Meandering Path Investigation

Approximately 3.5 acres of meandering path data were collected in the OD Grounds using the EM61 (**Figure 1-6**). This data were collected to the west and north of the grids surveyed in the OD Grounds. Due to extremely thick brush and forest to the east of the gridded area of the OD Grounds no meandering path data were collected in this direction. The meandering path data that was collected represented 2% of the 174-acre area outside of the 60-acre area investigated by the grid surveys. Of the 970 anomalies selected from the meandering path data, 701 (72%) were intrusively investigated. Munitions-related items were recovered from 666 of the 701 anomalies investigated (95%), and 21 of the locations contained MEC and/or "MPPEH." Nineteen (2.7%) were "false positives" as no discernible metallic debris was located. Density determinations were made and the OD Grounds meandering path AOI was defined as 'high density' for having a density greater than 10 anomalies/acre.

False Positives

Occasionally, anomalies identified on the Anomaly Dig Sheet could not be reacquired with the instrument that performed the survey. In such instances, the anomaly was flagged at the coordinate location and the inability to reacquire the anomaly was documented on the reacquisition team dig sheet. The intrusive teams would again search the immediate area around the flag using both Schonstedt® and Foerster® metal-detectors. If again no anomaly was identified, the location was assumed to be a "false positive"; however, 10% of the "false positives" were excavated to 18 inches and re-checked using the Schonstedt® and Foerster for quality control (QC) purposes. No munitions-related items were found in locations where "false-positive" digs were performed.

1.2.8.4 Phase I Geophysical Investigation

The Phase I Geophysical Investigation of the OD Grounds was conducted in 2003. An EM61 towed-array system was used to perform a geophysical survey in all accessible areas between 1,000 ft. and 2,500 ft. from the OD Hill (213 acres) and a "mag and flag" approach using hand-held magnetometers was used in a portion of the wooded/transect areas (9.65 acres) (**Figure 1-7**).

To verify the accuracy of results obtained both digitally and manually, Weston and EOTI UXO Technicians removed a total of 512 items from anomaly target locations within the non-wooded/open areas, and a total of 736 items from anomaly target locations within the transects. Of the 512 target anomalies excavated from the non-wooded/open area there were 46 "MPPEH," 247 MD, 193 other debris items and 14 no contacts. Approximately 88% of the items were found at a maximum depth of 12 inches bgs and approximately 99% were found above a maximum depth of 18 inches bgs. No munitions related items were identified at depths exceeding 20 inches bgs.

1.2.8.5 Phase II Ordnance and Explosives Removal Activities

The primary objective of Phase II was to reacquire and resolve/remove approximately 8,500 anomalies located in non-wooded areas, between the 1,500 ft. and 2,500 ft. radius from the OD Hill to a maximum depth of 4 feet. In addition, additional anomalies located along 220 transects through wooded areas of the OD Grounds also required reacquisition and resolution/removal.

Between September 2003 and March 2005, Weston removed 7,940 of the 8,500 identified anomalies within the open area of the OD Grounds. In the wooded area, Weston investigated and removed munitions-related items from 169 of the 220 transects (**Figure 1-8**).

In the open area, a total of 7,737 individual items were removed from 6,474 anomalies between the 1,500-ft and 2,500-ft. radius. Weston removed 6,663 individual items from the wooded areas. The percentage of items recovered in both Phase I and Phase II investigations that were classified as either MEC or "MPPEH" was 6%. Approximately 59% of the items recovered were classified as MD and 28% were classified as "cultural debris" (i.e., non-munitions related debris such as barbed wire, horseshoes, and consumer hardware). Six percent (6%) of the investigated anomaly locations were no-contacts (i.e., no source of the anomaly was found). No contacts may be the result of instrument noise caused by jarring of the coils during collection, removal of the anomaly source during the excavation of another anomaly, or the movement or removal of the anomaly source between Digital Geophysical Mapping (DGM) data collection and the intrusive investigation.

During the intrusive investigation along transects in the wooded areas, 98.9% of the items were recovered at depths less than 12 inches bgs and 99.7% were recovered at depths less than 18 inches bgs. These values exclude four no contacts and 170 items for which no depth was recorded. In the non-wooded area a total of 96.4% of the items were recovered at depths less than 12 inches bgs and 98.9% were recovered at depths less than 18 inches bgs. This excludes 970 no contact records.

Table 1-2 summarizes the anomaly and "MPPEH" densities based on the Phase II results.

Table 1-2
Summary of Phase I and II Anomaly and MEC/MD MPPEH Densities
OD Grounds, SEDA, Romulus, NY

Coverage Area			Findings and Results [2]						
Range of Buffer Area at OD Grounds Center	Total Acres	DGM Acres	Anomalies		Recovered Items	Anomaly per Acre	"MPPEH"	"MPPEH" per acre	Notes [2]
			Identified:	Investigated:					
1,000 to 1,250 ft buffer of the OD Grounds Center	40.6	20.8	16,076	12	13	773 [1]	7	--	Total Anomaly Density is 773 per acre. Insufficient intrusive data to calculate reliable densities. The high "MPPEH" to anomaly ratio suggests the anomaly selection was biased on items most likely to be MEC/MD.
1,250 to 1,500 ft buffer of the OD Grounds Center	49.4	26.9	13,014	57	63	484 [1]	19	105	Total Anomaly Density is 484 per acre. Insufficient intrusive data to calculate reliable "MPPEH" densities at low mV range. Other "MPPEH" densities may be biased by small dataset. Total "MPPEH" Density is estimated at 105 per acre assuming a 3% MEC/MD rate in the low mV range.
1,500 to 1,750 ft buffer of the OD Grounds Center	58.6	38.2	10,740	2,202	2,946	281	463	40.2	
1,750 to 2,000 ft buffer of the OD Grounds Center	67.6	39.6	7,217	1,657	1,947	182	189	12	
2,000 to 2,250 ft buffer of the OD Grounds Center	76.6	47.6	6,577	1,247	1,373	138	47	4.3	Insufficient intrusive data to calculate reliable "MPPEH" densities at low mV range. Total "MPPEH" Density is estimated at 4.3 per acre assuming a 3% MEC/MD rate in the low mV range.
2,250 to 2,500 ft buffer of the OD Grounds Center	85.6	48.6	6,071	1,299	1,395	125	24	2.7	Total "MPPEH" Density is estimated at 2.7 per acre assuming a 3% MEC/MD rate in the low mV range.

(1) The anomaly densities are biased low in this area.

(2) Results were originally reported as "MPPEH" and are presented here as a combined total of "MEC/MD." There are no specific data for individual quantities of MEC and MD found.

1.2.8.6 Additional Munitions Response Site Investigation

A focused site investigation was conducted by Parsons in 2010 and included topographic and geophysical surveys of specific areas within the OD Grounds and the collection and analysis of soil samples from TP and surface soil locations. The objectives of the site investigation included determining MC/COPC concentrations in subsurface and surface soils in or adjacent to the OD Hill; depth of soil and debris in saturated areas for geophysical mapping to identify individual anomalies; determine the volume of soil in the OD Hill; and estimation of the bedrock surface at the OD Grounds. The results of the MC sampling indicated that metal concentrations are generally greatest in soils closest to the OD Hill and decrease with distance from OD Hill. With one exception, concentrations of metals detected at a distance greater than 1,000 ft from the OD Hill were below the relevant criteria levels. The topographic investigation concluded that bedrock underlying the area of the OD Hill mound is estimated to vary from 10 to 20 ft. bgs. Based on the topographic survey, the estimated volume of the earthen mound above ground surface is 38,000 cubic yards (cy) (**Figure 1-9**). The estimated volume of soil in the OD Hill above bedrock surface is 75,000 cy (Parsons, 2010).

The Army selected five test plots in order to provide a preliminary assessment of the vertical deposition of MEC (UXO/DMM), MD, MC, and other debris located at different distances and in different directions from the OD Hill (**Figure 1-9**). As part of this investigation, if the initial geophysical survey at a test plot location continued to show high levels of geophysical anomalies, additional one-foot excavations and repeat EM surveys were conducted as directed by the Army.

Review of the data gathered indicates that anomaly densities generally decrease with depth of excavation, especially at distances greater than 100 to 200 feet from the OD Hill mound. The overall assessment of the data suggests that there may be a directional component to the vertical deposition of anomalies, as is evidenced by the absence of anomalies to the southeast of the OD Hill and the presence of anomalies to the northeast and northwest at roughly comparable distances from the detonation site. Additionally, the results suggest that areas in close proximity to the OD Hill may have more subsurface anomalies due to the extensive amount of soil rework that was done at this site during its operational period.

As part of the 2010 SI, Parsons collected soil samples from 76 locations and submitted them for laboratory analysis. Analysis included target analyte list (TAL) metals, explosives, SVOCs, PCB, herbicides, and metals leachability. The results of the soil investigations are summarized in **Section 1.3.1** below.

1.2.8.7 Munitions Response Action – 1,000 To 2,000 Ft Radius

During the 2012 field effort (April 18, 2012 to August 7, 2012), Parsons reacquired and intrusively investigated 14,688 anomalies that were previously identified during the Phase I work conducted by Weston Solutions (Parsons, 2016). These anomaly locations were identified based on geophysical investigations completed in the open areas between the 1,000 ft. to 1,500 ft. radius rings. Using real time kinematic (RTK) global positioning system (GPS), Parsons reacquired the location of each anomaly that exceeded the Work Plan-defined 50mV response threshold during the previously obtained surveys. Note that the 50mV threshold was not approved by the stakeholders. A total of 14,688 anomaly locations were reacquired and intrusively investigated (**Figure 1-10a**). Of the 14,688 anomaly locations investigated, 748 anomaly

locations contained MPPEH. At several anomaly locations, multiple MPPEH items were recovered from a single location during intrusive investigation activities. In all, 1,387 MPPEH items were recovered. The MPPEH items were processed to render them inert. Of the 1,387 MPPEH items, 757 items were thermally processed in the burn tray and 630 items were explosively perforated. Only the explosively perforated items could be further classified as having been MEC items (i.e., prior to processing) before they were classified as material documented as safe (MDAS) after processing. Based on the results of the perforation operation, a total of 104 items were classified as having been MEC prior to processing. **Table 1-3** summarizes the anomaly and MEC/MD densities within each subarea of the investigation area. The depth distribution of items recovered during the intrusive investigation of anomalies is included in **Table 1-4**. When anomalies that were "no contact" are excluded from the total number of anomalies investigated, over 99% of the recovered items found during the DGM intrusive investigation were found within the top 18 inches bgs.

Work areas where DGM surveys were not performed during the previous investigation (e.g., vegetated areas inaccessible to the EM61-MK2, or with poor RTK GPS coverage) were cleared using analog "mag and dig" techniques during this munitions response action between 2012 and 2014. In total, the analog survey covered 59.8 acres within 158 grids (including some partial grids). During the analog removal, 1,023 "MPPEH" items were recovered by the field teams. The "MPPEH" items were then reviewed by UXO technicians and processed to render them inert. Of the 1,023 "MPPEH" items identified by the mag and dig field teams, 110 "MPPEH" items were thermally processed in the burn tray, 348 "MPPEH" items were explosively perforated, and the remainder were certified as MDAS. Only the explosively perforated items could be further classified as having been MEC prior to processing. A total of 140 items recovered during mag and dig operations were classified as MEC. The depth distribution of items recovered during the mag and dig operation in the wooded area is included in **Table 1-5**. Over 99% of the items recovered during the mag and dig operation were found no deeper than 24 inches bgs.

Table 1-3
Summary of DGM Intrusive Results and MEC/MD Densities in Non-Wooded Areas
Munitions Response Action (2012-2014 Parsons)
OD Grounds, SEDA, Romulus, NY

Coverage		Findings		Results	
Area	**Acres**	**Anomalies**	**MPPEH**	**Anomalies per Acre**	**MEC/MPPEH per Acre**
1,000 to 1,250 ft buffer of the OD Grounds Center	Total Acres: 40.6 DGM Acres: 20.8	Identified: 16,076 Intrusive: 11,824	564 "MPPEH" (thermally treated) 377 MEC/MD (explosively perforated, no high explosive [HE]) 84 confirmed MEC	773 (1)	MEC = 5.5/acre (2) Total MEC/MD = 67/acre (2)
1,250 to 1,500 ft buffer of the OD Grounds Center	Total Acres: 49.4 DGM Acres: 26.9	Identified: 13,014 Intrusive: 5,011	193 "MPPEH" (thermally treated) 149 MEC/MD (explosively perforated, no HE) 20 confirmed MEC	484 (1)	MEC = 1.9/acre (2) Total MEC/MD = 34.9/acre (2)

(1) The Final Site-Specific Project Report (Weston, 2005) described the area between 1,000 and 1,500 ft of the OD ground center as being "saturated" with MEC (UXO/DMM) and MD. Therefore, it is assumed that target selection in these areas was impacted by the high density of metal and that the anomaly densities are biased low in this area.

(2) To derive the MEC and MEC/MD density the MEC or MEC/MD rate from the intrusive results was multiplied by the anticipated number of anomalies in each zone. Intrusive results were biased toward larger anomalies more likely to represent MEC/MD (all intrusively investigated anomalies were over 50mV in amplitude). Therefore, the estimates may bias the density calculations to be higher than the actual density.

Table 1-4
Depth Distribution of Items (DGM) in Non-Wooded Areas
Munitions Response Action (2012-2014, Parsons)

Depth (inches bgs to top of item)	Anomaly Type						Grand Total	
	No Contact or same anomaly	MD	"MPPEH" (thermal treatment)	"MPPEH" (explosively perforated, no explosives present)	MEC (MPPEH explosively perforated, explosives present)	Other (RRD, Cultural, Shared Anomaly, Seeds, ferrous rock)		
0	0	81	0	0	0	86	167	1.0%
0.5 to 6	0	7,310	404	233	58	181	8,186	48.6%
7 to 12	0	6,769	334	266	46	111	7,526	44.7%
13 to 18	0	265	14	16	0	19	314	1.9%
19 to 24	0	43	3	9	0	3	58	0.3%
25 to 30	0	12	2	2	0	0	16	0.1%
31 to 36	0	14	0	0	0	7	21	0.1%
37+	0	4	0	0	0	0	4	0.02%
No Contact	543	0	0	0	0	0	543	3.2%
TOTAL	**543**	**14,498**	**757**	**526**	**104**	**407**	**16,835**	**100%**

Table 1-5
Depth Distribution of Items (Mag and Dig) In Wooded Areas
Munitions Response Action (2012 – 2014, Parsons)

Depth (inches bgs to top of item)	Anomaly Type					Grand Total	
	MD	"MPPEH" (thermal treatment)	"MPPEH" (explosively perforated, no explosives present)	MEC (MPPEH explosively perforated, explosives present)	Other (RRD, Cultural, Shared Anomaly, Seeds, ferrous rock)		
0	281	3	5	1	818	1,108	1.2%
0.5 to 6	36,220	65	153	127	18,071	54,636	58.0%
7 to 12	18,905	45	65	62	9,712	28,789	30.6%
13 to 18	2,143	0	1	11	1,163	3,318	3.5%
19 to 24 (1)	1,033	500 (2)	0	17	3,948	5,498	5.8%
25 to 30	142	0	0	7	14	163	0.17%
31 to 36	137	0	0	1	126	264	0.28%
37 to 42 (3)	17	0	0	3	105	125	0.13%
43 to 48	0	0	0	2	217	219	0.23%
49 to 54	0	0	0	5	0	5	0.01%
55 to 60	8	0	0	0	0	8	0.01%
TOTAL	**58,886**	**613**	**224**	**236**	**34,174**	**94,133**	**100.0%**

(1) Depth results included a category for 19 to 36 inches bgs. The category included 240 MD and 53 other. These counts have been included with the 19 to 24-inch bgs range.
(2) The 500 "MPPEH" items at the 19- to 24-inch bgs level were all found in a single dig, the items consisted of small items like fuzes and primers.
(3) Depth results included a category for over 36 inches bgs. The category included 5 MD and 5 other. These counts have been included with the 37 to 42-inch bgs range.

1.2.8.8 MMRP Work of Inner Radius – 0 to 1,000 Ft Radius

Shaw (CB&I) prepared a work plan for proposed work in the area within 1,000 feet of the OD Hill (Shaw, 2012). CB&I's contract was terminated before their scope was completed, and documentation of the details of their work is not available for review at this time. Before their contract was terminated, CB&I did complete a DGM survey within the 1,000 ft radius. The selected targets from the DGM data is included in **Figure 1-10b**. Since no additional data or analysis are available for this phase of work, data are not discussed further. Based on discussions with the Army, the contract did include a surface clearance of UXO/DMM. Parsons was tasked in 2018 with handling and disposal of the MD and MPPEH that was stored on site after this task ended abruptly. **Table 1-6** below lists the items that were identified during the removal of stored material as part of the 2018 activities. The location of where the items were found is not clearly documented; however, based on CB&I's scope, it is assumed that the items were all removed from the 0-1,000 foot Radius of the OD Grounds during CB&I Shaw MMRP work. A total of 8 drums of MD were certified as MDAS and shipped offsite for disposal.

Table 1-6
Summary of Items Identified as Likely Surface Finds from 0-1,000 ft Radius

Type	Category	Quantity
20mm projectiles	MEC	120
Rifle grenade fuzes	MEC	6
M66 BD fuzes	MEC	6
M48 PD fuzes	MEC	2
M72 LAW warheads	MEC	2
2.36" HEAT warhead	MEC	1
BD fuze partial	MD	1
90mm unknown	MD	1
Unknown components	MD	2
57mm M306	MEC	4
57mm projectile	MD	1
MK 2 grenade	MEC	1
40mm projectile	MEC	1
40mm projectile	MD	1
75mm projectile	MD	4
M2 mine (kill mechanism)	MEC	1
Unknown fuzes	MD	6
M3 mine partial	MD	1

1.2.8.9 Perchlorate Sampling

Parsons conducted groundwater and soil sampling in June 2018 at the OD Grounds. The purpose of the sampling was to determine the presence or absence of perchlorate in the vicinity of the OD Hill. A well

condition survey was conducted to evaluate the condition of nine existing wells proposed for perchlorate sampling in the OD and OB Grounds. The Army determined it was necessary to replace five of the existing monitoring wells that were no longer in good condition. New wells were installed using a truck mounted auger rig. Using low flow sampling methods, samples were collected at nine well locations. Soil samples were collected from two depths (generally 0 to 0.5 ft and 1.5 to 2 ft bgs) at ten locations. The sample locations were identified based on the areas most likely to be impacted given the site history. All the samples were analyzed by TestAmerica – Denver using USEPA Method 6860. The perchlorate results are discussed in **Section 1.3**.

1.3 Nature and Extent of Impacts

1.3.1 Munitions and Explosives of Concern in Soil

Based on the CSMs presented, MEC in the form of UXO and DMM are present in the surface and subsurface to depth of 36 inches with 99% of the "MPPEH" and UXO/DMM occurring in the top 24 inches. Items greater than 36 inches may occur in fill areas. A surface clearance was performed at the OD Hill (**Section 1.2.7.7**), therefore UXO/DMM are not expected on the surface in this area.

Table 1-7 summarizes the findings of MD/"MPPEH" and UXO/DMM during the Phase I and II Investigations and the Munitions Response Action (2012-2014). From this dataset, all items containing sufficient data to be categorized by type were categorized to support the development of a vertical CSM (a total of 3,041 records were identified). **Table 1-8** summarizes the maximum depth for MD, MPPEH, and UXO/DMM found in each category, as well as a description of the categories.

Table 1-9 summarizes the revised MEC conceptual site model (CSM) for the OD Grounds MRS. The revised CSM and vertical CSM are based on the results of the Phase I and II Investigations and the Munitions Response Action (2012-2014), with the depth distribution summarized in **Table 1-7**. **Figure 1-11** shows the vertical and horizontal distribution of excavated munitions items at the OD Grounds. **Figure 1-12** shows examples of the anomaly distribution within four example grids. It should be noted that the data represented in **Figure 1-11** includes only DGM data from multiple field efforts (See **Section 1.2.7**), each of which focused on different areas of the site and consisted of predominantly anomalies greater than 50mV (note that data from analog efforts are not presented in the figure). Both **Figures 1-11** and **1-12** show that the density of munitions items/anomalies decreases with distance from the OD Hill center. The Munitions Response Action performed in 2012-2014 removed only items from between 1,000 and 1,500 feet out from the OD Hill. This study was also the only action where UXO/DMM were confirmed based on post demolition conditions; therefore, no confirmed UXO/DMM are shown outside of the area of the Munitions Response Action footprint. As such, the lack of UXO/DMM at distances greater than 1,500 feet from the OD Hill is an artificial result of the data documentation, and not a reflection on the presence (or absence) of MEC at greater distances. The "MPPEH" shown on the table is designated as such because a final determination is not available and the "MPPEH" shown likely includes a mix of inert practice items as well as UXO and DMM. In addition, a certain level of bias should be expected in the intrusive results due to the selection of only anomalies over 50mV following DGM. This would tend to bias the data toward larger items more likely to represent UXO/DMM but may also bias the data to shallower items which could have a larger amplitude anomaly due to the shorter distance to the sensor.

In the visual representation of the data in **Figure 1-11** it can be recognized that there is a tendency for items over 1 foot deep to occur at an even 6-inch interval. The depths of the munitions items are estimated during the removal; therefore, estimates over 1 foot tend to be made in 6-inch intervals. While there may be some bias in the data due to variability in documentation, it is believed that as a general representation that the vertical CSM has sufficient data quality to be accepted as a true estimate of site conditions. Based on previous analog investigations, fill areas were encountered in 1% of the area where analog surveys were conducted; in these fill areas MD, UXO, and DMM were found often at depths below which other munitions items were typically discovered. **Figure 1-11** shows that the 99% Upper Tolerance Limit (UTL) generally ranges between 12 inches and 18 inches. By comparison, 40% of the items recovered from these fill areas were found deeper than 24 inches, and 54% of recovered items in the fill areas were found deeper than 12 inches. It shows that generally, munitions related items become less dense with distance from the OD Hill and with depth.

Figure 1-13 show the vertical distribution of identifiable munition-related items categorized by type. **Figure 1-14** shows a plan view map of the same data and includes all digs to help show the horizontal distribution of the data. This vertical CSM by munitions type shows only dig results containing sufficient data to be categorized by type (a total of 3,043 items were identified). The type categories shown on **Figure 1-13** correlates to the categories and descriptions shown in **Table 1-8**, which summarizes the maximum depth for MD, "MPPEH", and UXO/DMM for each category. **Table 1-10** summarizes that number of items found at each depth interval by munitions category and is simply a different representation of the same data shown on **Figure 1-13**.

Table 1-7
Depth Distribution of Total MD, "MPPEH", and MEC Items
Phase I and II Investigation and the Munitions Response Action (2012-2014)

Depth (inches bgs)	Munitions Debris		"MPPEH"		Confirmed UXO or DMM		Percent of MPPEH and UXO/DMM at or above depth
	Total	Percent	Total	Percent	Total	Percent	
0	459	0.6%	23	0.7%	1	0.3%	0.7%
0.5 to 6	51,444	62.0%	1,575	51.0%	185	54.4%	52.0%
7 to 12	27,170	32.7%	914	29.6%	108	31.8%	81.8%
13 to 18	2,467	3.0%	57	1.8%	11	3.2%	83.8%
19 to 24	1,089	1.3%	514	16.6%	17	5.0%	99.3%
25-30	155	0.2%	5	0.2%	7	2.1%	99.6%
31 to 36	153	0.2%	2	0.1%	1	0.3%	99.7%
37 to 42	21	< 0.1%	0	< 0.1%	3	0.9%	99.8%
43 to 48	1	< 0.1%	0	< 0.1%	2	0.6%	99.9%
49 to 54	0	< 0.1%	0	< 0.1%	5	1.5%	100.0%
55 to 60	8	< 0.1%	0	< 0.1%	0	0.00%	100.0%
Total	**82,981**	**100%**	**3,090**	**100%**	**340**	**100%**	

Table 1-8
Munitions Categories Used in Vertical CSM and Related Maximum Depths Found

Munitions Category	Description	Maximum Depth of UXO/DMM (inches bgs) (1)	Maximum Depth of MPPEH (2) (inches bgs) (1)	Maximum Depth of MD (inches bgs) (1)
B1	Butterfly Bomblets	--	8	8
B2	20lb Fragmentation Bombs	--	2	3
F1	Very Small – approx. 2"x3" or smaller (e.g., small base fuzes, small Russian projectile fuzes, rocket base fuses, some land mine fuzes, etc.)	12	26	8
F2	Small - Between 2"x3" and 4"x6". (e.g., "T-bar" fuzes, artillery projectile fuzes, smaller rocket fuzes, etc.)	12	26	12
F3	Medium - 100 series bomb fuzes, larger rocket fuzes, etc.	5	18	12
F4	Large - M60 series base fuzes and similar very heavy, large fuzes.	7	9	--
G1	Hand Grenades	9	12	12
G2	Rifle Grenades	12	14	2
M1	M1 square mines and "bouncing betty" mines and flares.	9	12	12
P1	20mm/25mm/1.1" projectiles and similar	10	36	24
P2	30mm projectile without cartridge case	5	15	--
P3	37mm/40mm projectiles without cartridge case. 20mm with cartridge case, 30mm with cartridge case, etc.	12	18	12
P4	57mm projectiles, 2.36" rocket warheads, 2.36" rocket motors, etc.	12	24	16
P5	75mm/76mm projectiles, 90mm AP projectiles	10	25	21
P6	105mm projectiles, 3.5" rockets, etc.	--	18	10
P7	155mm projectiles/6" projectiles, 4.2" mortars, 120mm projectiles, etc.	--	15	6

(1) Data compiled from the Phase I and II Investigation and the Munitions Response Action (2012-2014).

(2) "MPPEH" here refers to a combination of MEC and MD that cannot be further differentiated based on the source information available.

Table 1-9
Revised MEC Conceptual Site Model Summary

Munitions Response Site	REVISED MEC CONCEPTUAL SITE MODEL SUMMARY						
	Known or Suspected Contamination Source(s)	**Location**	**Confirmed or Suspected Contamination Source(s)**	**Confirmed Location and Distribution**	**Source or Exposure Media**	**Current and Future Receptors**	**Complete Exposure Pathway**
NAME: OD Grounds **Acreage:** 403 acres (420.55 acres inside the 2,500-foot buffer and excluding the OB Grounds) **Suspected Past DoD Activities (*release mechanisms*):** This MRS was used for open detonation (OD) to destroy munitions beginning in 1941 until 2000 as part of the military mission at the Seneca Army Depot. **Current and Future Land Use:** The OD Grounds are currently closed and the planned future use of the MRS is projected to be as conservation/recreation.	Known/Suspected MEC: MEC in the form of UXO and DMM have been confirmed and UXO/DMM are suspected to remain within the MRS. Various munitions and munitions component types have been identified including: • Projectiles ranging from 20mm to 155mm; • Bombs including 4-lbs and 20-lbs (also a single 250-lb inert concrete filled bomb identified) • Rockets ranging from 2.36-inch to 5-inch; • Mortars including 60mm, 81mm, and 4.2-inch. • Various Anti-personnel mines. • Anti- tank mines; • Hand and rifle grenades, including foreign rifle grenades. • Multiple types of fuzes, bursters, boosters, flares, smoke cannisters, and smoke pots. • Various munitions components and other related devices.	OD Hill	*Munitions and Explosives of Concern:* UXO and DMM has been identified. Munitions types found at the site are summarized in Table 1-8.	Confirmed UXO/DMM on the surface and the subsurface. MEC was cleared from surface; therefore, the current distribution is expected to only be in the subsurface.	Subsurface soil	Current Receptors: Hunters (recreational users) and installation personnel (site workers). Future Receptors: Future use of the MRS is planned to be conservation/recreation and users will include, site visitors/tour participants, hunters, and conservation area workers.	**YES** Exposure to UXO/DMM in subsurface soil.
		Kickout Area		UXO/DMM are potentially present throughout the entire Kickout Area down to a depth of 36 inches bgs, with 99% of items being found within 24 inches of the surface. In addition, some fill areas are potentially present in at discrete locations at the site and these might contain items down to 60 inches bgs.	Surface or subsurface soil		**YES** Exposure to UXO/DMM in surface or subsurface soil.

Table 1-10
Vertical Distribution of Identifiable Munitions Items Used in the Vertical CSM

Depth (inches bgs)	Bombs				Fuzes		Grenades		Mines	Projectiles/Rockets							TOTAL
	B1	B2	F1	F2	F3	F4	G1	G2	M1	P1	P2	P3	P4	P5	P6	P7	
0				1	2								14			1	18
1			1	1	4					9		1	19		1		36
2		1	2	7	19	1				15		2	45	2	4		98
3	1	1	2	33	40			1		56		9	91	5	1		240
4	2		13	68	67	3		2	4	127	1	27	90	2			406
5	5		10	63	49	1		1	2	151	3	40	68	11	1		405
6	3		22	85	73	2			2	257		53	68	15	2	1	583
7	1		9	27	23	3	1	2	1	151	1	38	38	10	2		307
8	2		16	55	31	4				167	1	35	39	12			362
9			2	10	7	1	1	1	2	75	1	8	21	8	1		138
10			1	18	12					50	1	4	15	10	1		112
11				1						11		1	3	2			18
12			9	22	9		3	4	2	93	1	17	49	16			225
13										5			1				6
14			1	1				1		8		1	2				14
15										3	1	2	1	2		1	10
16										7		1	3	2			13
17																	0
18			1	1	1					14		3	3	6	1		30
19																	0
20										2			1	3			6
21														1			1
22			1										1				2
23																	0
24										2			2	2			6
25										1				1			2
26			1	1													2
27-35																	0
36										1							1
Total	**14**	**2**	**91**	**394**	**337**	**15**	**5**	**12**	**13**	**1,205**	**10**	**242**	**574**	**110**	**14**	**3**	**3,041**

1.3.2 Chemicals of Potential Concern in Soil

Based on the previous investigations described in **Section 1.2**, metals concentrations are elevated in the surface soil, with higher concentrations closer to the OD Hill. **Figure 1-15A** and **Figure 1-15B** show the approximate locations of the soil samples collected at the OD Grounds during the ESI (ES, 1995) and Additional Munitions Response SI (Parsons, 2010), and **Figure 1-16** shows the soil sample locations that were sampled for perchlorate during the 2018 sampling event. A summary of soil exceedances is presented in **Tables 1-11** through **1-13**. The full datasets are provided in **Appendices A-1, A-2** and **A-3**. Exceedances were defined as concentrations above the May 2018 USEPA Regional Screening Levels (RSL) for residential soil (HQ=0.1) (USEPA, 2018) as a screening value. In addition, NYS Remedial Program Soil Cleanup Objectives (SCOs) (6 CRR-NY 375-6.8) (NYSDEC, 2018a), effective June 2018, are also displayed in the summary tables below and in **Appendix A**. NYSDEC SCOs are developed for unrestricted use and restricted use scenarios (NYSDEC, 2018). Based on the future land uses described in **Section 1.2.2**, the NYSDEC restricted use SCOs for the commercial use scenario are considered to be the appropriate criteria for the OD Grounds. If a compound does not exceed its USEPA RSL, but does exceed its respective NYSDEC SCO, additional text is included below to discuss the differences.

1.3.2.1 Chemicals of Potential Concern in Surface Soil

Within the OD Grounds, 52 samples were collected within the 500-foot OD Hill radius. The remaining 25 samples were collected at locations between 500 and 2,000 feet from the OD Hill to delineate the extent of any impacts to the surface soil within the Kickout Area. Soil samples were collected during two investigations; one during the ESI in 1993 and one during the Additional Munitions Response Action in 2010.

Samples were analyzed for VOCs, SVOCs, explosives, metals, perchlorate, herbicides, pesticides, and PCBs. The list of analytes collected varied depending on the sampling round. VOCs were only analyzed during the 1993 investigation and perchlorate was only analyzed during a 2018 sampling event.

The VOC, pesticide, or perchlorate results were all below their respective screening criteria. In all cases where an analyte exceeded its NYSDCC SCO, it also exceeded the USEPA RSL. The COPCs identified in soil based on an exceedance of a screening value are MCPA (herbicide), nitroglycerine (explosive), 2,4-DNT (analyzed as an SVOC), Aroclor-1254 (PCB), and several metals.

Exceedances of MCPA, nitroglycerine, 2,4-DNT and Aroclor-1254 were limited to only one or two detections which exceeded their respective USEPA RSL (**Table 1-11**). These exceedances are discussed in the HHRA (**Appendix B1**) where it was determined that none of these compounds were COCs.

During the perchlorate investigation in 2018, perchlorate was detected in eight of the ten surface soil (0-0.5 ft bgs) samples. The highest concentration of perchlorate in the surface soil samples was measured at 8.2 Micrograms per kilogram (µg/kg) and is located on the OD Hill (S45-ODG-SS-06) (**Figure 1-16**). None of the surface soil samples contained levels of perchlorate that exceeded the USEPA RSL for Residential Soil (HQ=0.1) value of 5,500 µg/kg (**Table 1-6**).

Metals which exceed USEPA RSLs and are considered COPCs include: aluminum, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, silver, thallium, and vanadium (**Table 1-11** and **Figures 1-17A** and **1-17B**). Cadmium, copper, and mercury were the only metals to exceed their respective NYS Commercial SCOs. Lead, silver and vanadium had one or two exceedances each over the RSL. The HHRA did not identify any COCs in surface soil (**Appendix B1**).

The evaluation of potential risk to human health and the environment posed by these metals concentrations in soils is discussed below in **Section 1.5** below. Samples collected for metals analysis were also sent for synthetic precipitation leaching procedure (SPLP) analysis during the 2010 Supplemental Work. The discussion of these results and samples are included in **Section 1.4.1**.

Table 1-11
Summary of Surface Soil Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

							NYS SCO Commercial Use[1]		EPA RSLs Residential Soil (HQ=0.1)[2]	
Parameter	Unit	Maximum Detected Value	Qualifer	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	Criteria Value[1]	Number of Exceedances	Criteria Value[2]	Number of Exceedances
Volatile Organic Compounds	**(No Detects)**									
Herbicides										
MCPA	UG/KG	9,400		SS45-1	2	29	NA	0	3,200	2
Explosives										
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	23	41	NA	0	220,000	0
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	32	41	NA	0	3,600	0
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	31	41	NA	0	1,700	0
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	30	41	NA	0	15,000	0
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	27	41	NA	0	15,000	0
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	26	41	NA	0	390,000	0
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	1	31	NA	0	630	1
RDX	UG/KG	5,800	J	SS45-9	33	41	NA	0	6,100	0
Tetryl	UG/KG	330		SS45-6	3	41	NA	0	16,000	0
Semivolatile Organic Compounds										
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	7	29	NA	0	1,700	1
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	1	29	NA	0	360	0
Acenaphthylene	UG/KG	30	J	SS45-5	1	29	500,000	0	NA	0
Anthracene	UG/KG	18	J	SS45-5	1	29	500,000	0	1,800,000	0
Benzo(a)anthracene	UG/KG	50	J	SS45-5	3	29	5,600	0	1,100	0
Benzo(a)pyrene	UG/KG	82	J	SS45-5	3	29	1,000	0	110	0
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	4	29	5,600	0	1,100	0
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	2	29	500,000	0	NA	0
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	2	29	56,000	0	11,000	0
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	7	29	NA	0	39,000	0
Chrysene	UG/KG	130	J	S45-ODH-8-01	7	29	56,000	0	110,000	0
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	6	29	NA	0	630,000	0
Fluoranthene	UG/KG	66	J	SS45-5	6	29	500,000	0	240,000	0
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	6	29	6,000	0	210	0
Hexachloroethane	UG/KG	21	J	SS45-6	1	29	NA	0	1,800	0
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	1	29	5,600	0	1,100	0
Naphthalene	UG/KG	21	J	SS45-5	1	29	500,000	0	3,800	0
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3	29	NA	0	110,000	0
Phenanthrene	UG/KG	38	J	SS45-5	4	29	500,000	0	NA	0
Pyrene	UG/KG	100	J	SS45-5	6	29	500,000	0	180,000	0
Pesticides										
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	2	19	92,000	0	190	0
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	16	19	62,000	0	2,000	0
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	13	19	47,000	0	1,900	0
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	1	19	24,000	0	NA	0
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	11	19	1,400	0	34	0
Endosulfan I	UG/KG	55	J	S45-R5-04	15	19	200,000	0	NA	0
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	1	19	200,000	0	NA	0
Endrin	UG/KG	3.6	J	S45-TP-2-01	1	19	89,000	0	1,900	0
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	1	19	NA	0	NA	0
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3	19	NA	0	NA	0
Methoxychlor	UG/KG	45		S45-ODH-4-01	1	19	NA	0	32,000	0
PCBs										
4,4'-DDE	UG/KG	4.2	J	SS45-6	4	10	62,000	0	2,000	0
4,4'-DDT	UG/KG	3.4	J	SS45-5	2	9	47,000	0	1,900	0
Alpha-Chlordane	UG/KG	2	J	SS45-6	3	9	24,000	0	NA	0
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	2	28	1,000	1	120	1
Dieldrin	UG/KG	3.2	J	SS45-6	2	9	1,400	0	34	0
Endosulfan I	UG/KG	1.8	J	SS45-5	2	10	200,000	0	NA	0
Inorganics										
Aluminum	MG/KG	27,900		S45-R5-08	76	76	NA	0	7,700	75
Antimony	MG/KG	3.1		S45-R5-02	24	76	NA	0	3.1	0
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	76	76	16	0	0.68	76
Barium	MG/KG	365		SS45-8	76	76	400	0	1,500	0
Beryllium	MG/KG	1.2	J	S45-R5-08	74	76	590	0	16	0
Cadmium	MG/KG	1,100		S45-ODH-4-01	59	76	9.3	6	7.1	30
Calcium	MG/KG	193,000		S45-R4-04	75	76	NA	0	NA	0
Chromium	MG/KG	446		S45-ODH-11-01	76	76	1,500	0	NA	0
Cobalt	MG/KG	26.8	J	S45-R15-01	76	76	NA	0	2.3	76
Copper	MG/KG	4,180		S45-ODH-6-01	76	76	270	39	310	36
Iron	MG/KG	118,000		S45-ODH-4-01	76	76	NA	0	5,500	76
Lead	MG/KG	998	J	S45-R5-08	76	76	1,000	0	400	1
Magnesium	MG/KG	15,000		S45-R4-04	76	76	NA	0	NA	0
Manganese	MG/KG	5,040	J	S45-R15-01	76	76	10,000	0	180	76
Mercury	MG/KG	7		S45-TP-3-01	75	76	2.8	33	1.1	49
Nickel	MG/KG	59.3		S45-ODH-11-01	71	71	310	0	150	0
Potassium	MG/KG	4,880	J	S45-R5-08	55	55	NA	0	NA	0
Selenium	MG/KG	0.92	J	S45-R10-07	3	76	1,500	0	39	0
Silver	MG/KG	205		S45-ODH-4-01	47	76	1,500	0	39	1
Sodium	MG/KG	211		S45-TP-3-01	60	76	NA	0	NA	0
Thallium	MG/KG	0.27	J	S45-TP-1-01	4	76	NA	0	0.078	4
Vanadium	MG/KG	41.9	J	S45-R15-02	76	76	NA	0	39	2
Zinc	MG/KG	1,350		S45-R1-02	71	71	10,000	0	2,300	0
Perchlorate										
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	8	10	NA	0	5,500	0

Notes:
1) Criteria values are the NYSDEC Commercial SCOs (6 CRR-NY 375-6.8, June 2018).
2) Criteria values are the USEPA RSLs for Residential Soil (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.
3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

Table 1-12
Summary of Subsurface Soil Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

							NYS SCO Commercial Use[1]		EPA RSLs Residential Soil (HQ=0.1)[2]	
Parameter	Unit	Maximum Detected Value	Qualifer	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	Criteria Value[1]	Number of Exceedances	Criteria Value[2]	Number of Exceedances
Volatile Organic Compounds										
Tetrachloroethene	UG/KG	19		TP45-3	6	6	150,000	0	8,100	0
Herbicides (No Detects)										
Explosives										
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	5	6	NA	0	220,000	0
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	6	6	NA	0	3,600	0
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	5	6	NA	0	1,700	0
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	6	6	NA	0	15,000	0
HMX	UG/KG	470	J	TP45-2	6	6	NA	0	390,000	0
RDX	UG/KG	4,300		TP45-4	6	6	NA	0	6,100	0
Tetryl	UG/KG	180	J	TP45-5	1	6	NA	0	16,000	0
Semivolatile Organic Compounds										
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	6	6	NA	0	1,700	1
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	1	6	NA	0	360	1
Acenaphthylene	UG/KG	19	J	TP45-1	2	6	500,000	0	NA	0
Anthracene	UG/KG	17	J	TP45-1	1	6	500,000	0	1,800,000	0
Benzo(a)anthracene	UG/KG	36	J	TP45-4	5	6	5,600	0	1,100	0
Benzo(a)pyrene	UG/KG	46	J	TP45-1	5	6	1,000	0	110	0
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	5	6	5,600	0	1,100	0
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	5	6	500,000	0	NA	0
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	5	6	56,000	0	11,000	0
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	2	6	NA	0	39,000	0
Chrysene	UG/KG	51	J	TP45-4	5	6	56,000	0	110,000	0
Diethyl phthalate	UG/KG	35	J	TP45-4	1	6	NA	0	5,100,000	0
Di-n-butylphthalate	UG/KG	6,800		TP45-2	6	6	NA	0	630,000	0
Fluoranthene	UG/KG	68	J	TP45-4	5	6	500,000	0	240,000	0
Hexachlorobenzene	UG/KG	62	J	TP45-1	5	6	6,000	0	210	0
Hexachloroethane	UG/KG	1,100		TP45-3	5	6	NA	0	1,800	0
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	3	6	5,600	0	1,100	0
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	4	6	500,000	0	3,800	0
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	4	6			110,000	0
Phenanthrene	UG/KG	46	J	TP45-1	5	6	500,000	0	NA	0
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	6	6	500,000	0	180,000	0
Pesticides & PCBs										
4,4'-DDE	UG/KG	3.2	J	TP45-4	2	6	62,000	0	2,000	0
4,4'-DDT	UG/KG	2.9	J	TP45-3	2	6	47,000	0	1,900	0
Dieldrin	UG/KG	2.4	J	TP45-4	1	6	1,400	0	34	0
Endosulfan I	UG/KG	2.2	J	TP45-1	4	6	200,000	0		
Inorganics										
Aluminum	MG/KG	22,800		TP45-3	21	21	NA	0	7,700	21
Antimony	MG/KG	5.1	J	S45-TP-3-03	8	21	NA	0	3.1	1
Arsenic	MG/KG	8.7		S45-TP-1-02	21	21	16	0	0.68	21
Barium	MG/KG	248		TP45-3	21	21	400	0	1,500	0
Beryllium	MG/KG	1.1	J	TP45-3	21	21	590	0	16	0
Cadmium	MG/KG	13.4		S45-TP-1-02	18	19	9.3	5	7.1	9
Calcium	MG/KG	101,000		S45-TP-2-03	21	21	NA	0	NA	0
Chromium	MG/KG	39.2		S45-TP-1-03	21	21	1,500	0	NA	0
Cobalt	MG/KG	16.9		TP45-3	21	21	NA	0	2.3	21
Copper	MG/KG	7,310		S45-TP-1-02	21	21	270	13	310	13
Cyanide	MG/KG	0.7		TP45-1	2	6	27	0	2.3	0
Iron	MG/KG	60,900		S45-TP-1-02	21	21	NA	0	5,500	21
Lead	MG/KG	153	J	S45-TP-3-03	21	21	1,000	0	400	0
Magnesium	MG/KG	12,500		S45-TP-4-04	21	21	NA	0	NA	0
Manganese	MG/KG	1,380		TP45-1	21	21	10,000	0	180	21
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	21	21	2.8	16	1.1	18
Nickel	MG/KG	54		S45-TP-1-02	21	21	310	0	150	0
Potassium	MG/KG	3,510	J	S45-TP-3-04	21	21	NA	0	NA	0
Selenium	MG/KG	0.56	J	S45-TP-4-03	1	21	1,500	0	39	0
Silver	MG/KG	53.7		S45-TP-1-02	19	21	1,500	0	39	1
Sodium	MG/KG	213		S45-TP-2-03	21	21	NA	0	NA	0
Thallium	MG/KG	0.25	J	S45-TP-2-05	2	21	NA	0	0.078	2
Vanadium	MG/KG	38		TP45-3	21	21	NA	0	39	0
Zinc	MG/KG	1,470		S45-TP-2-04	21	21	10,000	0	2,300	0
Perchlorate										
Perchlorate	UG/KG	41		S45-ODG-SS-06	9	12	NA	0	5,500	0

Notes:

1) Criteria values are the NYSDEC Commercial SCOs (6 CRR-NY 375-6.8, June 2018)

2) Criteria values are the USEPA RSLs for Residential Soil (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.

3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

Table 1-13
Summary of Ditch Soil Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

							NYS SCO Commercial Use[1]		EPA RSLs Residential Soil (HQ=0.1)[2]	
Parameter	Unit	Maximum Detected Value	Qualifier	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	Criteria Value[1]	Number of Exceedances	Criteria Value[2]	Number of Exceedances
Volatile Organic Compounds (No Detects)										
Herbicides (No Detects)										
Explosives										
2,4,6-Trinitrotoluene	UG/KG	120	J	SW/SD45-2	1	4	NA	0	3,600	0
2,4-Dinitrotoluene	UG/KG	83	J	SW/SD45-2	1	4	NA	0	1,700	0
2-amino-4,6-Dinitrotoluene	UG/KG	260		SW/SD45-2	1	4	NA	0	15,000	0
RDX	UG/KG	210		SW/SD45-2	1	4	NA	0	6,100	0
Tetryl	UG/KG	140	J	SW/SD45-2	1	4	NA	0	16,000	0
Semivolatile Organic Compounds										
Benzo(a)anthracene	UG/KG	32	J	SW/SD45-2	2	4	5,600	0	1,100	0
Benzo(a)pyrene	UG/KG	37	J	SW/SD45-2	2	4	1,000	0	110	0
Benzo(b)fluoranthene	UG/KG	37	J	SW/SD45-2	2	4	5,600	0	1,100	0
Benzo(ghi)perylene	UG/KG	48	J	SW/SD45-2	1	4	500,000	0	NA	0
Benzo(k)fluoranthene	UG/KG	28	J	SW/SD45-2	2	4	56,000	0	11,000	0
Chrysene	UG/KG	50	J	SW/SD45-2	3	4	56,000	0	110,000	0
Di-n-butylphthalate	UG/KG	25	J	SW/SD45-2	1	4	NA	0	630,000	0
Fluoranthene	UG/KG	60	J	SW/SD45-2	3	4	500,000	0	240,000	0
Hexachlorobenzene	UG/KG	40	J	SW/SD45-2	2	4	6,000	0	210	0
Indeno(1,2,3-cd)pyrene	UG/KG	32	J	SW/SD45-2	1	4	5,600	0	1,100	0
Naphthalene	UG/KG	24	J	SW/SD45-4	1	4	500,000	0	3,800	0
Phenanthrene	UG/KG	34	J	SW/SD45-2	3	4	500,000	0	NA	0
Pyrene	UG/KG	110	J	SW/SD45-2	3	4	500,000	0	180,000	0
Pesticides & PCBs										
4,4'-DDE	UG/KG	12	J	SW/SD45-4	2	4	62,000	0	2,000	0
Aldrin	UG/KG	2.2	J	SW/SD45-4	1	4	680	0	39	0
Alpha-Chlordane	UG/KG	5.7	J	SW/SD45-4	1	4	24,000	0	NA	0
Aroclor-1254	UG/KG	580	J	SW/SD45-4	2	4	1,000	0	120	1
Dieldrin	UG/KG	7.4	J	SW/SD45-4	1	4	1,400	0	34	0
Endosulfan I	UG/KG	2.7	J	SW/SD45-2	2	4	200,000	0	NA	0
Endrin aldehyde	UG/KG	3.2	J	SW/SD45-4	1	4	NA	0	NA	0
Inorganics										
Aluminum	MG/KG	35,000		SW/SD45-2	4	4	NA	0	7,700	4
Arsenic	MG/KG	16.1		SW/SD45-4	4	4	16	1	0.68	4
Barium	MG/KG	308		SW/SD45-2	4	4	400	0	1,500	0
Beryllium	MG/KG	1.4		SW/SD45-2	4	4	590	0	16	0
Cadmium	MG/KG	25.6	J	SW/SD45-4	4	4	9.3	2	7.1	2
Calcium	MG/KG	84,400		SW/SD45-1	4	4	NA	0	NA	0
Chromium	MG/KG	48.4		SW/SD45-2	4	4	1,500	0	NA	0
Cobalt	MG/KG	19.7		SW/SD45-2	4	4	NA	0	2.3	4
Copper	MG/KG	814		SW/SD45-2	4	4	270	2	310	2
Iron	MG/KG	50,500		SW/SD45-2	4	4	NA	0	5,500	4
Lead	MG/KG	101		SW/SD45-2	4	4	1,000	0	400	0
Magnesium	MG/KG	10,200		SW/SD45-2	4	4	NA	0	NA	0
Manganese	MG/KG	935		SW/SD45-4	4	4	10,000	0	180	4
Mercury	MG/KG	5.3		SW/SD45-2	4	4	2.8	2	1.1	3
Nickel	MG/KG	67.7		SW/SD45-2	4	4	310	0	150	0
Potassium	MG/KG	4,680		SW/SD45-2	4	4	NA	0	NA	0
Silver	MG/KG	5.8		SW/SD45-2	3	4	1,500	0	39	0
Sodium	MG/KG	377	J	SW/SD45-2	4	4	NA	0	NA	0
Vanadium	MG/KG	53.7		SW/SD45-2	4	4	NA	0	39	1
Zinc	MG/KG	755		SW/SD45-2	4	4	10,000	0	2,300	0

Notes:
1) Criteria values are the NYSDEC Commercial SCOs (6 CRR-NY 375-6.8, June 2018)
2) Criteria values are the USEPA RSLs for Residential Soil (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.
3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

1.3.2.2 Chemicals of Potential Concern in Subsurface Soil

A total of 31 subsurface soil samples were collected within the 500-foot OD Hill radius. Two of the perchlorate subsurface samples were collected between the 500- and 1,000-foot radii; however, none of the other subsurface soil samples were collected outside the 500-foot radius. Ten of the subsurface samples were analyzed for perchlorate only, and the remaining 21 samples were analyzed for inorganic metals. In addition to metals, six of the subsurface samples were analyzed for explosives, VOCs, SVOCs, herbicides, pesticides, and PCBs. None of the VOC, herbicide, pesticide, or explosive results exceeded their respective USEPA RSLs (**Table 1-12**).

Two explosives were detected in the SVOC analytical run at concentrations above USEPA RSLs and were identified as COPCs. 2,4-dinitrotoluene (2,4-DNT), was detected with a maximum concentration of 14,000 µg/kg, and 2,6-DNT, with a maximum concentration of 700 µg/kg. Both exceedances were detected in one sample (TP45-2), which was collected at a location on top of OD Hill. Note that in the explosives analytical run (Method SW8330), 2,4-DNT and 2,6-DNT were detected at concentrations below the RSLs.

Metals in subsurface soil that exceeded their respective USEPA RSLs and were identified as COPCs include: aluminum, antimony, arsenic, cadmium, copper, cobalt, copper, iron, manganese, mercury, silver, and thallium (**Figures 1-17A** and **1-17B**). Only cadmium, copper and mercury exceeded their respective NYSDEC SCOs (**Table 1-12**).

Ten subsurface soil samples and two duplicates were analyzed for the presence of perchlorate during the 2018 sampling effort. Perchlorate was detected in eight samples and one duplicate. The highest level of perchlorate detected was measured at 41 µg/kg from a sample 1.5 to 2.0 feet bgs in the OD Hill. This sample location (S45-ODG-SS-06) contained the highest concentration of perchlorate in both surface and subsurface soil samples (**Table 1-12**, **Figure 1-16**). All of the detections of perchlorates were at levels below the USEPA RSL Residential Soil (HQ=0.1) value of 5,500 µg/kg. The HHRA did not identify any COCs in subsurface soil (**Appendix B1**).

1.3.2.3 Chemicals of Potential Concern in Ditch Soil

Four ditch soil samples were collected during the ESI. Three of the samples were collected from the drainage ditches located downgradient of the OD Hill and the fourth sample was collected from a low-lying area northwest of the OD Hill. Water within these features is ephemeral and the features are not recognized surface water bodies by the NYSDEC. The material at the base of the drainage swales is site soil. The ditch soil samples collected during the ESI are located approximately 500 ft to 600 ft from the OD Hill, or within or close to the OD Hill. These samples were analyzed for VOCs, SVOCs, metals, PCBs, pesticides, herbicides and nitrate/nitrite nitrogen (**Appendix A-3**).

VOCs and herbicides were not detected in the samples (**Table 1-13**). Several explosives, SVOCs, nitroaromatics, pesticides, and PCBs were detected at low concentrations and below applicable screening criteria. One PCB (Aroclor-1254) was identified as a COPC with one exceedance of the USEPA RSL.

A summary of the ditch soil analytical results from the ESI and a comparison to the USEPA RSLs is presented in **Table 1-13**. Aluminum, arsenic, cadmium, cobalt, copper, iron, manganese, mercury, and vanadium were detected at concentrations above their respective RSL values and were identified as COPCs.

The ditch soils are grouped with surface soil results within the risk assessment because extensive RI data for the OB Grounds showed that all drainage ditches and Reeder Creek sediment (at the time) were consistent with levels of metals in all the soil data, including background levels. Therefore, there is no distinction between ditch soils and surface soils. The HHRA did not identify any COCs in the ditch soil data (**Appendix B1**).

1.3.3 Chemicals of Potential Concern in Groundwater

There were two main groundwater events at the OD Grounds: the ESI in 1994, and June 2018 for perchlorate only; one well at the OD Grounds (MW45-4, located west of the OD Hill), was sampled an additional three times between 1997 and 1999 as part of OB Grounds groundwater investigations (**Appendix A-4**). Water quality screening criteria used for comparison in this FS report are USEPA RSLs for tap water, based on a noncarcinogenic HQ of 0.1. Groundwater results were also compared against NY Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 CRR-NY 703.5; June 2018) (NYSDEC, 2018b). A consolidated summary of groundwater exceedances from these reports is presented in **Table 1-14**.

The groundwater data were presented in the 1995 ESI, and the evaluation in the ESI did not suggest impacts from MC/COPCs on the groundwater within the OD Grounds. Concentrations of VOCs, herbicides, pesticides, and PCBs were below the groundwater screening values. Two explosives were detected in the groundwater one time each. Both explosives (1,3-Dinitrobenzene and Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine [HMX]) were detected below their respective groundwater criteria (**Table 1-14**).

One SVOC [Bis(2-Ethylhexyl)phthalate] was detected in four groundwater samples at concentrations above its RSL and it was identified as a COPC; however, this is a common laboratory contaminant associated with plastics. Ten metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium [exceedance of NYS GA and USEPA chromium VI values], cobalt, copper, lead, manganese, mercury, nickel, sodium [exceedance of NYS GA], thallium, and vanadium) were found in one or more the groundwater samples at concentrations above the screening values. Except for iron and sodium, all of these compounds were identified as COPCs in the HHRA. Calcium, iron, magnesium, potassium, and sodium were not evaluated in the HHRA because they are essential nutrients and are generally not expected to pose an unacceptable risk to human receptors.

Nine groundwater samples and one duplicate were analyzed during the perchlorate sampling event in 2018. Perchlorate was detected in eight samples and one duplicate, with a maximum concentration of 4.1 Micrograms per liter (µg/L) (MW45-3) (**Figure 1-16**). Two of the wells contained perchlorate levels above the guidance value of 1.4 µg/L identified in the perchlorate Work Plan (Parsons, 2018). The wells that contained exceedances of perchlorate included MW45-2 and MW45-3 and were both located east of the OD Hill. A summary of perchlorate levels in groundwater samples are presented in **Table 1-14** and **Appendix A-4**.

No COCs were identified after analysis of the groundwater data in the HHRA.

Table 1-14
Summary of Groundwater Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

							NYS CLASS GA STANDARD		2018-05 RSL Tap Water (HQ=0.1)	
Parameter	Unit	Maximum Detected Value	Qualifier	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	Criteria Level	Number of Exceedances	Criteria Level	Number of Exceedances
Volatile Organic Compounds										
Tetrachloroethene	UG/L	1	J	MW1	1	8	5	0	4.1	0
Herbicides (No Detects)										
Explosives										
1,3-Dinitrobenzene	UG/L	0.067	J	MW5	1	8	5	0	0.2	0
HMX	UG/L	0.5		MW1	1	8	NA	0	100	0
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	UG/L	33		MW1	4	8	5	4	5.6	4
Pesticides & PCBs (No Detects)										
Inorganics										
Aluminum	UG/L	63,300		MW45-4	9	12	NA	0	2,000	3
Antimony	UG/L	52.1	J	MW3	7	12	3	7	0.78	7
Arsenic	UG/L	9.5	J	MW45-4	3	12	25	0	0.052	3
Barium	UG/L	751		MW45-4	12	12	1,000	0	380	1
Beryllium	UG/L	5		MW45-4	3	12	NA	0	2.5	1
Cadmium	UG/L	3.8	J	MW4	4	12	5	0	0.92	4
Calcium	UG/L	660,000		MW45-4	12	12	NA	0	NA	0
Chromium	UG/L	106		MW45-4	5	12	50	1	NA	0
Cobalt	UG/L	94.4		MW45-4	4	12	NA	0	0.6	4
Copper	UG/L	123		MW45-4	7	12	200	0	80	1
Iron	UG/L	113,000		MW45-4	10	12	500	5	1,400	3
Iron+Manganese	UG/L	117,640		MW45-4	12	12	NA	0	NA	0
Lead	UG/L	75.6		MW45-4	8	12	25	1	15	2
Magnesium	UG/L	77,900		MW45-3	12	12	NA	0	NA	0
Manganese	UG/L	4,640		MW45-4	12	12	300	4	43	5
Mercury	UG/L	1.8		MW4	3	12	0.7	1	0.063	3
Nickel	UG/L	209		MW45-4	5	12	100	1	39	2
Potassium	UG/L	18,700		MW45-3	9	12	NA	0	NA	0
Selenium	UG/L	2.5	J	MW45-2	5	12	10	0	10	0
Silver	UG/L	4.6	J	MW4	2	12	50	0	9.4	0
Sodium	UG/L	40,000		MW45-2	12	12	20,000	1	NA	0
Thallium	UG/L	3.4	J	MW45-4	1	12	NA	0	0.02	1
Vanadium	UG/L	93.1		MW45-4	3	12	NA	0	8.6	3
Zinc	UG/L	321		MW45-4	12	12	NA	0	600	0
Perchlorate										
Perchlorate	UG/L	4.1		MW45-3	9	10	NA	0	1.4	3

Notes:

1) Criteria values are the NYS Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 CRR-NY 703.5; June 2018).

2) Criteria values are the USEPA RSLs for Tap Water (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.

3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

1.3.4 Chemicals of Potential Concern in Surface Water

During the ESI, four surface water samples were collected from the drainage ditches within the OD Grounds. These four samples were collocated with the ditch soil samples described above. Three of the surface water samples were collected from drainage ditches located downgradient of the OD Hill and the fourth sample was collected from a low-lying area northwest of the OD Hill. The surface water samples were collected from drainage swales that were typically dry and the water sampled likely represented surface runoff from a recent precipitation event, rather than site surface water. The four surface water samples collected were from ephemeral drainage ditches and a low-lying swale. These on-site surface water pools are not classified by NYSDEC as surface water bodies and therefore NYS surface water criteria do not apply but are provided for reference. Sample results were compared against USEPA RSLs for Tap Water as well as NYS Class D surface water criteria (**Appendix A-5.1**) (USEPA, 2018; NYSDEC, 2018b). Surface water data from the ESI is summarized in **Table 1-15**.

No VOC, SVOC, pesticide, PCB, herbicide compounds were detected in the samples collected. Fourteen metals (aluminum, arsenic, barium, cadmium, cobalt, copper, cyanide, iron, lead, manganese, mercury, nickel, vanadium, and zinc) were detected at concentrations above the associated criteria values and were identified as COPCs. In addition, nitroaromatic compounds were detected in two of the surface water samples collected. One detection of RDX exceeded the USEPA RSL and was identified as a COPC. No COCs were identified in the onsite surface water during analysis in the HHRA (**Appendix B1**).

During the 1994 OB Grounds RI, surface water sampling was conducted within Reeder Creek (Parsons, 1994). Reeder Creek is a recognized surface water body and therefore NYS Class C criteria would apply to human and ecological receptors (NYSDEC, 2018b). Surface water samples were collected from Reeder Creek up- and down-gradient of the OB Grounds (**Appendix A-5.2**). Reeder Creek serves as drainage for much of the OD Grounds; therefore, these samples were downgradient of various portions of the OD Grounds. Results from Reeder Creek were compared to USEPA RSLs for Tap Water as well as NYS Class C surface water criteria (**Appendix A-5.2**) (USEPA, 2018; NYSDEC, 2018b). COPCs identified in the Reeder Creek surface water include: one VOC (1,2-dichloroethane), one explosive (RDX) and nine metals (aluminum, arsenic, barium, beryllium, cyanide, lead, manganese, mercury, vanadium). Surface water data from Reeder Creek is summarized in **Table 1-16**.

1.3.5 Chemicals of Potential Concern in Sediment

In conjunction with surface water samples collected during the OB Grounds RI, collocated sediment samples were collected from within Reeder Creek (**Figure 1-5**) (Parsons, 1994). Arsenic, copper, lead, manganese, mercury, nickel and zinc exceeded NY Sediment Criteria values. These exceedances were for a "to be considered" (TBC), therefore sediment was retained as a medium of interest in the OB Grounds FS. As part of the OB Grounds remedial action, impacted sediment was excavated and removed from the creek. Since the removal of sediment, the inspections of Reeder Creek have found minimal sediment in various sections. Recent inspections of Reeder Creek observed that the streambed contained exposed bedrock and fractured shale pieces and thin organic/sediment layers which appear to be from decomposition of fallen leaves and the migration of tree material stockpiles by beavers in previous seasons and not the result of active erosion of the site soil and soil transport (Parsons, 2017). Evidence for excessive erosion into the creek was not found. Monitoring at OB Grounds suggests no visual impacts to Reeder Creek.

Table 1-15
Summary of Onsite Surface Water Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

							NYS CLASS D (HUMAN HEALTH)[1]		NYS CLASS D (AQUATIC)[1]		EPA RSLs Tap Water (HQ=0.1)[2]	
Parameter	Unit	Maximum Detected Value	Qualifier	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	Criteria Level	Number of Exceedances	Criteria Level	Number of Exceedances	Criteria Level	Number of Exceedances
Volatile Organic Compounds (No Detects)												
Herbicides (No Detects)												
Explosives												
HMX	UG/L	0.49		SW/SD45-3	2	4	NA	0	NA	0	100	0
RDX	UG/L	2		SW/SD45-2	2	4	NA	0	NA	0	0.7	1
Semivolatile Organic Compounds (No Detects)												
Pesticides & PCBs (No Detects)												
Inorganics												
Aluminum	UG/L	37,500		SW/SD45-4	4	4	NA	0	NA	0	2,000	3
Arsenic	UG/L	2.3	J	SW/SD45-4	1	4	NA	0	340	0	0.052	1
Barium	UG/L	439		SW/SD45-4	4	4	NA	0	NA	0	380	1
Beryllium	UG/L	1.5	J	SW/SD45-4	2	4	NA	0	NA	0	2.5	0
Cadmium	UG/L	11.2		SW/SD45-4	1	4	NA	0	NA	0	0.92	1
Calcium	UG/L	194,000		SW/SD45-1	4	4	NA	0	NA	0	NA	0
Chromium	UG/L	50.8		SW/SD45-4	3	4	NA	0	16	2	NA	0
Cobalt	UG/L	18.2	J	SW/SD45-4	2	4	NA	0	NA	0	0.6	2
Copper	UG/L	612		SW/SD45-4	4	4	NA	0	NA	0	80	3
Cyanide	UG/L	47.7		SW/SD45-4	1	4	NA	0	NA	0	0.15	1
Iron	UG/L	60,400	J	SW/SD45-4	4	4	NA	0	NA	0	1,400	3
Lead	UG/L	68.7		SW/SD45-4	4	4	NA	0	NA	0	15	2
Magnesium	UG/L	24,300		SW/SD45-1	4	4	NA	0	NA	0	NA	0
Manganese	UG/L	1,250		SW/SD45-4	4	4	NA	0	NA	0	43	3
Mercury	UG/L	3		SW/SD45-4	4	4	0.0007	4	1.4	1	0.063	4
Nickel	UG/L	74.2		SW/SD45-4	4	4	NA	0	NA	0	39	2
Potassium	UG/L	9,670		SW/SD45-4	4	4	NA	0	NA	0	NA	0
Sodium	UG/L	4,340	J	SW/SD45-4	4	4	NA	0	NA	0	NA	0
Vanadium	UG/L	54.9		SW/SD45-4	3	4	NA	0	190	0	8.6	2
Zinc	UG/L	883		SW/SD45-4	4	4	NA	0	NA	0	600	1

Notes:
1) Criteria values are the NYS Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 CRR-NY 703.5; June 2018).
2) Criteria values are the USEPA RSLs for Tap Water (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.
3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

Table 1-16
Summary of Reeder Creek Surface Water Data
Feasibility Study Report - OD Grounds
Seneca Army Depot Activity

Parameter	Unit	Maximum Detected Value	Qualifier	Location ID of Maximum Detect	Number of Times Detected	Number of Samples Analyzed	NYS CLASS C (HUMAN HEALTH)[1] Criteria Level	NYS CLASS C (HUMAN HEALTH)[1] Number of Exceedances	NYS CLASS C (AQUATIC)[1] Criteria Level	NYS CLASS C (AQUATIC)[1] Number of Exceedances	2018-05 RSL Tap Water (HQ=0.1)[2] Criteria Level	2018-05 RSL Tap Water (HQ=0.1)[2] Number of Exceedances
Volatile Organic Compounds												
1,2-Dichloroethane	UG/L	2	J	SW-140	1	9	NA	0	NA	0	0.17	1
Methylene chloride	UG/L	8	J	SW-300	1	9	200	0	NA	0	11	0
Explosives (No Detects)												
Semivolatile Organic Compounds (No Detects)												
Inorganics												
Aluminum	UG/L	402	J	SW-120	2	7	NA	0	100	2	2,000	0
Barium	UG/L	114.6	J	SW-120	8	9	NA	0	NA	0	380	0
Beryllium	UG/L	4.9	J	SW-120	1	9	NA	0	11	0	2.5	1
Calcium	UG/L	210,000	J	SW-120	9	9	NA	0	NA	0	NA	0
Cyanide	UG/L	14.9		SW-300	2	9	NA	0	NA	0	0.15	2
Iron	UG/L	1,474		SW-150	6	6	NA	0	NA	0	1,400	1
Lead	UG/L	2.2	J	SW-150	1	9	NA	0	NA	0	15	0
Magnesium	UG/L	31,000	J	SW-120	9	9	NA	0	NA	0	NA	0
Manganese	UG/L	466		SW-150	8	8	NA	0	NA	0	43	5
Mercury	UG/L	0.19	J	SW-150	1	9	0.0007	1	0.77	0	0.063	1
Potassium	UG/L	6,270	J	SW-150	6	6	NA	0	NA	0	NA	0
Selenium	UG/L	1.6	J	SW-310	3	9	NA	0	4.6	0	10	0
Sodium	UG/L	59,100	J	SW-196	8	9	NA	0	NA	0	NA	0
Vanadium	UG/L	39.2	J	SW-196	1	9	NA	0	14	1	8.6	1
Zinc	UG/L	13.4	J	SW-196	1	5	NA	0	NA	0	600	0

Notes:
1) Criteria values are the NYS Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 CRR-NY 703.5; June 2018).
2) Criteria values are the USEPA RSLs for Tap Water (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018.
3) Number of analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs were not averaged.

1.4 MEC HAZARD ASSESSMENT

A MEC Hazard Assessment (MEC HA) was prepared to qualitatively assess the potential explosive hazards to human receptors associated with complete MEC exposure pathways at the OD Grounds. The results of the MEC HA show that implementation of a remedy would reduce the MEC hazard potential. A detailed description of the MEC HA conducted for the OD Grounds, including the information and assumptions used for this assessment, is included as **Appendix C1** of this FS.

A qualitative baseline evaluation of the potential MEC hazards posed was conducted by reviewing each of the MEC HA input factors for the OD Hill and Kickout areas. For the OD Hill, the baseline score (the no action alternative) results in a MEC HA score of 845 corresponding to a Hazard Level rating of 1 ('highest potential explosive hazard conditions'). For the Kickout area, the baseline score (the no action alternative) results in a MEC HA score of 695 corresponding to a Hazard Level rating from 3 ('moderate potential explosive hazard conditions').

In addition to providing a technique to evaluate baseline MEC hazards, the MEC HA method establishes a process to qualitatively evaluate the hazard mitigation that would be achieved by remedial actions. This process is based on assumptions made regarding the effects of a given remedial response (e.g., LUCs, surface cleanup, subsurface cleanup), coupled with modified scores for MEC HA input factors, to evaluate how the MEC HA score might be reduced following implementation of the response. The primary purpose of this process is to support the evaluation of response alternatives conducted during an FS; i.e., this evaluation should not be used as the sole basis upon which to recommend a remedial response. As with the baseline score, these total MEC HA scores and the associated hazard levels are *qualitative references only* and should not be interpreted as quantitative measures of explosive hazard.

Since this initial MEC HA was completed, the DoD issued a letter to USEPA (dated November 10, 2014) stating that the MEC HA has been evaluated and at this time is not recognized as a "suitable tool for assessing explosives hazards associated with MEC known or suspected to be present at a Munitions Response Site (MRS)". As such, the Army acknowledges limitations in the application of the information provided in this MEC HA.

For this reason, in addition to the MEC HA, a MEC Risk Assessment was prepared to evaluate the risk from explosive hazards to human receptors associated with complete MEC exposure pathways at the OD Grounds (**Appendix C2**). The MEC risk assessment technique used followed the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017) and evaluated the risk associated with MEC exposure considering both current land use conditions and planned future land use conditions at the Kickout Area and the OD Hill. The results of the MEC Risk Assessment indicate that unacceptable MEC risk conditions are present within the Kickout Area under both current and future land use conditions. The evaluation of risk showed that MEC risk conditions are acceptable at the OD Hill under current land use conditions, but that under future land use conditions the MEC risk is unacceptable. The reason for the different conclusions between the two areas is primarily driven by the surface clearance that has been conducted at the OD Hill, which results in a slightly lower potential amount of MEC than in the Kickout Area (i.e., no UXO/DMM on the surface). A detailed description of the MEC Risk Assessment

conducted for the OD Grounds, including the information and assumptions used for this assessment, is included as **Appendix C2** of this FS.

1.5 HUMAN HEALTH RISK ASSESSMENT

A Human Health Risk Assessment (HHRA) and a HHRA Supplement were conducted for the OD Grounds and is presented as an appendix to this FS in **Appendix B1**. The objectives of the risk assessments were to:

- Assess the OD Grounds conditions for protectiveness of human health and the environment;
- Determine whether additional response actions are necessary at OD Grounds;
- Identify COPCs and provide a basis for determining levels of COPCs that are adequately protective of human health and the environment; and
- Provide a basis for comparing potential health impacts of various remedial alternatives and evaluate selection of the No-Action remedial alternative, where appropriate.
- Evaluate the potential for human health effects as a result of potential exposures to perchlorate in soil and groundwater at the OD Grounds.

To meet these objectives, the risk assessments generally follow USEPA guidance [the Risk Assessment Guidance for Superfund (RAGS) series of guidance documents] and incorporates exposure scenarios and assumptions that are appropriate for current and anticipated future land use at this site (USEPA, 1989). The HHRA provides an evaluation of the potential risks to human health posed by constituents detected in surface soil, combined surface and subsurface soil, groundwater and surface water associated with the OD Grounds at SEDA. A detailed summary of the Human Health Risk Assessment is provided in Section 4.4 of **Appendix E** and the full HHRA is provided in Appendix B1.

1.6 BASELINE ECOLOGICAL RISK ASSESSMENT

A Baseline Ecological Risk Assessment (BERA) was conducted for the OD Grounds and is presented as **Appendix B2** in this FS. The objectives of the BERA were to:

- Assess the OD Grounds conditions for the potential for adverse effects on ecological receptors;
- Determine whether additional response actions are necessary at OD Grounds;
- Identify Chemicals of Potential Ecological Concern (COPECs) and provide a basis for determining levels of COPECs that are adequately protective of human health and the environment; and
- Provide a basis for comparing potential health impacts of various remedial alternatives, and evaluate selection of No-Action remedial alternative, where appropriate.

To meet these objectives, the BERA preparation followed Ecological Risk Assessment Guidance for Superfund (ERAGS) methodology (USEPA 1992, 1997) and supplemental guidance (USEPA 2009, 2018). The initial phase of the ERAGS process is the screening of constituents that require further evaluation as a potential concern for exposure of ecological receptors. Subsequent elements of the ERAGS process characterize the potential ecological risk on biological communities. A detailed summary

of the Baseline Ecological Risk Assessment is provided in Section 4.5 of **Appendix E** and the full BERA is provided in **Appendix B2**.

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2.0 REMEDIAL ACTION OBJECTIVES

The purpose of this section is to develop RAOs and remedial response processes for each medium of interest identified at the OD Grounds. Based on the RAO and the remedial response processes, potential remedial technologies are identified and screened in **Sections 2** and **3**, and a detailed analysis of remedial action alternatives is provided in **Section 4**. This process follows the USEPA and NYSDEC method of identifying and screening technologies/processes and consists of the following six steps:

- Develop RAOs that specify media of interest, COCs, exposure pathways, and preliminary remediation goals that permit a range of treatment and containment alternatives to be developed. The preliminary remediation goals will be based on chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) and the results of the HHRA and the MEC Risk Assessment (**Section 2**);
- Develop remedial response processes for each medium of interest that will satisfy each remedial action objective for the OD Grounds (**Section 2**);
- Identify estimates of volumes or areas, to the extent practical, of media to which remedial response processes might be applied (**Section 2**);
- Identify remediation technologies/processes associated with each general remedial action. Screen and eliminate technologies/processes based on technical implementability (**Section 2**);
- Evaluate technologies/processes and retain processes that are representative of each technology (**Section 2**); and
- Assemble and further screen the retained technologies/processes into a range of alternatives as appropriate (**Sections 3** and **4**).

2.1 OVERVIEW

As discussed in **Section 1**, the ESI, OE EE/CA, the munition response actions, and the 2010 supplemental work conclude that further actions are warranted for the OD Grounds. Based on the site history and previous investigations and the proposed future site use, soil was identified as a medium of interest due to the potential presence of UXO/DMM. Based on the risk assessment results, groundwater is a media of concern due to the presence of MC/COPCs, and soil is a media of concern when the residential scenario is considered. The following unacceptable risks have been identified:

- Presence of UXO/DMM in soil that might result in human receptors being exposed to unacceptable risks from explosive hazards via direct contact.
- Presence of MC/COPCs in soil that might result in human receptors being exposed to unacceptable risks from exposure to MC/COPCs via incidental ingestion, dermal contact, or inhalation of suspended particulates.
- Presence of MC/COPCs in groundwater that might result in human receptors being exposed to unacceptable risks from exposure to MC/COPCs via ingestion as drinking water.

RAOs address the goals for reducing the explosive hazards from UXO/DMM and/or risks from exposure to soil contamination to ensure protection of human health, safety and the environment (USEPA, 1988). The RAOs are intended to be as specific as possible, but not so specific that the range of alternatives that can be developed is unduly limited. The intent of this FS is to select RAOs that are protective of human health and the environment for evaluation and that achieve an acceptable minimum level of risk at the OD Grounds. The future use for the OD Grounds is passive recreation/conservation for walking and hiking activities. There would be no intrusive soil activities such as digging, camping, camp fires, tent staking, trail construction, playgrounds, etc.

The overall objective of any remedial response is to protect human health and the environment. RAOs have been developed to meet this overall objective. The objectives are then used as a basis for developing remedial alternatives.

CERCLA, as amended by SARA of 1986, requires that a CERCLA remedial action:

- At minimum, attain federal or more stringent state ARARs on completion of the remedial action for on-site remedial actions (unless an ARAR waiver becomes necessary).
- Use remedial alternatives that permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances;
- Select remedial actions that protect human health and the environment, are cost effective, and involve permanent solutions, alternative solutions, and resource recovery technologies to the maximum extent possible;
- Avoid off-site transport and disposal of untreated hazardous substances or contaminated materials where practical technologies exist to treat these materials on-site.

The National Contingency Plan (NCP) regulations, which implement CERCLA, generally require ARAR compliance during remedial actions as well as at completion [40 CFR 300.435(b)(2)]. However, a no-action decision does not require compliance with ARARs.

The RAOs for the OD Grounds consist of media specific objectives designed to be protective of human health and the environment. Where applicable, consideration was given to the NCP preference for permanent solutions. The overall objectives for the OD Grounds are as follows:

- Prevent public or other persons from direct contact with UXO/DMM, direct contact with soil, or inhalation of MC/COPCs that may present a health risk due to potential contamination. The "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017) was used to evaluate acceptable explosive hazard conditions for protection of human health and the environment. NYSDEC Commercial SCOs were used to evaluate appropriate and acceptable chemical contaminant levels for protection of human health and the environment.
- Restore the area to a condition that would comply with the SEDA Local Redevelopment Authority (LRA) determination in which the future use of the OD Grounds would be for passive

recreation/conservation where contact with the soil is not likely (i.e., would not include playgrounds, ballparks, camping).

The investigation and remediation of the OD Grounds is subject to pertinent requirements of both federal environmental statutes or regulations (generally administered by USEPA Region II for SEDA) and the State of New York environmental statutes and regulations (generally administered by the NYSDEC), determined in accordance with the CERCLA ARAR process. ARARs are promulgated standards that may be applicable to the site cleanup process after a remedial action has been selected for implementation.

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

Three categories of potentially applicable state and federal requirements were reviewed: (1) chemical-specific, (2) location-specific, and (3) action-specific. Chemical-specific ARARs address certain contaminants or class of contaminants and relate to the level of contamination allowed for a specific pollutant in various environmental media. Location-specific ARARs are based on the specific setting and nature of the site. Action-specific ARARs relate to specific actions proposed for implementation at a site. Both location-specific and action-specific ARARs are independent of the media. In addition to ARARs, advisories, criteria, or guidance may be evaluated as TBC. The NCP provides that the TBC category may include advisories, criteria, or guidance that were developed by USEPA, other federal agencies, or states that may be useful in devising CERCLA remedies. These advisories, criteria, and guidance are not promulgated and, therefore, are not legally enforceable standards such as ARARs.

2.2 POTENTIAL CHEMICAL-SPECIFIC ARARS AND TBCS

Chemical-specific ARARs are usually health-based or risk-based numerical values or methodologies, established by promulgated standards, that are required to be used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment. Chemical-specific TBCs can serve to indicate contaminant levels that may merit concern.

Potential federal and state chemical-specific ARARs and TBCs considered in connection with the FS at the OD Grounds include:

- USEPA RSLs for Residential Soil (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018 are considered to be relevant and appropriate criteria for the site (USEPA, 2018).
- USEPA RSLs for Tap Water (HQ=0.1) from the USEPAs Regional Screening Levels - May 2018 are considered to be relevant and appropriate criteria for the site (USEPA, 2018).
- Cleanup levels for hazardous constituents in soil have been proposed by NYS. Surface and

subsurface soil chemical concentrations were compared to NYS Subparts 375-6 Remedial Program Soil Cleanup Objectives, Table 375-6.8(b): Restricted Use Soil Cleanup Objectives. 6 NYCRR Subpart 375-6, current through June 15, 2018, includes the SCO tables developed for different categories of future land use (i.e., unrestricted use, residential, restricted-residential, commercial, and industrial) (NYSDEC, 2018a). As the OD Grounds is located in the conservation area, the NYSDEC SCOs for commercial use scenario are considered TBCs for this FS.

- NYS Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (NYSDEC, 2018b) are considered TBCs.

2.3 POTENTIAL LOCATION-SPECIFIC ARARS

Location-specific ARARs may serve to limit contaminant concentrations, or even to restrict or to require some forms of remedial action in environmentally or historically sensitive areas at a site, such as natural features (including wetlands, flood-plains, and sensitive ecosystems) and manmade features (including landfills, disposal areas, and places of historic or archaeological significance). These ARARs generally restrict the concentration of hazardous substances or the conduct of activities based solely on the particular characteristics or location of the site.

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

Federal:

- Seneca Army Depot Federal Facilities Agreement and RCRA Permit requirements.
- Executive Orders 11593, Floodplain Management (May 24, 1977), and 11990, Protection of Wetlands (May 24, 1977).
- Clean Water Act, Section 404, and Rivers and Harbor Act, Section 10 (requirements for Dredge and Fill Activities) and the associated regulations (i.e. 40 CFR part 230).
- Wetlands Construction and Management Procedures (40 CFR part 6, Appendix A).

Based on the OD Grounds conditions and the land use determination, further consideration of Protection of Wetlands, Clean Water Action, and Wetlands Procedures location-specific ARARs do not appear warranted at this time.

The Seneca Army Depot RCRA Permit requires that all waste (including UXO/DMM) generated from activities performed under the purview of the RCRA permit be properly handled as a generated waste. As such it is understood that all UXO/DMM remaining on site as the results of RCRA permitted disposal activities should be removed to the greatest extent practicable.

2.4 ACTION-SPECIFIC ARARS

Action-specific ARARs are usually technology or activity-based requirements or limitations that control actions involving specific substances. Action-specific ARARs generally set performance or design standards, controls, or restrictions on particular types of activities. To develop technically feasible alternatives, applicable performance or design standards must be considered during the development of all response action

alternatives. Note that regulations that are not related to environmental law or do not govern activities that take place at the CERCLA site are not considered ARARs.

No action-specific regulations were identified in connection with this response action. Based on the OD Grounds conditions, further consideration of these action-specific ARARs does not appear warranted at this time.

2.5 SITE-SPECIFIC REMEDIAL ACTION OBJECTIVES

Remedial action at the OD Grounds is guided by the goal of protecting human health and the environment by reducing unacceptable risks to receptors resulting from exposure to UXO/DMM in soil and MC/COPCs in soil and groundwater. The site-specific RAOs for the OD Grounds will have the effect of protecting human health and the environment and complying with ARARs (**Table 2-1**).

2.6 GENERAL REMEDIAL ACTIONS

General remedial actions are selected to satisfy the RAOs for each medium of concern at the project site. Identification of the general remedial actions also includes identification of ARARs. General remedial actions are those actions that will achieve the identified RAOs and may include treatment, containment, excavation, extraction, disposal, LUCs, or some combination of any or all of these. This subsection describes the general remedial actions applicable to the OD Grounds. The general remedial actions identified include the following:

- No Action
- Hazard Management – LUCs (e.g., engineering controls [fencing] and institutional controls [activity restrictions through permitting or deed restrictions/notifications, education, or signage])
- Remedial Action (Mapping, excavation, disposal, engineering controls, restoration) – MEC removal through geophysical mapping and excavation, soil excavation, MEC disposal, soil capping, site restoration

With the exception of the No Action alternative, the general remedial actions identified above may be combined in developing remedial action alternatives for the project site. Some areas may exhibit a higher MEC density and a correspondingly greater potential for explosive hazards so it may be appropriate to apply a different response action or combination of response actions in different parts of the site.

The No Action alternative refers to a site remedy where no active remediation or enforceable LUCs are implemented. Under CERCLA, evaluation of a No Action alternative is required, pursuant to the NCP (42 CFR 300.430 et seq.), to provide a baseline for comparison with other remedial technologies and alternatives.

Table 2-1
OD Grounds Remedial Action Objectives

Medium	Contaminant	Receptors	Exposure Routes	Remedial Action Objective	Applicable ARAR/TBCs (1)
Soil	UXO/DMM	Human (current and future site workers, site visitors, and recreational users)	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved (as defined by Matrix 4). (2)	RCRA
Soil	MC/COPCs	Human (hypothetical future child residents – unrestricted use scenario)	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved (as defined by the applicable TBCs and supplemental risk assessment).	NYSDEC Commercial SCOs USEPA RSLs
Groundwater	MC/COPCs	Human (current and future site workers, site visitors, recreational users, and hypothetical future residents)	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved (as defined by the applicable TBCs and supplemental risk assessment).	RSL or GA Std

(1) ARARs and TBCs are described in Subsection 2.1 of this report.

(2) See the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017).

Table 2-2
OD Grounds Remedial Action Objective Depths

Munitions Category	Description	Estimated DGM Detection Depth (inches bgs) (1)	Max. Depth of MEC/MPPEH (inches bgs) (2)	Max. Intrusive Depth (inches bgs) (3)	RAO Depth (inches bgs) (4)
Bomb, B1	Butterfly Bomblets	11	8	18	8
Bomb, B2	20-lb. Fragmentation Bombs	45	2	18	2
Fuze, F1	Very Small – approx. 2"x3" or smaller (e.g., small base fuzes, small Russian projectile fuzes, rocket base fuses, some land mine fuzes, etc.)	8	26	18	26
Fuze, F2	Small – Between 2"x3" and 4"x6" (e.g., "T-bar" fuzes, artillery projectile fuzes, smaller rocket fuzes, etc.)	11	26	18	26
Fuze, F3	Medium – 100 series bomb fuzes, larger rocket fuzes, etc.	21	18	18	18
Fuze, F4	Large – M60 series base fuzes and similar very heavy, large fuzes.	25	9	18	9
Grenade, G1	Hand Grenades	11	12	18	12
Grenade, G2	Rifle Grenades	11	14	18	14
Mine, M1	M1 square mines and "bouncing betty" mines and flares	25	12	18	12
Proj., P1	20mm/25mm/1.1" projectiles and similar	4	36	18	36
Proj., P2	30mm projectile without cartridge case	9	15	18	15
Proj., P3	37mm/40mm projectiles without cartridge case, 20mm with cartridge case, 30mm with cartridge case, etc.	12	18	18	18
Proj., P4	57mm projectiles, 2.36" rocket warheads, 2.36" rocket motors, etc.	21	24	18	24
Proj., P5	75mm/76mm projectiles, 90mm AP projectiles	32	25	18	25
Proj., P6	105mm projectiles, 3.5" rockets, etc.	45	18	18	18
Proj., P7	155mm projectiles, 6" projectiles, 4.2" mortars, 120mm projectiles, etc.	47	15	18	15

(1) DGM detection depths were calculated using a 13.9mV threshold for the sum of time gates 1-3, based on the threshold required to detect a 37mm projectile at 12in below ground surface(bgs). All depths are for a horizontally oriented munition, offset 0.3m across-track from the center of the coil using the standard EM61-MK2 coil height of 42cm. For items without available response curve data, a munition of similar size was used to estimate detection depths.

(2) Maximum Depth of MEC/MPPEH as presented in **Table 1-7**.

(3) Maximum Intrusive Depth based on current and future land uses.

(4) RAO depth is based on the Maximum Depth of MEC/MPPEH found during the Phase I and II Investigations and the Munitions Response Action (2012-2014).

Hazard management technologies include enforceable administrative institutional controls and/or physical measures (engineering controls) to prevent or limit exposure of receptors to MEC or MC. A deed notice/environmental easement is an example of an institutional control. Physical barriers and access restrictions (e.g., fencing, locked gates, and warning signs) or activity restrictions (prohibiting intrusive activities) are examples of engineering controls. LUCs can be cost-effective, reliable, and immediately effective, and can be implemented either alone or in conjunction with other remedial components. Inspections and monitoring typically are required to document long-term effectiveness of LUCs. The administrative feasibility of and cost to implement LUCs depend on site-specific circumstances (e.g., whether or not a site is under the direct operational control of the DoD, or has been transferred to non-federal ownership).

A remedial action alternative may employ technologies to reduce the toxicity, mobility, or volume of contaminants in the subsurface, thereby preventing or minimizing exposure of receptors to MEC or chemical contamination that could pose unacceptable MEC or MC/COPCs risks. Physical extraction methods are typically used to remove surface and subsurface MEC for disposal. The feasibility and cost to implement MEC excavation options can vary widely based on site-specific conditions and circumstances. Examples of remedial action approaches include removal of soil and/or MEC by hand, implementation of an engineered cover, or excavation and off-site disposal.

2.7 IDENTIFICATION AND SCREENING OF TECHNOLOGIES BY CONTAMINANT AND MEDIUM

2.7.1 Background

The USEPA has established guidelines for the types of remedial alternatives that should be developed during the detailed analysis stage; they are listed in the NCP (40 CFR 300.430(a)(1)) and are summarized as follows:

- Use treatment to address the principal threats posed by a site, wherever practicable.
- Use engineering controls for low, long-term threats or where treatment is impracticable.
- Use a combination of methods, as appropriate, to achieve protection of human health and the environment.
- Use institutional controls to supplement engineering controls to prevent or limit exposure to hazardous substances, pollutants, or contaminants. The use of institutional controls shall not substitute for active response measures as the sole remedy unless such active measures are determined not to be practicable.
- Consider using innovative technologies.

NCP guidance further states that "the development and evaluation of alternatives shall reflect the scope and complexity of the remedial action under consideration" (40 CFR 300.430(e)) (GPO, 2014). Land use is also a consideration in developing alternatives. An initial list of remedial technologies was developed based on Version 4.0 of the Remediation Technologies Screening Matrix and Reference Guide produced by the Federal Remediation Technologies Roundtable (FRTR) (FRTR, 2007). The FRTR is a consortium of

government agencies that have worked to build a more collaborative atmosphere among federal agencies involved in hazardous waste site remediation. The remedial technologies identified are described in further detail below.

2.7.2 Remedial Technologies for Munitions and Explosives of Concern

Available remedial technologies for MEC are described below and summarized in **Table 2-3**.

Table 2-3
General Remedial Actions for MEC

General Remedial Action	Technology	Process Options
Land Use Controls (LUCs)	Access Restrictions	Fence
	Activity Restrictions	No intrusive activities
		On-call MEC support required
		On-site MEC support required
	Hazard Notification	Signs
		Educational Materials
		Deed Notice/Notification
		Fence
Containment	Cover	Paved, earth, or earth/lined
Source Removal	Detection	DGM surveys
		DGM/Advanced Classification
	Excavation	Manual excavation
		Mechanical excavation
		Mechanical excavation and sifting
Disposal	MEC Disposal	Demolition (BIP or consolidated shots)

2.7.2.1 Land Use Controls

LUCs can be cost-effective, reliable, and immediately effective, and can be implemented either alone or in conjunction with other remedial actions. The administrative feasibility of and cost to implement LUCs depend on site-specific circumstances, including whether or not a site is under the direct operational control of the DoD or was transferred to non-federal ownership, as well as on the ability, willingness, and commitment of local authorities to implement LUCs. Inspections and monitoring are typically required to document the long-term effectiveness of LUCs. A variety of potentially effective LUCs for addressing explosive hazards are described below.

Access Restrictions

Physical barriers, such as fences, can prevent or limit uncontrolled access to the contaminated area. In the case of MEC, such restrictions prevent access to both surface and subsurface hazards by potential receptors. Access restrictions can be used in conjunction with hazard notification methods, such as signs (see below), to enhance the awareness of site receptors regarding the potential hazards.

Activity and Use Restrictions

Activity restrictions can limit contact with MEC by preventing or otherwise controlling the manner in which receptors might be exposed. Use restrictions and regulatory controls dictate the type of development that would occur on a site and the methods in which that development occurs. For example, using a deed notice or restrictive covenant to designate that the land use cannot include residential use would only prevent future residential land uses at the site. Other common activity restrictions include total prohibitions on intrusive activities in the contaminated area, implementing a "no parking" restriction, or the implementation of procedures that require "MEC support" for intrusive or non-intrusive activities in the contaminated area.

MEC support can be implemented at various levels of support dependent on the needs of project and the probability of encountering MEC. USACE Engineer Manual 385-1-97 (USACE, 2013) presents procedures for anomaly avoidance conducted during hazardous, toxic, and radioactive waste investigation/design activities; standby MEC support during construction activities; and subsurface removal of MEC during construction activities. All MEC support is provided by MEC-qualified personnel. Anomaly avoidance involves using metal detectors to avoid surface or subsurface MEC and is typically practiced where the planned intrusive activities are limited, such as collecting soil samples or placing survey stakes. MEC support is usually performed during larger intrusive efforts, such as construction or excavation, and involves either MEC standby support ("on-call" MEC support) or subsurface removal in support of construction activities ("onsite" MEC support), with the type of support required being dependent on the probability of encountering MEC. MEC standby support is required if the probability of encountering MEC is low, while onsite MEC support is required in other situations of higher probability of MEC presence.

Hazard Notification

Hazard notification involves methods of increasing potential receptors' awareness of the explosive hazards at a site. Available processes include signage, fencing, educational materials, and notations in the installation master plan. Placing signs around a contaminated area can help to warn potential receptors of the associated explosive hazards so they can choose to avoid them entirely by not entering the affected area or make them less likely to interact with potential hazards (e.g., suspicious items that might be MEC) if they do enter the area. Signs can also be used in conjunction with access restrictions, such as fencing. At the same time a fence even if it has gates that allow access can be used to restrict the flow of people and help notify a site user that they have entered an area with restrictions. Another method of hazard notification involves the production and distribution of educational materials to receptors to inform them about the nature of the MEC potentially present at the site. Similar to signs, these materials warn potential receptors of the associated explosive hazards so they can choose to avoid them entirely by not entering the affected area or make them less likely to interact with potential hazards. Another method of hazard notification is to record deed notices or master plan notations, which are non-enforceable, purely informational documents that alert anyone searching the records to important information about the property, such as the known or potential presence of contamination. Deed notices or master plan notations help to ensure that information concerning the property is permanently recorded and maintained if the land changes owners and/or uses over time.

2.7.2.2 Source Containment Technologies

Containment technologies include the installation of some type of physical barrier over the surface of the affected area to reduce or eliminate the potential for receptor interaction with subsurface MEC. Common construction materials that could be applied as physical barriers include concrete, paving, gravel, or earth. Containment technologies are typically used over small, discrete areas and are not practical over large acreages. Containment technologies are often used in conjunction with deed notices or master plan notations and are typically used over small, discrete areas and are not practical over large acreages.

2.7.2.3 Source Removal Technologies

Detection

Detection and location technologies for MEC primarily depend on the ability of geophysical instruments to distinguish the physical characteristics of MEC from those of the surrounding environment. While there are many potential detection methods, the best instruments currently available detect the metallic content of the target items. Geophysical instruments are grouped into two main families of detectors based on how their data are interpreted. Analog geophysical instruments are instruments that produce an audible output, a meter deflection, and/or numeric output, which can be interpreted in real time by the instrument operator, while DGM instruments are instruments that digitally record geophysical measurements and geo-reference data to where each measurement occurred. DGM instruments include advanced electromagnetic induction (EMI) sensors that can collect data from multiple directions and enable the "classification" of subsurface anomalies (see below).

Analog geophysical instruments include all handheld metal detectors and ferrous locators (e.g., Schonstedt magnetic locators, Whites Metal Detectors, etc.). Geophysical surveys using these instruments involve the equipment operator(s) methodically scanning the area to be surveyed, either placing marker flags at location of detected subsurface anomalies ("mag and flag" surveys) or intrusively investigating subsurface anomalies as each one is detected ("mag and dig" operations). In the case of "mag and flag" surveys, the flags are intrusively investigated at a later stage of the operation. Their advantages include real-time detection and accurate location of anomalies. However, analog instruments have several disadvantages compared with DGM instruments. For example, they do not detect items as deep as DGM instruments and their quality is dependent on operator training and attentiveness. Also, QC methods for analog instruments are more challenging and less precise than those used for digital instruments, and they detect smaller items, which typically results in a higher number of intrusive investigations versus digital surveys. Finally, there is no permanent data record of survey results, which prevents subsequent analysis and review of electronic data. Despite these limitations, the instruments ease of use means that analog geophysical surveys are effective in areas where vegetation and terrain limit the use of larger digital systems. Analog instruments are also often used for anomaly avoidance (see above) and for surface removals, where they can help locate surface MEC items obscured by leaves and other detritus.

DGM instruments include all geophysical tools capable of recording and geo-referencing geophysical measurements. Most magnetic and electromagnetic instruments have the capability to output a digital signal to a data logger that can be co-registered with positional information to develop a two-dimensional map of

the characteristic the instrument is measuring. DGM surveys are able to capitalize on the use of sensors with higher sensitivity, application of noise reduction techniques, and advanced data-analysis techniques. DGM instruments can be hand-pulled, but they can also be configured into multi-sensor "towed arrays" that are pulled by vehicles and can be used to gather data across wider paths than a single instrument. If the site conditions are suitable, using these towed arrays can increase data collection speed appreciably. The advantages of DGM surveys include a uniform process for data collection and analysis, geo-referenced location of data and anomalies, and no reliance on operator subjectivity (e.g., to place or not to place a flag). DGM instruments also provide the ability to further evaluate electronic data, the creation of a permanent electronic record, and the ability to define rigorous QC measures capable of detecting all/most possible failure modes for the geophysical survey. Challenges for performing DGM include the instruments' decreased effectiveness in high clutter areas; operational constraints resulting from vegetation and topography; and defining anomaly selection criteria that meet the project team's needs in terms of adequately identifying all MEC-like targets, while not selecting excessive numbers of non-MEC anomalies.

In addition to these more commonly used geophysical instruments, there are several advanced digital geophysical sensor technologies (e.g., MetalMapper, TEMTADS®, MPV) that have been developed and proven successful in recent years at various DoD sites. These "advanced geophysical classification" (AGC) technologies use advanced EMI sensors to differentiate more effectively between buried MEC items and anomalies that are not MEC in order to reduce the dig list. In this way, these technologies have the potential to reduce the number of anomalies that would need to be intrusively investigated and, therefore, also potentially reduce the cost of completing remedial actions. It should be noted that implicit in the use of these classification technologies is the assumption that not all geophysical anomalies would be intrusively investigated; however, only metallic items identified not to be munitions would remain buried following the associated removal.

Excavation

MEC removal is typically conducted using excavation to the depth of anomaly detection (i.e., the removal team continues digging until the anomaly source is located and removed) or excavation to a fixed removal depth. During excavation to a fixed depth, the removal team would stop digging at that depth whether or not the anomaly is resolved. This approach is typically used when the maximum potential intrusive depth for site receptors is established so removal would not need to proceed deeper than the fixed depth, or where the maximum potential depth of MEC was established.

Excavation technologies include manual and mechanical methods (e.g., mini-excavators, backhoes). Manual excavation is considered the industry standard for MEC recovery and can safely achieve good results. Mechanical excavation methods can also be used if site conditions or the anticipated depth of MEC might make manual excavation challenging. Using mechanical excavators to remove MEC may necessitate the use of "up-armored" excavators to protect the operator in the event of an unintentional detonation and might require remote control equipment if large MEC items might be present. Mechanical excavation methods can also be used in conjunction with mechanical sifting equipment to process quantities of soil containing large amounts of MEC or metal debris. Excavation and sifting are typically costly and results in large disturbances to the affected land.

2.7.2.4 MEC Disposal

Disposal of MEC items recovered during removal operations may be conducted using BIP procedures, or if the MEC items are deemed acceptable to move, consolidated demolition shots may be performed at the end of a project or on an as-needed basis. All disposal of MEC needs to be conducted following approved safety procedures.

2.7.3 Remedial Technologies for COPCs in Soil and Potential for Future Migration to Groundwater

Available remedial technologies for MC/COPCs in soil and groundwater (based on potential migration to groundwater) are described below and summarized in **Table 2-4**.

Table 2-4
General Remedial Actions for MC/COPCs in Soil and Groundwater

General Remedial Action	Technology	Process Options
Land Use Controls	Access Restrictions	Fence
	Activity Restrictions	Deed Restriction
	Hazard Notification	Signs
		Educational materials
		Deed Notice/Notification
		Fence
Source Containment	Cover	Lined, paved, gravel, earth, or vegetative cover
	Engineered Cap	Thin layer, isolation
	Low Permeability Barrier Wall or slurry wall	Low permeability wall to isolate groundwater
Physical/Chemical Treatment	Solidification/Stabilization	*In Situ*
		Ex Situ
	Soil Washing/Density Separation	*Ex Situ*
Source Removal	Excavation	Mechanical Excavation/Off-site Disposal
		Mechanical Excavation/On-site Disposal

2.7.3.1 Land Use Controls

LUC technologies for COPCs in soil and groundwater are largely similar to those described for MEC in **Subsection 2.7.2** above. However, activity restrictions for COPCs in soil and groundwater will include deed restriction.

Deed restrictions prohibit specific land uses at a site. For example, a deed restriction might stipulate land cannot be used for residential development or that groundwater use is prohibited. In this way, the deed restriction ensures certain receptors would not be exposed to the contamination present.

2.7.3.2 Source Containment Technologies

Containment technologies are similar to those described for MEC and involve the installation of some type of physical barrier over the surface of the affected area to reduce or eliminate the potential for receptor interaction with the MC-contaminated soil or groundwater. Common construction materials that could be applied as physical barriers include concrete, paving, rock, gravel, and low-permeability and high-permeability soils. Low-permeability materials divert water and prevent its passage into the waste, while high permeability materials carry away water that percolates into the barrier. Other materials such as vegetative or synthetic covers may be used to increase slope stability and prevent or reduce erosion of the source contamination.

A low permeability barrier wall, or slurry wall, can involve installation of a low-permeability zone below the ground surface that prevents groundwater movement across the zone. This contain impacted groundwater contamination and can prevent movement of contaminants in the subsurface.

Containment technologies are often used in conjunction with deed notices or master plan notations and are typically used over small, discrete areas and are not practical over large acreages.

2.7.3.3 Physical and Chemical Soil Treatment Technologies

Physical and chemical treatments use the physical and/or chemical properties of contaminants or of the contaminated medium to destroy (i.e., chemically convert), remove, or contain the contamination. Physical treatment processes generally address contamination by changing its phase (e.g., soil to liquid, liquid to vapor or gas) to facilitate removal while chemical treatment processes change the chemical nature and characteristics of the pollutants to produce less toxic or compounds more easily removed from the soil or sediment. These treatments are typically cost effective and can be completed in short time periods, and the necessary equipment is readily available and is generally not engineering or energy-intensive. Treatability testing is often required prior to conducting treatment to ensure the selected process would achieve the desired outcome. Soil treatment can be carried out *in situ* (i.e., onsite within the area of contamination) or *ex situ* (i.e., outside the area of contamination or offsite). Physical and chemical treatment processes include solidification/stabilization, and soil washing/density separation.

Solidification/stabilization is the process of adding chemical reagents to contaminated soil or sediment to limit the solubility and mobility of contaminants and is the most commonly selected treatment option for metals-contaminated sites. Solidification/stabilization can be implemented *in situ* or *ex situ* (Conner, 1990).

Soil separation processes (often referred to as "soil washing") remove metals from the soil or sediment in aqueous suspension by either dissolving or suspending them in a wash solution that is passed through the soil, or by concentrating them into a smaller volume of soil through particle size or gravity separation. The type of wash solution used depends on the contaminants present and the soil characteristics. Some examples are chelating agents, oxidizing and reducing agents, and surfactants. The wash solution used in the process would require further treatment before it is disposed of. Soil separation processes are implemented *ex situ* (Evanko and Dzombak, 1997; Fuentes, et al, 2002; USEPA, 2006).

2.7.3.4 Source Removal Technologies for COPCs

Mechanical excavation is the source removal technology for COPCs in soil. When a well-defined, concentrated source is present, source removal is typically the most effective way to mitigate and prevent ongoing release of contamination. Confirmation samples are collected during and after the source area has been excavated to ensure contamination is removed to the appropriate regulatory standards. Excavated soil is characterized based on the concentrations and leachability of the contaminants and in accordance with applicable local, state, and federal regulations. Soil can be treated to reduce leachability of contaminants and meet non-hazardous waste standards prior to disposal.

2.7.4 Evaluation of Technologies

All technologies considered technically implementable at the OD Grounds were screened against three criteria: effectiveness, Implementability, and cost. Each of these criteria are described in further detail below.

2.7.4.1 Effectiveness

The assessment of effectiveness considers whether the technology will address the hazards or risks identified at the site and is capable of achieving the established RAOs.

2.7.4.2 Implementability

Because the technical implementability of the technologies is judged in the initial screening step, this part of the evaluation focuses on the administrative and institutional implementability of the technology (e.g., likelihood of community and/or regulator acceptance or resistance based on safety or other concerns).

2.7.4.3 Cost

Relative cost information for technology screening represents the technology cost only (implementation and operation), not the overall remedial cost to achieve a cleanup objective.

2.7.5 Conclusions

All the technologies described in **Subsection 2.7.2** and **2.7.3** were subjected to screening against the three criteria described above. **Tables 2-5** and **2-6** show the results of this screening for the OD Grounds MRS. Technologies were retained for consideration and inclusion in the remedial alternatives if they were deemed effective, implementable, and practical based on cost. Technologies were eliminated by this screening if they did not meet one or more of the three criteria.

Following the screening, analog geophysical surveys were ruled out due to DoD policy to use DGM wherever practical. There are no restrictions for DGM at this site; therefore, DGM is practical and analog data collection has been screened out. For COPCs in soil and groundwater, hazard notification, and soil washing/density separation were eliminated. **Tables 2-5** and **2-6** indicate why the technologies listed either do or do not meeting the screening criteria.

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Table 2-5
Technology Screening and Evaluation – Munitions and Explosives of Concern

General Remedial Action	Remedial Technology	Process Options	Screening: Technically Implementable?	Evaluation			
				Effective?	Administratively and Institutionally Implementable?	Cost Prohibitive?	Retained for Consideration?
No Action	None	None	N/A [1]	N/A [1]	N/A [1]	No Cost	YES
LUCs	Access Restriction	Fence (for preventing access)	YES	YES Achieves RAOs by preventing access to the site; which would limit interaction with MEC.	YES Readily implementable for small areas, planned future land use would not be conducive to restricting access over the entire site.	NO Low cost	YES
	Activity Restriction	No intrusive activities allowed/no parking	YES	YES Helps achieve RAOs by preventing subsurface exposures, which would limit interaction with MEC. More effective for limiting interactions with low density residual MEC that can remain following removal efforts.	YES Readily implementable	NO Negligible cost	YES
		On-call MEC support required for intrusive activities	YES	YES Helps achieve RAOs by assessing items for recovery and disposal, which would limit receptor interaction. Should be preformed along side other processes such as anomaly avoidance or education to be Effective.	YES Difficult to implement without significant long lead coordination with land owners.	NO Moderate cost	YES
		Onsite MEC support required for intrusive activities	YES	YES Achieves RAOs by detecting potential items for recovery and disposal, which would limit interaction with source contaminants during intrusive activities.	YES Difficult to implement without significant long lead coordination with land owners.	NO High cost	YES
	Hazard Notification	Warning signs	YES	YES Helps achieve RAOs by increasing awareness of explosive hazards, which would discourage activities that would lead to interaction with MEC.	YES Readily implementable	NO Low cost	YES
		Educational materials	YES	YES Helps achieve RAOs by increasing awareness of explosive hazards, which would discourage activities that would lead to interaction with MEC	YES Readily implementable	NO Negligible cost	YES
		Deed Notification	YES	YES Can be effective to achieves RAOs by limiting the allowable uses of a site; therefore, preventing certain activities that could result in contact with subsurface. If enforced can be effective at preventing interaction with MEC.	YES Readily implementable	NO Negligible cost	YES
		Fence (as a notification tool)	YES	YES Help achieve the RAO by increasing awareness of explosive hazards, which would limit interaction with MEC. More effective for limiting interactions with low density residual MEC that can remain following removal efforts.	YES Readily implementable	NO Low cost	YES

Table 2-5, continued
Technology Screening and Evaluation – Munitions and Explosives of Concern

General Response Action	Remedial Technology	Process Options	Screening: Technically Implementable?	Evaluation			
				Effective?	Administratively and Institutionally Implementable?	Cost Prohibitive?	Retained for Consideration?
Containment	Cover	Paved or gravel cover	YES	YES Helps achieve RAOs by preventing contact with subsurface, which would prevent interaction with MEC. Most effective when used in combination with other efforts to restrict or discourage activities that can results in interaction with potential MEC in the subsurface.	YES Readily implementable	NO Moderate cost	YES
		Earth cover	YES	YES Helps achieve RAOs by preventing contact with current surface and subsurface, which would prevent interaction with MEC. Most effective when used in combination with other efforts to restrict or discourage activities that can results in interaction with potential MEC in the subsurface.	YES Readily implementable	NO Moderate cost	YES
Detection/ Excavation/ Disposal	Detection	Analog surveys	YES	NO Achieves RAOs by detecting MEC for recovery, which would limit interaction with MEC	NO DoD policy is to use DGM wherever practical. At this site, there are no limitations on the use of DGM equipment; therefore, analog detection methods are not administratively implementable.	NO Moderate cost	NO *Not implementable at this site.*
		DGM surveys	YES	YES Achieves RAOs by detecting MEC for recovery, which would limit interaction with MEC	YES Readily implementable	NO Moderate cost	YES
		DGM surveys/AGC	YES	YES Achieves RAOs by detecting MEC for recovery, which would limit interaction with MEC	YES Readily implementable; Government has indicated a preference for AGC	No High cost (2)	YES
	Excavation	Manual excavation	YES	YES Achieves RAOs by recovering detected MEC for disposal, which would limit interaction with MEC	YES Readily implementable	NO Moderate cost	YES
		Mechanical excavation	YES	YES Achieves RAOs by recovering detected MEC for disposal, which would limit interaction with MEC	YES Readily implementable	NO High cost	YES
		Mechanical excavation and sifting	YES	YES Achieves RAOs by recovering detected MEC for disposal, which would limit interaction with MEC	YES Readily implementable	NO Very high cost	YES
	MEC Disposal	BIP or consolidated shots conducted by qualified MEC personnel	YES	YES Achieves RAOs by disposing of recovered MEC and rendering items safe, which would limit interaction with MEC	YES Readily implementable	NO Moderate Cost	YES

(1) Evaluation of the No-Further Action alternative is required to provide a baseline for comparison with other remedial technologies and alternatives; the No Action alternative is retained for further consideration throughout the FS.

Table 2-6
Technology Screening and Evaluation – COPCs in Soil and Groundwater

General Response Action	Remedial Technology	Process Options	Screening: Technically Implementable?	Evaluation			
				Effective?	Administratively and Institutionally Implementable?	Cost Prohibitive?	Retained for Consideration?
No Action	None	None	N/A (1)	N/A (1)	N/A (1)	No Cost	YES
LUCs	Access Restriction	Fence (for preventing access)	YES	YES Achieves RAOs by limiting interaction with contamination in soil and groundwater.	YES Readily implementable	NO Low cost	YES
	Activity Restriction	Deed Restriction	YES	YES Achieves RAOs by limiting use of the site and groundwater to limit human exposure.	YES Readily implementable	NO Low cost	YES
	Hazard Notification	Warning signs, Educational materials, Deed Notification	YES	NO Would not achieve RAOs under planned future land use.	YES Readily implementable	NO Low cost	NO *Not Effective at this site under the planned future land use.*
		Fence (as a notification tool)	YES	NO Would not achieve RAOs under planned future land use.	YES Readily implementable	NO Low cost	NO *Not Effective at this site under the planned future land use.*
Containment	Cover	Paved/lined, gravel, or earth cover	YES	YES Achieves RAOs by limiting interaction with contamination in soil and groundwater.	YES Readily implementable	NO Moderate cost	YES
	Engineered Cap	Thin layer or isolation cap	YES	YES Achieves RAOs by limiting interaction with contamination in soil and groundwater.	YES Readily implementable	No Moderate to high cost	YES
Physical/ Chemical Treatment	Solidification/ Stabilization	*In Situ*	YES	NO Does not achieve RAOs as a standalone technology; achieves RAO in combination with off-site disposal.	YES Readily implementable	NO Moderate cost to high cost	YES Only in combination with off-site disposal
		Ex Situ	YES	NO Does not achieve RAOs as a standalone technology; achieves RAO in combination with off-site disposal.	YES Readily implementable	NO Moderate cost	YES Only in combination with off-site disposal
	Soil Washing/ Density Separation	*Ex Situ*	YES	YES Achieves RAOs by removing COCs.	NO Requires hazardous waste permit, and the volume of soil to treat is feasible.	Yes Very high cost	NO Not implementable and cost prohibitive
Source Removal	Excavation	Mechanical Excavation Off-site Disposal	YES	YES Achieves RAOs by removing impacted soil/sediment off-site, which would prevent interaction with COCs.	YES Readily implementable	NO Very High cost	YES
		Mechanical Excavation On-site Disposal	YES	YES Does not achieve RAOs as a standalone technology; achieves RAOs in combination with engineered cap.	YES Readily implementable	NO Moderate cost	YES

(1) Evaluation of the No-Further Action alternative is required to provide a baseline for comparison with other remedial technologies and alternatives; the No Action alternative is retained for further consideration throughout the FS.

3.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

3.1 INTRODUCTION

This section summarizes the remedial action alternatives that were developed from the technologies screened in **Section 2**. Prior to the development of alternatives, an evaluation of general response actions and a technology screening was performed for inclusion into proposed remedial action alternatives for the OD Grounds. Technologies were combined into alternatives considering potential waste-limiting and site-limiting factors unique to the OD Grounds and the level of technical development for each technology. This information was used to differentiate alternatives with respect to effectiveness and implementability. This FS focuses on identifying and evaluating alternatives for the OD Grounds.

3.2 DESCRIPTION OF ALTERNATIVES

Remedial technologies selected in Chapter 2 were assembled into several remedial alternatives to achieve the RAOs for the OD Grounds. **Table 3-1** summarizes these remedial action alternatives, including their key elements. Detailed descriptions of the above remedial alternatives are included in the following sections.

3.2.1 Alternative 1 – No-Further Action

Alternative 1 is the no action alternative. CERCLA and NYSDEC guidance for conducting FSs recommends that the no-action alternative be considered as a baseline for comparison against other alternatives. The no action alternative would leave the OD Grounds undisturbed with the continuation of existing site security measures, such as locked gates, to prevent civilian access and direct contact with contaminated soil and possible exposure to explosive hazards from potential UXO/DMM.

3.2.2 Alternative 2 – LUCs Only, Including Groundwater Restrictions

Under Alternative 2, LUCs would be implemented. LUCs would include an environmental easement to prohibit the use of groundwater as a potable water source, prohibit unauthorized intrusive activities (requiring construction support, if necessary), and implement land use restrictions to prevent the future use of the OD Grounds as a daycare or for residential activities. Access to and use of the groundwater would be restricted at the OD Grounds under the terms of the future ROD. A fence currently exists around a larger area that contains the OD Grounds. This perimeter fence would be maintained as part of the LUCs. The groundwater is not currently being used, and would not be used in the future, as a potable water source. Currently, a non-groundwater sourced municipal water supply is available for SEDA. Inspections would be performed annually to confirm that restrictions are being followed. In addition, as a part of this alternative SEDA would implement public awareness measures that would involve briefings on potential explosive hazards to future site personnel to alert them to these issues and reinforce the "three Rs" of explosives safety (*recognize, retreat, and report*). This alternative would allow potential UXO/DMM and MC contamination to remain in place, however; increasing awareness of hazards, and restricting site activities would reduce the potential for human interaction with potential MEC and land use and groundwater use restrictions would reduce human health risk from potential MC exposure. A five-year review would be conducted to ensure that conditions have not changed in such a way that the RAOs are not being achieved or are no longer protective. **Table 3-2** summarizes and describes the purpose of each element of this alternative.

Table 3-1
Summary of Remedial Alternatives and Elements

Alternative	Contaminant	Key Components
Alternative 1: No Action	N/A	None
Alternative 2: Land Use Controls (LUCs)only, including groundwater use restrictions	UXO/DMM	• Restrict the site to non-residential land use • Require MEC construction support for intrusive activities • Implement educational awareness for workers and visitors • Maintain the perimeter fence to control access • Conduct annual LUC inspections
	MC/COPCs	• Restrict to non-residential land use • Prohibit groundwater use as potable source
Alternative 3: Consolidate and cap with surface and subsurface clearance outside the cap and LUCs	UXO/DMM	• Consolidate soil with high densities of metallic debris at the OD Hill beneath an engineered cap • Conduct surface and subsurface MEC removal outside the cap • Prohibit intrusive activity within the cap footprint • Implement LUCs from Alternative 2 o Note that construction support will only be necessary when intrusive activities occur to depths determined to potentially contain residual UXO/DMM based on remedial action data.
	MC/COPCs	• Consolidate contaminated soil at the OD Hill beneath the engineered cap and install low permeability barrier wall to prevent groundwater movement • Conduct long-term groundwater monitoring o Implement LUCs from Alternative 2
Alternative 4: Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC at the OD Hill • Conduct surface and subsurface MEC removal over the entire MRS including below the material removed at the OD Hill. • Implement LUCs from Alternative 2 o Note that construction support will only be necessary when intrusive activities occur to depths determined to potentially contain residual UXO/DMM based on remedial action data.
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated • Implement LUCs from Alternative 2
Alternative 5: Excavate entire site to 1 foot below grade and perform surface/subsurface clearance	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC across the whole site to 1 foot below grade • Conduct surface and subsurface MEC removal across the whole site following mechanical separation and sorting operation • Implement LUCs from Alternative 2 o Note that construction support will only be necessary when intrusive activities occur to depths determined to potentially contain residual UXO/DMM based on remedial action data.
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated • Implement LUCs from Alternative 2
Alternative 6: Excavate entire site and process for off-site disposal	UXO/DMM	• Conduct mechanical separation and sorting to remove MEC across the whole site to greater than 3 feet bgs
	MC/COPCs	• Sample mechanically separated soil and remove if contaminated

Table 3-2

Remedial Alternative 2 Summary of Elements

Remedial Action Objective	Exposure Routes	Remedy Component	How the Component Contributes to Achieving the Remedial Action Objective
Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved (as defined by Matrix 4).	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Restrict the site to non-residential land use	This component would minimize the number of people potentially interacting with UXO/DMM remaining at the OD Hill and Kickout Area by preventing residential construction and ensuring the site is restricted to site workers and recreational users. This would minimize of site receptors encountering UXO/DMM, which in turn would reduce risks from explosive hazards.
		Require MEC construction support for intrusive activities	This component would ensure intrusive activities would only be conducted with the support of UXO professionals using MEC safety protocols for anomaly avoidance. This would minimize the risk of site receptors encountering UXO/DMM, which in turn would reduce risks from explosive hazards. Implementation would require long lead coordination with the land owner to be technically feasible. May be difficult to implement due to all intrusive activities requiring support.
		Implement educational awareness for workers and visitors	This component would increase the awareness of potential explosive hazards, which would decrease the likelihood for receptors to interact with UXO/DMM items that might remain at the site. Educational awareness would also increase the effectiveness of other use restrictions by minimizing the chance receptors would unintentionally perform prohibited activities.
		Maintain the perimeter fence to control access	The fence would control access to the site to prevent inadvertent access by receptors and also, in conjunction with the other site restrictions, would help reinforce awareness that a person is in a potentially hazardous area and minimize the chance receptors would unintentionally perform prohibited activities. This would decrease the likelihood for receptors to interact with UXO/DMM items that might remain at the site.
		Conduct annual LUC inspections and 5-year reviews	This component would confirm that LUCs for the site remain in place and are functioning effectively (e.g., that the fence is still intact and that education awareness measures are being implemented and are up-to-date).
Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Restrict the site to non-residential land use	This component would eliminate the residential exposure scenario and, therefore prevent future child residents from being exposed to MC/COPCs in soil via direct contact.
Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Groundwater Use Restrictions (i.e., prohibit use as potable source)	This component would eliminate the drinking water exposure scenario and, therefore prevent hypothetical future residents, park workers, and recreational users from being exposed to MC/COPCs via ingestion as drinking water.

3.2.3 Alternative 3 – Consolidate and Cap with Surface and Subsurface Clearance Outside the Cap and LUCs

Alternative 3 would involve consolidating soil with high densities of metallic debris and MC/COPCs contaminated soil at the OD Hill and covering that soil with an engineered cap. The cap would be constructed in compliance with NYS Part 360-2.13 requirements. During consolidation, visible UXO/DMM would be removed; however, potential UXO/DMM would likely remain in the soil that is consolidated below the engineered cap. As part of the cap design, a low permeability barrier wall would be installed to restrict movement of contaminated groundwater and prevent movement of potential future contamination that may result from leaving UXO/DMM in place. This alternative would also include DGM data collection and intrusive investigation of anomalies to complete a MEC clearance in areas of the MRS that were not covered by the engineered cap.

Under this alternative, DGM surveys would be performed over the entire MRS in accessible areas outside of OD Hill. Initially, dynamic DGM surveys would be conducted using EM61-MK2s or AGC instruments with the objective of detecting known or suspected MEC in the subsurface. Following the dynamic surveys, if AGC was used for anomaly classification, AGC "cued" surveys would be conducted over detected anomalies and data would be processed to identify "targets of interest" (TOI) that are likely to be UXO/DMM. All TOI would be intrusively investigated by qualified UXO technicians, while anomalies classified as non-TOI would be left in place. If AGC was not used for anomaly classification, then all anomalies identified by the dynamic DGM or AGC surveys would be intrusively investigated by qualified UXO technicians to complete the MEC clearance. Qualified UXO technicians would perform required demolition procedures. The demolition team would dispose of potential UXO/DMM. All recovered MD/MPPEH/MEC will be handled from recovery (i.e., dug out of the ground at identified anomaly) through disposal in accordance with applicable DoD policies, requirements, and instructions.

It is anticipated that soil with high densities of metallic debris could be encountered in areas located outside the direct footprint of the OD Hill. At locations where the dynamic DGM surveys indicate soil with high densities of metallic debris (i.e., where surrounding anomaly densities are elevated such that DGM or dynamic AGC surveys would not be effective for anomaly discrimination), the surface soil would be excavated and the soil with high densities of metallic debris would be consolidated and incorporated at the OD Hill. It is assumed that approximately 25,000 to 35,000 cubic yards (CY) of soil would be moved from outside the OD Hill to consolidate under the cap. The excavated area would then be resurveyed using DGM to demonstrate that the soil with high densities of metallic debris around the OD Hill had been removed. The exact limits of the cap (and volume incorporated under the cap) would be determined during the design phase of the project and this information would be included in the Remedial Action Plan.

To facilitate the installation of the engineered cap over the consolidated soil at OD Hill, it is anticipated that an onsite soil borrow area would be established in the work plan. This area would be selected based on previous MEC clearance efforts. Soil from the borrow area would be excavated and evaluated to ensure UXO/DMM has been removed. This non-impacted soil would be used in the construction of the engineered cap. The clean soil would be placed on the OD Hill and the resulting surface would be compacted and graded. The engineered cap, covering an estimated 4 acres footprint and approximately 9,100 cy (+/- 35%)

of material, would be installed over the OD Hill and the associated consolidated soil. The cap would comply with NYS Part 360-2.13 requirements. A geomembrane layer would also be installed and the total thickness of the cap would be at least 18 inches.

After soil was excavated from the borrow area, DGM surveys would be performed and identified anomalies would be reacquired and intrusively investigated in the same manner as in the other areas of the OD Grounds (see above) to ensure the MEC clearance meets the RAOs.

Long term monitoring (LTM) for Alternative 3 would include inspections and maintenance of the engineered cap, groundwater monitoring, and LUC inspections. Access to and use of the groundwater would be restricted at the OD Grounds under the terms of the future ROD. The groundwater is not currently being used, and would not be used in the future, as a potable water source. Currently, a non-groundwater sourced municipal water supply is available for SEDA. Inspections would be performed annually to confirm that restrictions are being followed. A five-year review would be conducted to ensure that conditions have not changed in such a way that the RAOs are not being achieved or are no longer protective. A fence currently exists around a larger area that contains the OD Grounds. This perimeter fence would be maintained as part of the LUCs. In addition, as a part of this alternative SEDA would implement public awareness measures that would involve briefings on explosive hazards to future site personnel to alert them to these issues and reinforce the "three Rs" of explosives safety (*recognize, retreat, and report*). Subsequent to the remedial action, groundwater sampling would be conducted to confirm that the groundwater was not negatively impacted as a result of the remedial action. **Table 3.3** summarizes and describes the purpose of each element of this alternative in achieving the RAOs.

Implementation of this alternative using a cap and MEC removal would be effective in partially reducing the on-site toxicity, mobility, or volume of UXO/DMM and COPCs at the OD Grounds, and transfer the impact of the remaining toxicity and volume to a controlled environment. The associated costs for capping and MEC removal are high.

Implementation of this alternative would be highly effective in achieving the RAOs, long-term effectiveness, preventing exposure, and implementability. The estimated duration of the construction is 42 months.

Table 3-3

Remedial Alternative 3 Summary of Elements

Remedial Action Objective	Exposure Routes	Remedy Component	How the Component Contributes to Achieving the Remedial Action Objective
Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved.	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Consolidate soil with high densities of metallic debris and MC/COPC contamination at the OD Hill beneath an engineered cap	This component would prevent receptors from coming into direct contact with UXO/DMM at the OD Hill, which would eliminate risks from explosive hazards in that area.
		Conduct surface and subsurface MEC clearance using DGM/AGC mapping and intrusive investigation to remove UXO/DMM outside cap	This component would remove most of the UXO/DMM in the Kickout Area to the depth of detection of the survey instrument (See **Table 2-2**). This would minimize explosive hazards present in the soil zone most receptors would potentially be in contact with, which would reduce unacceptable risks; note, residual UXO/DMM might remain below removal depth.
		Prohibit intrusive activity within the cap footprint	This component would safeguard the effectiveness of the engineered cap by avoiding excavation and/or damage. This would ensure the cap continued to prevent direct contact with UXO/DMM
		Require MEC construction support for intrusive activities Note: The depth of intrusive activity requiring construction support would be determined based on the removal depth achieved during the Remedial Action.	This component would ensure intrusive activities where digging would occur in uncleared areas would only be conducted with the support of UXO professionals using MEC safety protocols for anomaly avoidance. This would minimize the risk of site receptors encountering residual UXO/DMM that might remain after the soil consolidation and MEC clearance, which in turn would reduce risks from explosive hazards.
		Implement educational awareness for workers and visitors	This component would increase awareness of potential explosive hazards, which would reduce the chance for receptors to interact with residual UXO/DMM that might remain after soil consolidation and MEC clearance. Educational awareness would increase the effectiveness of other use restrictions by reducing the chance receptors would unintentionally perform prohibited activities.
		Maintain the perimeter fence to control access	The fence would control access to the site to prevent inadvertent access by receptors and also, in conjunction with the other site restrictions, would help reinforce awareness that a person is in a potentially hazardous area and minimize the chance receptors would unintentionally perform prohibited activities. This would decrease the likelihood for receptors to interact with residual UXO/DMM items that might remain after the soil consolidation and MEC clearance.
		Restrict the site to non-residential land use	This component would minimize people potentially interacting with potential UXO/DMM remaining at the OD Hill and Kickout Area by preventing residential construction and ensuring the site is restricted to site workers and recreational users. This would minimize the site receptors encountering residual UXO/DMM, which would reduce risks from explosive hazards
		Annual LUC inspections and 5-year reviews	This component would confirm that LUCs for the site remain in place and are functioning effectively (e.g., that the fence is still intact and that education awareness measures are being implemented and are up-to-date).
Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Consolidate soil with high densities of metallic debris and MC/COPC contamination at the OD Hill beneath an engineered cap	This component would eliminate the residential exposure scenario and, therefore prevent future child residents from being exposed to MC/COPCs in soil via direct contact. Additionally, the engineered cap would prevent contaminants leaching from MEC in soil beneath the cap that could be a source of potential future groundwater contamination.
		Restrict the site to non-residential land use	This component would eliminate the residential exposure scenario and, therefore prevent future child residents from being exposed to MC/COPCs in soil via direct contact.
Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Consolidate soil with high densities of metallic debris and MC/COPC contamination at the OD Hill beneath an engineered cap	The engineered cap would prevent contaminants leaching from MEC in soil beneath the cap that could be a source of potential future groundwater contamination.
		Install low permeability barrier wall around the OD Hill cap to prevent GW movement	This component would contain MC/COPCs that may leach into groundwater if water penetrates the engineered cap. This would further reduce the potential for future groundwater contamination.
		Groundwater Use Restrictions (i.e., prohibit use as potable source)	This component would eliminate the drinking water exposure scenario and, therefore prevent hypothetical future residents, park workers, and recreational users from being exposed to MC/COPCs via ingestion as drinking water.
		Conduct long-term groundwater monitoring	This component would confirm that COPC sources beneath the cap are not impacting groundwater above existing levels.

3.2.4 Alternative 4 – Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs

The geophysical mapping and intrusive investigation components of Alternative 4 are similar to those in Alternative 3 (see above), but instead of consolidating and capping soil at the OD Hill, Alternative 4 would involve the excavation and mechanical processing of soil with high densities of metallic debris at and around the OD Hill to remove UXO/DMM. The depth of the excavation would be based on site conditions, and at a minimum, would include all OD Hill soil located above a natural grade consistent with the current ground surface elevation surrounding the OD Hill. Similar to Alternative 3, this alternative would also involve DGM data collection and intrusive investigation of anomalies to complete MEC clearance in all areas of the MRS, including in the footprint of the OD Hill and any other excavations where soil with high densities of metallic debris is excavated for mechanical MEC removal.

The geophysical surveys would be performed using the same DGM and/or AGC methods as described under Alternative 3. If cued AGC surveys were implemented, identified TOI would be intrusively investigated by qualified UXO technicians, while anomalies classified as non-TOI would be left in place. If AGC was not used for anomaly classification, then all anomalies identified by the dynamic DGM or AGC surveys would be intrusively investigated by qualified UXO technicians to complete the MEC clearance. Qualified UXO technicians would perform required demolition procedures. The demolition team would dispose of UXO/DMM. All recovered MD/MPPEH/MEC will be handled from recovery (i.e., dug out of the ground at identified anomaly) through disposal in accordance with applicable DoD policies, requirements, and instructions.

Areas with soil with high densities of metallic debris, as delineated by the DGM surveys, would be excavated until all high-density metallic debris is removed (estimated 25,000 to 35,000 CY). The excavated soil would be mechanically processed to remove UXO/DMM and the overburden would be staged onsite for potential reuse and/or reincorporation to return the excavated surface to its original grade. A post-excavation confirmatory DGM survey would be conducted over the excavated area to confirm that all UXO/DMM is removed. Qualified UXO technicians would perform required demolition procedures. The demolition team would dispose of UXO/DMM. All recovered MD/MPPEH/MEC will be handled from recovery (i.e., dug out of the ground at identified anomaly) through disposal in accordance with applicable DoD policies, requirements, and instructions.

Excavated soils deemed free from UXO/DMM and meeting site cleanup standards would be left for potential reuse on-site. If hazardous soils are identified soil stabilization would be performed to treat contaminated soil to achieve level for non-hazardous disposal. Soils not appropriate for reuse at the site (e.g., soils intermixed with debris or above the cleanup standards) would be disposed of at an appropriate landfill based on the waste characterization. Trucks would be staged to haul the excavated soil off-site to an approved landfill, as needed. Identified UXO/DMM would be disposed of appropriately, as described in Alternative 3.

A sampling strategy for the soil, including sample locations, the number of samples, and analytical requirements, would be detailed in a follow-on document subsequent to MEC clearance activities as part of the RD.

Upon completion of excavation and confirmatory sampling, the excavated areas would be graded and re-vegetated to promote positive drainage. The disturbed areas would be restored to the natural grade.

Access to and use of the groundwater would be restricted at the OD Grounds under the terms of the future ROD. The groundwater is not currently being used, and would not be used in the future, as a potable water source. Currently, a non-groundwater sourced municipal water supply is available for SEDA. Inspections would be performed annually to confirm that restrictions are being followed. A fence currently exists around a larger area that contains the OD Grounds. This perimeter fence would be maintained as part of the LUCs. In addition, as a part of this alternative SEDA would implement public awareness measures that would involve briefings on explosive hazards to future site personnel to alert them to these issues and reinforce the "three Rs" of explosives safety (*recognize, retreat, and report*). Subsequent to the remedial action, groundwater sampling would be conducted to confirm that the groundwater was not negatively impacted as a result of the remedial action. A five-year review would be conducted to ensure that conditions have not changed in such a way that the RAOs are not being achieved or are no longer protective. **Table 3-4** summarizes and describes the purpose of each element of this alternative in achieving the RAOs.

Implementation of this alternative using excavation and off-site disposal would be effective in reducing the on-site toxicity, mobility, or volume of UXO/DMM and MC/COPCs at the OD Grounds. The estimated duration of the field effort is 40 months.

Table 3-4

Remedial Alternative 4 Summary of Elements

Remedial Action Objective	Exposure Routes	Remedy Component	How the Component Contributes to Achieving the Remedial Action Objective
Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved.	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Excavate soil at the OD Hill and conduct mechanical separation and sorting to remove UXO/DMM	This component would remove the source of explosive hazards from the excavated soil at the OD Hill, which would reduce unacceptable risks from explosive hazards in that area. However, residual UXO/DMM would likely remain below the excavation depth.
		Conduct surface and subsurface MEC clearance using DGM/AGC mapping and intrusive investigation to remove UXO/DMM remaining outside the OD Hill	This component would remove most of the UXO/DMM in the Kickout Area to the depth of detection of the survey instrument (See **Table 2-2**). This would minimize the explosive hazards present in the soil zone most receptors would potentially be in contact with, which would reduce unacceptable risks; however, residual UXO/DMM might remain below the removal depth. Note that the MEC clearance would be performed post excavation at the OD Hill area; therefore, the depth of removal would be the OD Hill excavation depth plus the depth of detection of the geophysical sensors.
		Require MEC construction support for intrusive activities Note: The depth of intrusive activity requiring construction support would be determined based on the removal depth achieved during the Remedial Action.	This component would ensure intrusive activities where digging would occur in uncleared areas would only be conducted with the support of UXO professionals using MEC safety protocols for anomaly avoidance. This would minimize the risk of site receptors encountering residual UXO/DMM that might remain after the mechanical separation and MEC clearance, which in turn would reduce risks from explosive hazards.
		Implement educational awareness for workers and visitors	This component would increase the awareness of potential explosive hazards, which would decrease the likelihood for receptors to interact with residual UXO/DMM items that might remain after the mechanical separation and MEC clearance. Educational awareness would also increase the effectiveness of other use restrictions by minimizing the chance receptors would unintentionally perform prohibited activities.
		Maintain the perimeter fence to control access	The fence would control access to the site to prevent inadvertent access by receptors and also, in conjunction with the other site restrictions, would help reinforce awareness that a person is in a potentially hazardous area and minimize the chance receptors would unintentionally perform prohibited activities. This would decrease the likelihood for receptors to interact with residual UXO/DMM items that might remain after the mechanical separation and MEC clearance.
		Restrict the site to non-residential land use	This component would minimize the number of people potentially interacting with potential UXO/DMM remaining at the OD Hill and Kickout Area by preventing residential construction and ensuring the site is restricted to site workers and recreational users. This would minimize the site receptors encountering residual UXO/DMM, which in turn would reduce risks from explosive hazards
		Annual LUC inspections and 5-year reviews	This component would confirm that LUCs for the site remain in place and are functioning effectively (e.g., that the fence is still intact and that education awareness measures are being implemented and are up-to-date).
Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Sample mechanically separated soil and remove from site if contaminated by MC/COPCs	This component would confirm that soil is suitable for reuse in accordance with the Remedial Design Plan and, therefore, would prevent contaminated soil from being returned to the site after excavation. This would help to prevent future child residents from being exposed to MC/COPCs in soil via direct contact, though it would not remove all contaminated soil from the site.
		Restrict the site to non-residential land use	This component would eliminate the residential exposure scenario and, therefore prevent future child residents from being exposed to MC/COPCs in soil via direct contact.
Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Groundwater Use Restrictions (i.e., prohibit use as potable source)	This component would eliminate the drinking water exposure scenario and, therefore prevent hypothetical future residents, park workers, and recreational users from being exposed to MC/COPCs via ingestion as drinking water. Note that the mechanical separation and MEC clearance would remove the majority of UXO/DMM at the site, which would remove the primary source of MC/COPCs.

3.2.5 Alternative 5 – Excavate entire site to 1 foot below grade and perform surface/subsurface clearance.

The geophysical mapping and intrusive investigation components of Alternative 5 are similar to those conducted under Alternative 4; however, in additional to excavation at the OD Hill, an MRS wide excavation to 1-foot bgs would be performed. Excavated soil would be processed as described in Alternative 4 to remove UXO/DMM and to sample for and treat COPC contamination as needed for potential reuse of the soil or for preparation for off-site disposal. A surface and subsurface MEC clearance via DGM and intrusive investigation would be performed using the same methods described under Alternative 4. However, under this alternative the DGM and MEC clearance would be performed on the post excavation depth of 1-foot bgs; therefore, the total number of anomalies would be significantly reduced, and the final depth of removal would reach an additional foot into the subsurface. UXO/DMM and MD would also be handled using the same methods as described under Alternative 4.

Upon completion of MEC clearance activities, the excavated areas would be graded and revegetated to promote positive drainage. The disturbed areas would be restored to the natural grade.

The implementation of Alternative 5 would substantially reduce the amount of potential MEC remaining on site; however, Alternative 5 would still include LUCs to prohibit the use of groundwater, to prohibit digging, and to prevent the use of the site as a day care or for residential activities. Following the remedial action, a groundwater sampling event would be conducted to confirm that the groundwater was not negatively impacted by the remedial action. A five-year review would be conducted to ensure that conditions have not changed in such a way that the RAOs are not being achieved or are no longer protective. **Table 3-5** summarizes and describes the purpose of each element of this alternative in achieving the RAOs.

Implementation of this alternative, including excavation over most of the site and off-site disposal (if needed) would substantially reduce the on-site toxicity, mobility, or volume of UXO/DMM and MC/COPCs at the OD Grounds, therefore, LUCs to restrict digging would no longer be required. LUCs would still be needed to prohibit the use of groundwater and prevent residential use due to elevated metals in soil and groundwater. The estimated duration of the field effort is 115 months.

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Table 3-5

Remedial Alternative 5 Summary of Elements

Remedial Action Objective	Exposure Routes	Remedy Component	How the Component Contributes to Achieving the Remedial Action Objective
Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved.	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Excavate soil across the whole site to 1 foot bgs and conduct mechanical separation and sorting to remove UXO/DMM	This component would remove the source of explosive hazards from the excavated soil at the OD Hill to a minimum of 1-foot bgs (and possibly deeper) and in the Kickout Area to 1-foot bgs. This would reduce unacceptable risks from explosive hazards to a minimum depth of 1-foot bgs across the entire site. However, residual UXO/DMM would likely remain below the excavation depth.
		Conduct surface and subsurface MEC clearance across the whole site using DGM/AGC mapping and intrusive investigation to remove UXO/DMM remaining after excavation and mechanical separation	This component would remove most of the UXO/DMM at the OD Hill and in the Kickout Area to the depth of detection of the survey instrument (See **Table 2-2**). This would minimize the explosive hazards present in the soil zone most receptors would potentially be in contact with, which would reduce unacceptable risks; however, residual UXO/DMM might remain below the removal depth. Note that the survey will be performed post excavation; therefore, the depth of removal would be the depth of detection plus the excavation depth. It is anticipated that UXO/DMM may remain below the depth of detection of the survey instrument; however, the number of UXO/DMM would be substantially reduced.
		Require MEC construction support for intrusive activities Note: The depth of intrusive activity requiring construction support would be determined based on the removal depth achieved during the Remedial Action.	This component would ensure intrusive activities where digging would occur in uncleared areas would only be conducted with the support of UXO professionals using MEC safety protocols for anomaly avoidance. This would minimize the risk of site receptors encountering residual UXO/DMM that might remain after the mechanical separation and MEC clearance, which in turn would reduce risks from explosive hazards.
		Implement educational awareness for workers and visitors	This component would increase the awareness of potential explosive hazards, which would decrease the likelihood for receptors to interact with residual UXO/DMM items that might remain after the mechanical separation and MEC clearance. Educational awareness would also increase the effectiveness of other use restrictions by minimizing the chance receptors would unintentionally perform prohibited activities.
		Maintain the perimeter fence to control access	The fence would control access to the site to prevent inadvertent access by receptors and also, in conjunction with the other site restrictions, would help reinforce awareness that a person is in a potentially hazardous area and minimize the chance receptors would unintentionally perform prohibited activities. This would decrease the likelihood for receptors to interact with residual UXO/DMM items that might remain after the mechanical separation and MEC clearance.
		Restrict the site to non-residential land use	This component would minimize the number of people potentially interacting with potential UXO/DMM remaining at the OD Hill and Kickout Area by preventing residential construction and ensuring the site is restricted to site workers and recreational users. This would minimize the site receptors encountering residual UXO/DMM, which in turn would reduce risks from explosive hazards
		Annual LUC inspections and 5-year reviews	This component would confirm that LUCs for the site remain in place and are functioning effectively (e.g., that the fence is still intact and that education awareness measures are being implemented and are up-to-date).
Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Sample mechanically separated soil and remove from site if contaminated by MC/COPCs	This component would confirm that soil is suitable for reuse in accordance with the Remedial Design Plan and, therefore, would prevent contaminated soil from being returned to the site after excavation. This would help to prevent future child residents from being exposed to MC/COPCs in soil via direct contact, though it would not remove all contaminated soil from the site.
		Restrict the site to non-residential land use	This component would eliminate the residential exposure scenario and, therefore prevent future child residents from being exposed to MC/COPCs in soil via direct contact.
Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Groundwater Use Restrictions (i.e., prohibit use as potable source)	This component would eliminate the drinking water exposure scenario and, therefore prevent hypothetical future residents, park workers, and recreational users from being exposed to MC/COPCs via ingestion as drinking water. Note that the mechanical separation and MEC clearance would remove the majority of UXO/DMM at the site, which would remove the primary source of MC/COPCs.

3.2.6 Alternative 6 – Excavate entire site and process for off-site disposal

Under Alternative 6 an MRS-wide excavation to the depth of contamination (estimated to be 3 feet bgs or more) would be performed to mechanically process and remove UXO/DMM from the site. An excavator would excavate the soils, which would then be processed using a screening table (or similar) to ensure the removal of all UXO/DMM. Soils deemed free from UXO/DMM and meeting site cleanup standards for residential use would be left for potential re-use on-site such that a post RA unlimited use/unlimited exposure (UU/UE) scenario is achieved. Post-excavation confirmatory (in-situ) soil would be sampled for metals by USEPA method SW846 6010C to ensure all source material posing an unacceptable risk to future residential users has been removed. Once source removal was complete groundwater sampling would be conducted until groundwater concentrations reach levels below site clean-up standards for use as drinking water. **Table 3-6** summarizes and describes the purpose of each element of this alternative in achieving the RAOs.

A sampling strategy for the soil and groundwater, including sample locations and the number of samples, would be detailed in a follow-on document subsequent to MEC clearance activities. The specific decision criteria regarding over-excavation would be detailed in the Work Plan. All recovered MD/MPPEH/MEC will be handled from recovery (i.e., dug out of the ground at identified anomaly) through disposal in accordance with applicable DoD policies, requirements, and instructions. No additional follow post RA work would be required after implementation of Alternative 6 and no LUCs would be required. This alternative would achieve a UU/UE status; however, the costs for Alternative 6 are excessively high considering the planned future land use does not require achieving UU/UE to be protection of human health.

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Table 3-6
Remedial Alternative 6 Summary of Elements

Remedial Action Objective	Exposure Routes	Remedy Component	How the Component Contributes to Achieving the Remedial Action Objective
Reduce unacceptable risks due to the presence of UXO/DMM (see **Table 2-2**) in soil to the associated bgs depths shown in **Table 2-2** to address the likelihood of exposure to current and future site workers, site visitors, and recreational users via direct contact such that an acceptable level of risk is achieved.	Direct contact to 18 inches bgs (Site workers conducting grounds and/or site maintenance, such as vegetation maintenance, fence installation, or plowing feed plots) Direct contact to 12 inches bgs (Site visitors/recreational users burying human waste or inserting stakes for shelters/tents)	Excavate soil across the whole site to at least 3 feet bgs and conduct mechanical separation and sorting to remove UXO/DMM	This component would remove the source of explosive hazards from the excavated soil across the entire site to a minimum of 3 feet bgs (and possibly deeper). Because measures would be implemented to ensure the removal of all UXO/DMM, this would eliminate unacceptable risks from explosive hazards across the entire site.
Reduce risks due to the presence of MC/COPCs in soil to address the likelihood of exposure to hypothetical future child residents via incidental ingestion or dermal contact such that an acceptable level of risk is achieved.	Direct contact (incidental ingestion or dermal contact) to12 inches bgs (Future unrestricted use scenario - children only)	Sample excavated soil and remove from site if contaminated by MC/COPCs	This component would result in the removal of soil contaminated by MC/COPCs from the site, which would eliminate the risk of future child residents being exposed to MC/COPCs in soil via direct contact. The removal of all UXO/DMM from the site would also ensure that no source of MC/COPCs remained at the OD Grounds, which would eliminate the possibility of future contamination resulting from residual UXO/DMM.
Reduce risks due to the presence of MC/COPCs in groundwater to address the likelihood of exposure to current and future site workers, site visitors, recreational users, and hypothetical future residents via ingestion as drinking water such that an acceptable level of risk is achieved.	Ingestion as drinking water (Site workers, site visitors, recreational users, and hypothetical future residents drinking water from onsite wells)	Sample excavated soil and remove from site if contaminated by MC/COPCs	This component would result in the removal of soil contaminated by MC/COPCs from the site, which should result in lower concentration of MC/COPCs in groundwater. Groundwater would be sampled post excavation to ensure levels are achieved and that the excavation was successful at reducing groundwater concentrations to level below those that results in unacceptable risk from groundwater to hypothetical future residents, park workers, and recreational users. The removal of all UXO/DMM from the site would also ensure that no source of MC/COPCs remained at the OD Grounds, which would eliminate the possibility of future contamination resulting from residual UXO/DMM.

3.3 SCREENING CRITERIA

The alternatives assembled above will be screened for effectiveness, implementability, and cost. This screening process is used to select the most favorable alternatives for a detailed analysis. Although this is a qualitative screening, care has been taken to ensure that screening criteria are applied consistently to each alternative and that comparisons have been made on an equal basis, at approximately the same level of detail. The screening criteria include the following:

- **Effectiveness** – the degree to which an alternative achieves the RAOs.
- **Implementability** – the technical and administrative feasibility of implementing the alternative.
- **Cost** – the costs of construction and any long-term costs to operate and maintain.
- **Reduction of Toxicity, Mobility, or Volume through Treatment** – the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as their principal element.

The screening of alternatives is summarized in the paragraphs below. Alternatives 1 through 5, were carried forward to the detailed analysis in **Section 4**. Alternative 6 was the only remedial alternative not carried forward to the detailed analysis in **Section 4**. The estimated cost for implementing Alternative 6 is more than $200 million, which was considered excessive. The detailed analysis and evaluation in **Section 4** compare additional criteria for each of the alternatives. **Section 4** identifies the most practicable permanent solution as determined by the criteria specified in the NCP (40 CFR 300.430).

Alternative 1, No Action, does not implement any remedy to reduce the potential risk; therefore, the Alternative does not provide long-term protection of either human health or the environment. Implementation of this alternative does not meet the effectiveness screening criteria as it makes no improvement of site conditions toward achieving the RAOs. The feasibility and the cost both screen well. Although this alternative does not meet the effectiveness requirements, it is retained for further evaluation for comparative purposes.

Alternative 2, LUCs only, including groundwater use restrictions, does not reduce the reduce toxicity, mobility, or volume of MEC or MC/COPCs within the MRS. The implementation of LUCs would be somewhat effective at achieving the RAOs by limiting public exposure to contaminants remaining at the site through restrictions and warnings which will change behavior and as a result reduce the likelihood that a land user will be injured by applying a force to a UXO/DMM item that presents an explosive hazard. LUCs however, do not eliminate the potential exposure pathway for injury from UXO/DMM. This Alternative is administratively difficult to implement, however technically feasible, because the need for UXO support for intrusive activity to any depth could result in a significant need for short notice support and funding. Implementability would require land owner cooperation to give proper advanced notice. The costs to complete this alternative, which are presented in **Section 4**, are low. Although this alternative does not satisfy the statutory preference to reduce toxicity, mobility, or volume of the hazardous substances as their principal element, it is retained for further evaluation.

Alternative 3, Consolidate and Cap with Surface and Subsurface Clearance outside the cap and LUCs, would meet the effectiveness criteria for MEC, soil, and groundwater. The alternative would minimize exposure to UXO/DMM by the completion of the intrusive investigation outside the cap and the installation of the cap which would stop exposure to UXO/DMM that may remain or MC/COPCs in soil, if present. The alternative is effective at reducing the exposure to MEC by removing UXO/DMM from the Kickout Area, excavating contaminated soil, and installing a protective cap over UXO/DMM/MC impacted soil near the OD Hill. This alternative is less effective than other alternatives that remove the UXO/DMM from the entire site because, while the alternative does restrict the exposure pathway due to the presence of a cap, UXO/DMM is still potentially present below the cap; therefore, the risk from human interaction with UXO/DMM is not eliminated. The volume of the UXO/DMM would be reduced through intrusive investigation and removal in the Kickout Area. The implementation of LUCs would be effective at limiting public exposure to any potential contaminants remaining at the site. Implementation is administratively and technically feasible, and the skilled labor (e.g., UXO technicians) is readily available to perform this work. The costs to complete this alternative, which are presented in **Section 4**, are high.

Alternative 4, Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs, would meet the effectiveness criteria for UXO/DMM and soil. This alternative is similar to Alternative 3, with the addition of excavation and mechanical sorting of soil from the OD Hill instead of placement beneath a cap. Excavated soil would be sampled to evaluate MC/COPC contamination and disposed of offsite if required; therefore, this alternative would be effective at reducing the toxicity, mobility, or volume of MC/COPCs at the site. The alternative would minimize exposure to UXO/DMM by the completion of intrusive investigation of anomalies outside of the OD Hill and the excavation of soil at the OD Hill. The alternative is effective at reducing the exposure to explosive hazards by permanently removing UXO/DMM and contaminated soil, if present, at the site. The volume of UXO/DMM would be reduced through intrusive investigation and excavation/off-site disposal. The implementation of LUCs would further be effective at limiting public exposure to any potential subsurface soil contamination remaining at the site. Implementation is administratively and technically feasible, and the skilled labor (e.g., UXO technicians) is readily available to perform this work. The costs to complete this alternative, which are presented in **Section 4**, are moderate due to the excavation, screening, and off-site disposal costs.

Alternative 5, Excavate entire site to 1 foot below grade and perform surface/subsurface clearance, would meet the effectiveness criteria for UXO/DMM and soil. This alternative is similar to Alternative 4, with the addition of excavation and mechanical sorting of soil throughout the MRS to a depth of 1-foot bgs. Excavated soil would be sampled for MC/COPC contamination and disposed of off-site if required; therefore, this alternative would be effective at reducing the toxicity, mobility, or volume of MC/COPC at the site. The alternative would minimize exposure to UXO/DMM by the completion of excavation and mechanical sorting followed by intrusive investigation of anomalies throughout the MRS. The alternative is highly effective at reducing the exposure to explosive hazards by permanently removing UXO/DMM and contaminated soil, if present, at the site. The volume of UXO/DMM would be significantly reduced through intrusive investigation and excavation/off-site disposal. Implementation is administratively and technically feasible (however, less feasible that other alternatives due to the amount of excavation), and the skilled labor (e.g., UXO technicians)

is readily available to perform this work. The costs to complete this alternative, which are presented in **Section 4**, are very high due to the excavation, screening, and off-site disposal costs.

Alternative 6, Excavate entire site and process for off-site disposal, would meet the effectiveness criteria for UXO/DMM and MC/COPCs in soil and groundwater. All contamination soil at the site would be removed; therefore, this alternative would be effective at reducing the toxicity, mobility, or volume of MC/COPCs at the site. The alternative is highly effective at reducing the exposure to explosive hazards by permanently removing UXO/DMM and contaminated soil, if present, at the site. The volume of UXO/DMM would be removed through intrusive investigation and excavation/off-site disposal. Implementation of this alternative is not feasible, the HHRA shows that metal in surface soil within both the OD Hill and the kickout area exceed residential SCO levels. The size of the site makes implementation infeasible with the volume of soil to be excavated at over 1.8 million CY (391 acres to 3 feet) and the estimated volume to be hauled off-site due to metal above residential levels estimated to exceed a half a million CY (20% of soil volume). The costs to complete this alternative are estimated to be excessively high (over $200M) due to the excavation, screening, and off-site disposal costs. In addition, implementation of this alternative is would eliminate all existing natural habitat within the OD Grounds for the white deer herd that currently uses the area. The OD Grounds is approximately 1/3 of the conservation area that will be designated for the white deer herd. While the area has not yet been transferred for recreational/conservation use the white deer herd already uses the area and this alternative would negatively impact the deer herd and habitat and a such would risk the preservation of the white deer herd. Alternative 6 has been not been retained for further consideration due to the excessive cost, difficult implementation, and determent to the local habitat of the white deer herd.

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4.0 DETAILED ANALYSIS OF RETAINED ALTERNATIVES

4.1 INTRODUCTION

The purpose of the detailed analysis is to evaluate and compare the identified alternatives and present a proposed plan to the regulatory agencies and for public review. The alternatives identified for the detailed analysis include the following:

- Alternative 1: No Action
- Alternative 2: LUCs only, including groundwater use restrictions
- Alternative 3: Consolidate and cap with surface and subsurface clearance outside the cap and LUCs
- Alternative 4: Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs; and
- Alternative 5: Excavate entire site to 1 foot below grade and perform surface/subsurface clearance, and LUCs.

The alternatives are compared and evaluated with respect to seven evaluation criteria developed to address the statutory requirements and preferences of CERCLA. The seven criteria are as follows:

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume
5. Short-term effectiveness
6. Technical and administrative implementability
7. Cost

Two additional criteria, state and community acceptance of the remedy, can play a role in weighing the balance between remedies that are cost effective and meet other criteria. Public involvement activities help provide an understanding of these factors even though the Proposed Plan has not yet been issued.

The state and community acceptance criteria are based on the degree of assumed acceptance from the local public and from state agencies regarding the implementation of alternatives. These criteria cannot be fully evaluated and assessed until comments on the FS and the Proposed Plan are received.

Each of the five alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key trade-offs. The alternative(s) identified as the most practicable solutions for mitigating the explosive hazards and MC/COPC risks is selected with respect to each evaluation criteria. The following sections describe each of the evaluation criteria and the evaluation process used for performing the analysis.

4.2 EVALUATION CRITERIA

Alternatives are compared and evaluated with the NCP criteria, including threshold factors, balancing factors, and modifying factors. The following sections describe the factors and each of the criteria.

4.2.1 Threshold Factors

Threshold factors (i.e., protectiveness, compliance with ARARs) are requirements that each alternative must meet or have specifically waived to be eligible for selection.

4.2.1.1 Overall Protection of Human Health and the Environment

The selected alternative must adequately protect human health and the environment from unacceptable risks posed by UXO/DMM and COPC contamination. In addition, the RAO described in **Section 2** needs to be achieved by the remedy. The overall protectiveness to human health, ecological receptors, and the environment was evaluated based on the impact each alternative has on limiting exposure of receptors to explosive hazards and MC/COPCs. With respect to this factor, each remedial alternative will be evaluated based on its ability to protect human health and the environment by limiting the exposure of receptors to MEC and COPCs. With respect to risks due to explosive hazards, this factor is evaluated by determining if the Alternative achieves acceptable risk conditions based on the evaluation of risk from explosive hazards using the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017). The baseline conditions for evaluation of risk from explosive hazards is discussed in **Section 1.7**. **Appendix C** contains the detailed risk assessment and includes the evaluation of each Alternative using the Decision Logic (USACE, 2017).

4.2.1.2 Compliance with ARARs

The NCP requires that all project sites meet ARARs (or that an ARAR waiver be obtained). The ARARs are identified in **Section 2** of this FS Report. Chemical-specific, location-specific, and action-specific were evaluated. Compliance with the NYS SCOs was identified as a chemical-specific ARAR.

4.2.2 Balancing Factors

Primary balancing criteria (i.e., long-term effectiveness, reduction, short-term effectiveness, implementability, cost) are those that form the basis for comparison among alternatives that meet the threshold criteria. CERCLA requires that alternatives be developed for treating principal threats at the project site through reductions in toxicity, mobility, or volume. In addition, remedies are required to be permanent (e.g., removal of UXO/DMM or soil contamination) to the maximum extent practicable, and to be cost effective. The five balancing factors described below are weighed against each other to determine which remedies are cost effective and are "permanent" to the maximum extent practicable. The NCP explains that in general, preferential weight is given to alternatives that offer advantages in terms of the reduction of toxicity, mobility, or volume through treatment, and that achieve long-term effectiveness and permanence. However, the NCP also recognizes that some contamination problems will not be suitable for treatment and permanent remedies. The balancing process takes that preference into account, and weighs the proportionality of costs to effectiveness to select one or more remedies that are cost effective. The final

risk management decision in the Decision Document is one that determines which cost-effective remedy offers the best balance of all factors to achieve permanence to the maximum extent practicable.

4.2.2.1 Long-term Effectiveness and Permanence

The permanence criterion evaluates the degree to which an alternative permanently reduces or eliminates the potential for UXO/DMM or MC/COPC contamination exposure hazard. This criterion also evaluates the magnitude of residual risk with the alternative in place, and the effectiveness of controls to manage the residual risk. With respect to UXO/DMM this criterion is very similar to the reduction of toxicity, mobility, or volume through treatment, because once UXO/DMM is removed from the site it no longer presents a risk. However, one other element to consider with long term effectiveness and permanence is the potential for future conditions to change in such a way that may result in the alternative no longer providing protection to human health and the environment.

4.2.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion addresses the statutory preference for selecting remedies that employ treatment technologies that permanently and significantly reduce the toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media.

4.2.2.3 Short-term Effectiveness

The short-term effectiveness criterion addresses the potential consequences and risks of an alternative during the implementation phase. Alternatives were evaluated for their effects on human health and the environment prior to the remedy being completed. Short-term risks address adverse impacts to the workers and community during the construction and implementation phases of the remedy.

4.2.2.4 Technical and Administrative Implementability

The technical and administrative implementability criterion evaluates the difficulty of implementing a specific cleanup action alternative. The evaluation includes consideration of whether the alternative is technically possible; availability of necessary on-site and off-site facilities, services, and materials; administrative and regulatory requirements; and monitoring requirements.

4.2.2.5 Cost

The cost criterion evaluates the financial cost to implement the alternative. This includes direct, indirect, and long-term operation and maintenance (O&M) costs (30-year duration). Direct costs are those costs associated with the implementation of the alternative. Indirect costs are those costs associated with administration, oversight, and contingencies. Cost estimates presented are order-of-magnitude level estimates based on a variety of information, including productivity estimates (based on site conditions), cost estimating guides, and prior experience at SEDA. The actual costs will depend on true labor rates, actual weather conditions, final project scope, and other variable factors. A present value analysis is used to evaluate costs (capital and operations/maintenance) which occur over different time periods. The TPV is the amount needed to be set aside at the initial point in time (base year) to assure that funds will be available

in the future as they are needed. A discount rate of 0.6% was used to estimate total present value (TPV) per a 2018 update (Office of Management and Budget [OMB], 2018) to the OMB Circular A-94 for benefit-cost analyses of proposed federal programs, policies, and regulations (OMB, 1994).

4.2.3 Modifying Factors

Community and state acceptance of the remedy can play a role in weighing the balance between remedies that are cost effective and meet other criteria. Public involvement helps to provide an understanding of these factors even though the Proposed Plan has not yet been issued. The community and state acceptance criteria are based on the degree of assumed acceptance from the local public and from state agencies regarding the implementation of alternatives. These criteria cannot be fully evaluated and assessed until comments on the FS and the Proposed Plan are received.

4.3 INDIVIDUAL ANALYSIS OF ALTERNATIVES

4.3.1 Alternative 1 – No Action

4.3.1.1 Description

Alternative 1 is described in **Section 3.2.1**. The no further-action alternative would leave the OD Grounds undisturbed with the continuation of existing site security measures, such as locked gates, to prevent civilian access and direct contact with, or possible exposure to UXO/DMM and soil contamination. Because no remedial activities would be implemented with the No Action alternative, long-term human health and environmental risks for the site essentially would be the same as those represented in the baseline MEC risk assessment (**Appendix C**). Future receptors would be exposed to risks from the pathways described in the HHRA (**Appendix B1**) and BERA (**Appendix B2**).

4.3.1.2 Assessment

Threshold Factors

This alternative is not protective because it would do nothing to reduce explosive hazards at the OD Grounds MRS. Nor would it put any measure in place to protect human health from MC/COPCs in soil and groundwater. This alternative would not achieve the RAO because it does not implement any measures to protect human health and the environment from known unacceptable risks. No ARARs apply to the implementation of Alternative 1.

Balancing Factors

The no-action alternative does not include controls for exposure nor long-term management measures, so it would not permanently reduce or eliminate the potential for explosive hazards over the long-term. All current and potential future risks would continue under this alternative. This alternative would provide no reduction in toxicity, mobility, or volume of UXO/DMM or MC/COPCs through treatment. There would be no additional risks posed to workers or the environment as a result of this alternative being implemented. There are no implementability concerns posed by this remedy, since no action would be taken. The present worth cost and 30-year cost of Alternative 1 are estimated to be $0, since there would be no action.

Summary – Alternative 1

Alternative 1 would not reduce the potential exposure hazards. Alternative 1 would not provide overall protection to human health or the environment, as it does not implement a remedy to reduce UXO/DMM or contaminated soil exposure. In addition, there would be no reduction in toxicity, mobility, or volume of wastes. No costs are associated with this alternative.

4.3.2 Alternative 2 – LUCs Only, Including Groundwater Use Restrictions

4.3.2.1 Description

Alternative 2 is described in **Section 3.2.2**. LUCs would be placed on the site to prohibit the use of groundwater, prohibit digging without UXO construction support, and prevent residential uses of the site. In addition, as a part of this alternative, SEDA would implement public awareness measures for explosive hazards.

The major components of Alternative 2 include:

- Land use and activity restrictions (i.e., prohibit residential use and intrusive activity without UXO construction support)
- Groundwater Use Restrictions (i.e., prohibit use as potable source)
- Maintenance and upkeep of the perimeter fence
- Educational Awareness
- Annual LUC inspections and 5-year reviews

4.3.2.2 Assessment

Threshold Factors

Alternative 2 was evaluated in **Appendix C** to assess the potential risk from explosives hazards at the site following implementation of the remedial action elements presented. Evaluation of this alternative using the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017) determined that implementation of Alternative 2 would not achieve acceptable risk conditions in either the Kickout Area or the OD Hill area. Alternative 2 does not remove UXO/DMM from the site which is a requirement of the RCRA permit, since the UXO/DMM is considered a waste; therefore, a location-specific ARAR is not met by this alternative.

Table 3-1 summarizes the different components of Alternative 2 and what purpose each serves toward attaining each RAO. The human health risk assessment determined that soil concentrations pose a risk to hypothetical future child residents and that groundwater poses a risk as drinking water. The RAOs for addressing risk in soil are achieved by prohibiting residential use which would protect human health and the environment by preventing activities that would result in conditions where soil presents an unacceptable risk to human health. The RAO for groundwater is achieved by prohibiting the use of groundwater. There are no ARARs associated with MC/COPCs for Alternative 2. With respect to MC/COPCs, Alternative 2 would meet both threshold criteria; however, Alternative 2 would not meet either the "Overall Protection of Human Heath and the Environment" or "Compliance with ARARs" with respect to UXO/DMM.

Balancing Factors

The LUCs implemented under Alternative 2 would be effective at reducing risks from explosive hazards and MC/COPCs over the long-term by restricting site access and groundwater use, increasing the awareness of potential hazards, and prohibiting intrusive activities without the use of construction support. The long-term effectiveness of the LUCs would be maintained through continued implementation of the activity restrictions, regular implementation of public awareness measures, and the 5-year reviews.

Alternative 2 would not reduce the toxicity, mobility, or volume of wastes nor does it employ treatment technologies; hazards and risks would be managed through controls to limit interaction with UXO/DMM and MC/COPCs rather than by source removal. Implementation of this alternative would not require any fieldwork, therefore there would be no short-term risks or adverse impacts to the workers and community during the construction and implementation phases of the remedy. The use of LUCs and educational awareness described under Alternative 2 have been implemented at other SEDA sites and are both technically and administratively implementable. UXO support under this Alternative is administratively difficult to implement, though technically feasible, because UXO support would be needed for intrusive activity to any depth. The need for UXO support for shallow intrusive activities could result in a significant need for short notice support and funding. Implementability would require land owner cooperation to give proper advanced notice.

The total 30-year cost for this alternative is $272K. The TPV (30-year present worth) cost of this alternative is estimated to be $252K. The capital costs include document preparation, documentation of the environmental easements/deed restrictions, etc. The total costs include $4K per year for annual LUC inspections and $18K per five-year review over the 30-year period. If the site cannot be used for unrestricted use, annual LUCs inspections and five-year reviews would continue beyond the 30-year planning horizon.

Summary – Alternative 2

Alternative 2 would not meet the Threshold Criteria of "Overall Protection of Human Heath and the Environment" or "Compliance with ARARs"; therefore, this Alternative does not meet the minimum criterion for selection as remedial action alternative.

4.3.3 Alternative 3 – Consolidate and Cap with Surface and Subsurface Clearance Outside the Cap and LUCs

4.3.3.1 Description

Alternative 3 is described in **Section 3.2.3**. This alternative includes a combination of activities including installing an engineered cap over impacted soil within the OD Hill, performing DGM surveys and intrusive investigation to remove UXO/DMM, installation of a low permeability barrier wall to restrict the movement of contaminated groundwater, and LUCs to achieve a reduction in risks from explosive hazards in soil and MC/COPCs in groundwater.

The major components of Alternative 3 include:

- Land use and activity restrictions (i.e., prohibit residential use and intrusive activity to uncleared depths without construction support)

- Groundwater Use Restrictions (i.e., prohibit use as potable source)
- Maintenance and upkeep of the perimeter fence
- Educational Awareness
- Consolidating soil with high densities of metallic debris and MC/COPC-contaminated soil at the OD Hill and installing an engineered cap over the consolidated soil
- Installing a low permeability barrier wall at the toe of the cap around the OD Hill
- DGM/AGC mapping and intrusive investigation to remove UXO/DMM to a depth of detection outside the cap
- Long-term monitoring of groundwater
- Annual LUC inspections and 5-year reviews

4.3.3.2 Assessment

Threshold Factors

Alternative 3 would be protective of human health and the environment through the implementation of several remedial measures. **Table 3-2** summarizes the purpose of each component of Alternative 3 with respect to the RAOs presented in **Section 2.0**. With respect to UXO/DMM, Alternative 3 would prevent contact with UXO/DMM through use of containment measures (i.e., the cap) at the OD Hill and through source removal (i.e. surface and subsurface removal) at the Kickout Area. During these actions UXO/DMM would be removed from the area outside the cap footprint using a removal depth designed based on anticipated future land use (currently 18 inches; see **Table 2-1**). However, it is not anticipated that the subsurface removal would achieve clearance to the anticipated depth of UXO/DMM for all munitions types (**Table 2-2**) (based on current detection technology). Implementation of LUCs would protect receptors from exposure to UXO/DMM that may remain below the removal depth and that likely remain below the cap. The majority of munitions items are expected to be within the detection depth for source removal; so, the implementation of Alternative 3 would substantially reduce the amount of UXO/DMM at the site overall. The elements of Alternative 3 will be protective of future site workers, site visitors, and recreational users by achieving the RAOs and substantially reducing the amount of UXO/DMM present within the depth of anticipated future land use activities (18 inches; see **Table 2-1**).

The evaluation of explosive risk in **Appendix C** show that Alternative 3 would achieve acceptable risk from explosives hazards based on the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017). With respect to UXO/DMM Alternative 3 is protective of human health and the environment. Alternative 3 is compliant with the ARARs with respect to UXO/DMM.

With respect to MC/COPCs, the human health risk assessment determined that soil concentrations pose a risk to hypothetical future child residents and that groundwater poses a risk as drinking water. The RAOs for this risk in soil is achieved by prohibiting residential use with LUCs. In addition, the cap itself provides an additional measure of protectiveness from contaminated soil at the OD Hill by providing a barrier to prevent contact with contaminated soil. The RAO for groundwater is achieved by prohibiting the use of groundwater with LUCs. In addition, Alternative 3 includes the installation of a low permeability barrier

wall around the toe of the cap. This wall prevents migration of contamination that could leach into groundwater from the UXO/DMM under the cap. Long-term monitoring would also be performed to ensure concentrations are not increasing. There are no ARARs associated with MC/COPCs for Alternative 3.

Overall Alternative 3 would meet the Threshold Criteria of "Overall Protection of Human Heath and the Environment" and "Compliance with ARARs" with respect to both UXO/DMM and MC/COPCs.

Balancing Factors

The remedial actions implemented under Alternative 3 would be effective at reducing explosive hazards over the long-term by consolidating soil around OD Hill and installing a cap over the consolidated soil, detecting and removing UXO/DMM from the remaining areas outside OD Hill using DGM/AGC methods, and implementing LUCs to limit exposure to residual UXO/DMM. The long-term effectiveness of these measures would be ensured through regular maintenance and inspection of the cap, continued implementation of the land and activity use restrictions, and regular implementation of public awareness measures (See **Table 3-2**). Alternative 3 would achieve partial reduction in the toxicity, mobility, or volume of wastes through the removal of surface and subsurface MEC in areas outside the consolidation area at OD Hill. Implementation of Alternative 3 would result in short-term hazards to workers involved with the consolidation and MEC removal activities because of the increased likelihood of MEC exposure. However, these hazards would be managed using industry standard safety procedures (e.g., using qualified UXO personnel, enforcement of safe separation distances, engineering controls, etc.), which would also minimize any associated potential hazards to the surrounding community.

The remedial actions implemented under Alternative 3 would be effective at reducing MC/COPCs risks over the long-term by consolidating soil around OD Hill and installing a cap over the consolidated soil, installing a low permeability barrier wall to limit movement of potentially contaminated groundwater, and implementing LUCs to limit exposure to MC/COPCs in soil and groundwater. Alternative 3 would achieve long term effectiveness through permanent measures that legally restrict land and groundwater use into the future (i.e., deed restrictions). Alternative 3 would not achieve any significant reduction in the toxicity, mobility, or volume of wastes for MC/COPCs in soil and groundwater but this alternative would not cause any short-term hazards to workers or the surrounding environment from exposure to MC/COPCs.

All technologies and methods involved in implementing Alternative 3 are well established and would be readily implementable, assuming they were approved by the relevant stakeholders.

The total 30-year cost for Alternative 3 is $18.5M. The TPV (30-year present worth) cost of this alternative is estimated to be $17.9M. The capital costs include document preparation, implementation of the field work for the remedial action, design, etc. The total costs include $154K per year for cap inspections, LUC inspections, and groundwater monitoring; $300K every 10 years for cap maintenance; and $18K per five-year review over the 30-year period. If the site cannot be used for unrestricted use, inspections, maintenance, and five-year reviews would continue beyond the 30-year planning horizon

Summary – Alternative 3

The RAOs are achieved through implementation of this alternative through decreased human exposure to UXO/DMM; this alternative provides significant reduction in toxicity, mobility, or volume of UXO/DMM.

This alternative provides for good long-term effectiveness and permanence and is easily implemented. The cost associated with implementing this alternative is high. There are minimal long-term maintenance costs.

4.3.4 Alternative 4 – Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs

4.3.4.1 Description

Alternative 4 is described in **Section 3.2.4**. This alternative is similar to Alternative 3, but in lieu of installing an engineered cap over contaminated soil at the center of the site, this alternative would involve excavating and mechanically processing soil with high densities of metallic debris to remove UXO/DMM at OD Hill.

The major components of Alternative 4 include:

- Land use and activity restrictions (i.e., prohibit residential use and intrusive activity to uncleared depths without construction support)
- Groundwater Use Restrictions (i.e., prohibit use as potable source)
- Maintenance and upkeep of the perimeter fence
- Educational Awareness
- Excavation of soil with high densities of metallic debris at and around the OD Hill and mechanical separation of UXO/DMM from that excavated soil
- DGM/AGC mapping and intrusive investigation to remove UXO/DMM to a depth of detection over the entire MRS
- Annual LUC inspections and 5-year reviews

4.3.4.2 Assessment

Threshold Factors

Alternative 4 would be protective of human health and the environment through the implementation of several remedial measures. **Table 3-3** summarizes the purpose of each component of Alternative 4 with respect to the RAOs presented in **Section 2.0**. With respect to UXO/DMM, Alternative 4 would significantly reduce the risk from explosive hazards through source removal (i.e. excavation and sorting and surface and subsurface removal). During these actions UXO/DMM would be removed from the MRS using a removal depth designed based on anticipated future land use (currently 18 inches; see **Table 2-1**). However, it is not anticipated that the subsurface removal would achieve clearance to the anticipated depth of UXO/DMM for all munitions types (**Table 2-2**) (based on current detection technology). Implementation of LUCs would protect receptors from exposure to UXO/DMM that may remain below the removal depth. The majority of munitions items are expected to be within the detection depth for source removal; so, the implementation of Alternative 4 would substantially reduce the amount of UXO/DMM at the site overall. The elements of Alternative 4 will be protective of future site workers, site visitors, and recreational users by achieving the RAOs and substantially reducing the amount of UXO/DMM present within the depth of anticipated future land use activities (currently 18 inches; see **Table 2-1**).

The evaluation of explosive risk in **Appendix C** shows that Alternative 4 would achieve acceptable risk from explosives hazards based on the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017). With respect to UXO/DMM Alternative 4 is protective of human health and the environment. Alternative 4 is compliant with the ARARs with respect to UXO/DMM.

With respect to MC/COPCs, the human health risk assessment determined that soil concentrations pose a risk to hypothetical future child residents and that groundwater poses a risk as drinking water. Although residential use is not anticipated for the site, the RAOs for this risk in soil are achieved by prohibiting residential use with LUCs. Although groundwater use is not anticipated due to poor natural quality and very low transmissivity, the RAO for groundwater is achieved by prohibiting the use of groundwater with LUCs. Alternative 4 would comply with the ARARs identified for the site. Chemical-specific ARARs would be addressed by achieving the commercial SCOs for soil remaining onsite.

Overall Alternative 4 would meet the Threshold Criteria of "Overall Protection of Human Heath and the Environment" and "Compliance with ARARs" with respect to both UXO/DMM and MC/COPCs.

Balancing Factors

The remedial actions implemented under Alternative 4 would be effective at reducing explosive hazards over the long-term by mechanically separating UXO/DMM from the soil at and around OD Hill, detecting and removing UXO/DMM from the remaining areas outside OD Hill using DGM/AGC methods, and implementing LUCs to limit exposure to residual UXO/DMM. The long-term effectiveness of these measures would be ensured through continued implementation of the land and activity use restrictions and regular implementation of public awareness measures (See **Table 3-3**). Alternative 4 would achieve significant reduction in the toxicity, mobility, or volume of wastes through the removal of surface and subsurface UXO/DMM throughout the site. Implementation of Alternative 4 would result in short-term hazards to workers involved with the consolidation, and surface and subsurface MEC removal activities because of the increased likelihood of MEC exposure. However, these hazards would be managed using industry standard safety procedures (e.g., using qualified UXO personnel, enforcement of safe separation distances, engineering controls, etc.), which would also minimize any associated potential hazards to the surrounding community.

With respect to MC/COPCs, Alternative 4 would achieve long term effectiveness through permanent measures that legally restrict land and groundwater use into the future (i.e., deed restrictions). Alternative 4 would not achieve any significant reduction in the toxicity, mobility, or volume of wastes for MC/COPCs in soil and groundwater but this alternative would not cause any short-term hazards to workers or the surrounding environment from exposure to MC/COPCs.

All technologies and methods involved in implementing Alternative 4 are well established and would be readily implementable, assuming they were approved by the relevant stakeholders.

Alternative 4 has a total 30-year cost of $13.5M. The TPV (30-year present worth) cost of this alternative is estimated to be $13.4M. The capital costs include document preparation, implementation of the field work for the remedial action, design, excavation. The total costs include $4K per year for LUC inspections,

plus $18K per five-year review over the 30-year period. If the Site cannot be used for unrestricted use, LUC inspections and five-year reviews would continue beyond the 30-year planning horizon.

Summary – Alternative 4

The RAOs are achieved through implementation of this alternative through decreased human exposure to explosive hazards; this alternative provides good reduction in toxicity, mobility, or volume of UXO/DMM. This alternative provides for good long-term effectiveness and permanence. The alternative would require some permitting to be implemented. The cost associated with implementing this alternative is moderate.

4.3.5 Alternative 5 – Excavate entire site to 1 foot below grade and perform surface/subsurface clearance

4.3.5.1 Description

Alternative 5 is described in **Section 3.2.5**. This alternative is similar to Alternative 4, but in addition to the excavations performed under Alternative 4, soil over the entire MRS would be removed to a level of 1 foot and mechanically processed to remove UXO/DMM.

The major components of Alternative 5 include:

- Land use and activity restrictions (i.e., prohibit residential use and intrusive activity to uncleared depths without construction support)
- Groundwater Use Restrictions (i.e., prohibit use as potable source)
- Excavation of soil with high densities of metallic debris at and around the OD Hill and to a depth of 1-foot bgs over the entire MRS and mechanical separation of UXO/DMM from that excavated soil
- DGM/AGC mapping and intrusive investigation to remove UXO/DMM over the entire MRS following the removal and mechanical separation of the top foot of soil
- Annual LUC inspections and 5-year reviews

4.3.5.2 Assessment

Threshold Factors

Alternative 5 would be protective of human health and the environment through the implementation of several remedial measures. **Table 3-4** summarizes the purpose of each component of Alternative 5 with respect to the RAOs presented in **Section 2.0**. With respect to UXO/DMM, Alternative 5 would significantly reduce the risk from explosive hazards through source removal (i.e. excavation and sorting and surface and subsurface removal). During these actions UXO/DMM would be removed from the MRS by removing 1 foot of soil and then performing DGM/AGC detection and removal of anomalies. Under Alternative 5, UXO/DMM removal efforts may not achieve the RAOs alone because UXO/DMM are could remain on site if the removal does not achieve clearance to the anticipated depth of UXO/DMM for all munitions types (**Table 2-2**). Because Alternative 5 removes one foot of soil before the DGM/AGC subsurface removal is performed, the depth of detection would go 1 foot deeper than the anticipated detection depth (prior to excavation). In the case of Alternative 5, the need for LUCs would need to be evaluated based on the items recovered during the remedial action. For the purpose of this FS, it is assumed

that some UXO/DMM would remain and LUCs would be required. The vast majority of munitions items are expected to be within the removal depth for the source removal performed under this alternative; so, the implementation of Alternative 5 would substantially reduce the amount of UXO/DMM at the site overall. Implementation of LUCs would protect receptors from exposure to UXO/DMM that may remain below the removal depth by decreased human receptor interaction with and reduced exposure to UXO/DMM. The elements of Alternative 5 will be protective of future site workers, site visitors, and recreational users by achieving the RAOs and substantially reducing the amount of UXO/DMM present within the depth of anticipated future land use activities (currently 18 inches; see **Table 2-1**).

The evaluation of explosive risk in **Appendix C** shows that Alternative 5 would achieve acceptable risk from explosives hazards based on the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017). With respect to UXO/DMM Alternative 5 is protective of human health and the environment. Alternative 5 is compliant with the ARARs with respect to UXO/DMM.

With respect to MC/COPCs, the human health risk assessment determined that soil concentrations pose a risk to hypothetical future child residents and that groundwater poses a risk as drinking water. The RAOs for this risk in soil are achieved by prohibiting residential use with LUCs. The RAO for groundwater is achieved by prohibiting the use of groundwater. Alternative 5 would comply with the ARARs identified for the site. Chemical-specific ARARs would be addressed by achieving the commercial SCOs for soil remaining onsite.

Overall Alternative 5 would meet the Threshold Criteria of "Overall Protection of Human Heath and the Environment" and "Compliance with ARARs" with respect to both UXO/DMM and MC/COPCs.

Balancing Factors

The remedial actions implemented under Alternative 5 would be effective at reducing explosive hazards over the long-term by mechanically separating UXO/DMM from the soil at and around OD Hill and across the rest of the MRS down to 1-foot bgs, and then detecting and removing UXO/DMM from the area beneath the excavated layer down to the depth of detection using DGM/AGC and intrusive investigation. Explosive hazards would be further reduced following the removal operation through the implementation of LUCs to limit exposure to residual UXO/DMM. The long-term effectiveness of these measures would be ensured through continued implementation of the land and activity use restrictions, and regular implementation of public awareness measures (See **Table 3-4**). The risk of exposure to MC/COPCs or UXO/DMM would be permanently and significantly reduced. Alternative 5 would achieve significant reduction in the toxicity, mobility, or volume of wastes through the removal of surface and subsurface MEC throughout the site. Implementation of Alternative 5 would result in short-term hazards to workers involved with the consolidation, and surface and subsurface MEC removal activities because of the increased likelihood of MEC exposure. However, these hazards would be managed using industry standard safety procedures (e.g., using qualified UXO personnel, enforcement of safe separation distances, engineering controls, etc.), which would also minimize any associated potential hazards to the surrounding community.

With respect to MC/COPCs, Alternative 5 would achieve long term effectiveness through permanent measure that legally restrict land and groundwater use into the future (i.e., deed restrictions). Alternative 5 would achieve reduction in the toxicity, mobility, or volume of wastes through the excavation and offsite disposal of soil contamination exceeding commercial use criteria. However, it should be noted that no treatment would be employed to reduce MC/COPC levels in soil to achieve more restrictive SCO level to allow residential site use or to reduce groundwater contamination. This alternative would not cause any short-term hazards to workers or the surrounding environment from exposure to MC/COPCs.

While the technologies and methods involved in implementing Alternative 5 are well established, this alternative would have lower implementability due to the massive scale of earthwork that would be required in addition to permitting and logistics requirements for the offsite disposal of the excavated material if soil were found with concentrations exceeding the SCO commercial levels.

Alternative 5 has a total 30-year cost of $69.1M. The TPV (30-year present worth) cost of this alternative is estimated to be $67.4M. The capital costs include document preparation, implementation of the field work for the remedial action, design, excavation. The total costs include $4K per year for LUC inspections, plus $18K per five-year review over the 30-year period. If the site cannot be used for unrestricted use, LUC inspection and five-year reviews would continue beyond the 30-year planning horizon. If, in the future, the Site is approved for unlimited use/unrestricted exposure, the inspections and five-year reviews may be terminated.

Summary – Alternative 5

The RAOs are achieved through implementation of this alternative through significantly reducing human exposure to UXO/DMM; this alternative provides substantial reduction in toxicity, mobility, or volume of UXO/DMM. This alternative provides for good long-term effectiveness and permanence. The alternative would require some permitting to be implemented. The cost associated with implementing this alternative is very high.

4.4 COMPARATIVE ANALYSIS OF ALTERNATIVES

In the following analysis, the alternatives are evaluated in relation to one another for each of the evaluation criteria to identify the relative advantages and disadvantages of each alternative in terms of the threshold and balancing criteria. **Table 4-1** summarizes the comparative analysis and ranks the alternatives, and **Table 4-2** summarizes the costs for these alternatives. Details regarding the comparative analysis are provided in the following sections.

4.4.1 Overall Protection of Human Health and the Environment

Based on the evaluation of each alternative in the individual analysis of alternatives, Alternatives 1 and 2 do not achieve the Overall Protection of Human Health and the Environmental because they do not achieve acceptable risk conditions with respect to the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017). All remedial alternatives identified to address MC/COPCs at the OD Grounds MRS protect human health and the environment, except for Alternative 1 (No Action), which does not include any remedial technologies and is only included in the FS to provide a baseline for comparison. Alternatives 3, 4, and 5 are protective of human health and the environment.

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Table 4-1
Ranking of Alternatives Comparative Analysis and Ranking of Remedial Alternatives

Remedial Action Alternative	Threshold Criteria		Primary Balancing Criteria					Total Score	Overall Ranking
	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in toxicity, Mobility, or Volume of Wastes	Short-Term Effectiveness	Implementability	Cost [1]		
Alternative 1: No-Further Action	Not protective of human health or environment under planned land use conditions.	Does not comply with RCRA permit because untreated wastes in the form of UXO/DMM are left on the site.	Not effective over long-term	No reduction in toxicity, mobility, or volume of wastes (*no MEC removal*)	No short-term hazards to workers or the surrounding area	Readily implementable (*no actions required*); however, highly unlikely to gain approval	$0	Does not Meet Threshold Criteria	Excluded
	Criterion Not Met	Criterion Not Met	0	0	3	0	3		
Alternative 2: LUCs Only, including groundwater restrictions	Does not achieve acceptable risk conditions per Matrix 4.[2]	Does not comply with ARAR because UXO/DMM are untreated reactive wastes un RCRA.	Somewhat effective over long-term assuming LUCs are effective at controlling human behavior	No reduction in toxicity, mobility, or volume of wastes (*no MEC removal*)	No short-term hazards to workers or the surrounding area Duration is 10 field days for 5-year review visits.	Administratively difficult to implement for any ground-breaking activity.	$271,680	Does not Meet Threshold Criteria	Excluded
	Criterion Not Met	Criterion Not Met	1	0	3	1	3		
Alternative 3: Consolidate and Cap with Surface and Subsurface Clearance Outside the Cap and LUCs	Protective of human health and environment under planned land use conditions.	Complies with ARARs through collection of post-detonation samples and waste samples	Effective over long-term as long as LUCs and LTM are maintained	Provides partial reduction in toxicity, mobility, or volume of wastes (*MEC removal outside cap; however, concentrated source at OD Hill is not removed*)	Moderate short-term hazards to workers and surrounding area (*Mechanical handling and compaction of soil with UXO/DMM at the OD Hill*) Field duration is 42 Months. Scored as a 1 due to compaction of soil with UXO/DMM and less exposure hours than Alternative 5.	Technically implementable (*uses well established technologies*); however, the burden of satisfying local, state, and federal permitting requirements makes this alternative less implementable.	$18,494,249	7	#3
	Criterion Met	Criterion Met	2	1	1	2	1		
Alternative 4: Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs	Protective of human health and environment under planned land use conditions.	Complies with ARARs through collection of post-detonation samples and waste samples	Effective over long-term; assuming Land and groundwater use control are maintained and effective; source removal reduces risk over the long term	Provides substantial reduction in toxicity, mobility, or volume of wastes (*MEC removal at OD Hill and in kickout area where 99% of UXO/DMM are anticipated*)	Moderate short-term hazards to workers and surrounding area (*Mechanical handling of soil with UXO/DMM at the OD Hill*) Field duration is 40 Months. Scored as 2 due to having a shorter duration than Alternative 5 and no compaction of soil containing UXO/DMM.	Readily implementable (*uses well established technologies*)	$13,546,296	12	#1
	Criterion Met	Criterion Met	3	2	2	3	2		
Alternative 5: Excavate entire site to 1 foot below grade and perform surface/subsurface clearance	Protective of human health and environment under planned land use conditions.	Complies with ARARs through collection of post-detonation samples and waste samples	Effective over long-term; assuming Land and groundwater use control are maintained and effective; source removal reduces risk over the long term	Provides greatest reduction in toxicity, mobility, or volume of wastes (*MEC removal at OD Hill and in kickout area to a greater depth; however, very few UXO/DMM would be expected at the greater depth.*	Moderate short-term hazards to workers and surrounding area (*Mechanical handling of soil with UXO/DMM over the entire MRS*) Field duration is 115 Months. Scored as 0 based on the duration of exposure hours (nearly three times the duration of other alternatives)	Readily implementable (*uses well established technologies*); however, the scale of the effort makes implementation more difficult.	$69,120,588	8	#2
	Criterion Met	Criterion Met	3	3	0	2	0		

(1) Costs shown are 30-year costs with a 20% contingency reported as a TPV. The TPV is based on a discount rate of 0.6 percent. Details of the cost estimates and the development of the TPVs are provided in **Appendix D**.

(2) See the "Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop RAOs for MRSs" (USACE, 2017).

(3) Alternatives were scored 0 to 3 for each screening criterion. A score of 0 represents the least favorable score and a score of 3 represents the most favorable score.

(4) The total score of all subcategories is the basis for the overall ranking of the alternatives; where the highest score is most favorable. The alternative with the highest total score represents the most favorable alternative.

(5) Shading shows alternative desirability with respect to that criterion:

Most acceptable (3)	Significantly acceptable (2)	Moderately acceptable (1)	Least acceptable (0)

Table 4-2
Remedial Alternatives Cost Summary

Alternative	Description	Capital Cost	Annual Cost (per event)	Periodic Cost (per event)	TPV at 0.6% Discount Rate
1	**Alternative 1: No-Further Action**	$0	--	--	--
2	**Alternative 2: LUCs Only, including groundwater restrictions**	$42,468	$4,000 LUC inspections	$18,202 five-year reviews	$251,722
3	**Alternative 3: Consolidate and Cap with Surface and Subsurface Clearance Outside the Cap and LUCs**	$12,865,037	$154,000 Landfill and LUC inspections	$18,202 five-year reviews $300,000 10-year maintenance	$17,911,881
4	**Alternative 4: Excavate OD Hill and perform surface/subsurface clearance over the entire site, and LUCs**	$13,317,084	$4,000 LUC inspections	$18,202 five-year reviews	$13,431,311
5	**Alternative 5: Excavate entire site to 1 foot below grade and perform surface/subsurface clearance**	$68,891,375	$4,000 LUC inspections	$18,202 five-year reviews	$67,358,631

Notes:

1) Discount rate of 0.6% per OMB (2018) and USEPA (2000) guidance was used to estimate TPV.
2) TPV includes six five- year review events and the long-term monitoring.

Remedial alternatives are either protective or not and, therefore, no comparison of overall protectiveness is possible.

4.4.2 Compliance with ARARs and Issues To Be Considered

ARARs are only applicable to remedial actions. Alternatives 1 and 2 do not remove UXO/DMM from the site which is a requirement of the RCRA permit and is therefore a location-specific ARAR that is not met by these two alternatives. All other remedial alternatives identified to address UXO/DMM and MC/COPCs at the OD Grounds MRS comply with ARARs. Remedial alternatives either comply with ARARs or not and, therefore, no comparison of ARAR compliance is possible.

4.4.3 Long-term Effectiveness and Permanence

The permanence criterion evaluates the degree to which an alternative permanently reduces or eliminates unacceptable risks posed by UXO/DMM and MC/COPC contamination.

LUCs under Alternative 2 do provide some long-term effectiveness because they restrict future use of the property and groundwater; however, the permanence is less that other alternatives that also remove explosive hazards. Under Alternative 3 UXO/DMM located at the OD Hill would not be removed but would be capped in place. A low permeability barrier wall would increase the permanence of Alternative 3 by limiting risk due to MC/COPC exposure in groundwater. However, the source of groundwater contamination (UXO/DMM and soil with high densities of metallic debris at the OD Hill) is not removed so Alternative 3 has less permanence that Alternatives 4 and 5 that remove the contaminant source. With respect to UXO/DMM, Alternative 3 has less permanence that Alternatives 4 and 5 because the cap would require long term maintenance to ensure it continues to limit interaction with UXO/DMM in the future. Alternatives 4 and 5 both provide a very high degree of long-term effectiveness and permanence. Both remove a substantial portion of the source of contamination. While Alternative 5 does increase the depth of UXO/DMM removal in the Kickout Area, it is anticipated that 99% of UXO/DMM is located within the top 24 inches of soil, so the increased removal depth does not provide a significant increase in the permanence. With respect to protection of future residents from MC/COPCs in soil, Alternatives 2, 3, 4, and 5 all provide the same permanence with implementation of land use restrictions.

In summary, Alternatives 4 and 5 are both considered to provide the highest degree of long-term effectiveness, Alternative 3 is considered to be less effective over the long-term than Alternatives 4 and 5 but more effective than Alternative 2, and Alternative 1 is considered to have no long-term effectiveness.

4.4.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Both Alternatives 1 and 2 provide no reduction in the toxicity, mobility, or volume of hazardous materials/substances. With respect to UXO/DMM, the largest volume of hazardous materials/substances is located at the OD Hill; therefore, alternatives removing UXO/DMM at the OD Hill achieve the largest reduction of toxicity, mobility, or volume of hazardous materials/substances. While Alternative 3 does cap the soil with high densities of metallic debris to reduce the mobility of contaminants from potential leaching and limit accessibility by receptors, it does not reduce the toxicity, mobility, or volume of contaminants at that location. Alternative 3 does provide some reduction of toxicity, mobility, or volume in the Kickout Area through the removal of UXO/DMM in that area. Alternatives 4 and 5 both achieve a significant

reduction in the toxicity, mobility, or volume of contaminants on site. Alternative 5 achieve a slightly greater reduction in toxicity, mobility, or volume because UXO/DMM is removed to a greater depth within the Kickout Area. This improved toxicity, mobility, or volume reduction is limited because 99% of the UXO/DMM would be anticipated to occur with the top 24 inches of soil which would also be addressed under Alternative 4.

Alternative 3 is the only alternative that includes element specifically designed to the achieve a reduction in the toxicity, mobility, or volume of MC/COPCs at the site. This alternative includes a cap and slurry wall intended to contain MC/COPCs in soil to prevent leaching to groundwater, and the slurry wall to prevent MC/COPCs in groundwater from moving outside the footprint of the cap. While the risk assessment did not indicate unacceptable risks to commercial/industrial workers, Alternatives 4 and 5 would include confirmation sampling of excavated soil prior to returning soil to the ground surface. If MC/COPC contamination exceeds the SCO commercial levels the soil would be removed off-site to an appropriate disposal facility. Based on this, if MC/COPC-impacted soil is found during confirmation samples, Alternatives 4 and 5 provide an additional reduction in the toxicity, mobility, and volume of potential MC/COPC soil contamination.

4.4.5 Short-term Effectiveness

No additional risk to the community, site workers, or the environment is caused by Alternative 1; however, Alternative 1 is determined to have the greatest risk and least short-term effectiveness because no action is taken to remove the UXO/DMM or mitigate contaminated soil risk therefore a continued impact for existing conditions would persist.

Locally, during implementation of Alternatives 3, 4, and 5, a temporary increase in dust may be associated with cap installation and/or excavation; however, the local community is generally buffered from these activities due to the location of the site within SEDA. Alternatives 3, 4, and 5 would require UXO personnel who would be exposed to explosive hazards. However, these personnel are trained to handle items property to reduce risk from explosive hazards during operations. Mechanical handling of soil with UXO/DMM present is considered more hazardous than hand digging due to the potential that heavy equipment could apply forces to a UXO/DMM item such that an unintended detonation could occur; however, armored equipment or remote operated equipment and appropriate evacuation zones would be applied to protect site workers. Due to the location on SEDA exclusion zones would not interfere with the local community. Because the mechanical handling of soil causes the greatest risk to site workers. Alternative 5 would involve the highest volume of mechanical handling so it is considered to have the least short-term effectiveness. Alternative 3 would be the next least as it would involve compaction of soil, and significant mechanical handling of soil at the OD Hill. Alternative 4 only involves mechanical handling of soil at the OD Hill and does not include compaction; therefore, it is ranked third least with respect to short-term effectiveness. Alternatives 1 and 2 provide no additional risk to site works or the community therefore they are ranked most favorable for short-term effectiveness.

Both Alternative 3 and 4 would provide similar short-term effectiveness in a similar amount of time (i.e., months). Alternative 3, 4, and 5 all include significant earthworks and handling of soil containing potential MEC; therefore, they all provide some level of risk to site workers. Alternative 3 includes compacting site

soil containing potential MEC in preparation of the cap, so such action may provide a greater risk to site works, as significant force may be applied to MEC during this activity. Alternative 4 and 5, which includes off-site transportation and disposal, has a short-term negative impact of hauling materials on public roads outside of the Depot, which can impact the surrounding community. Alternative 2 is the most favorable for short-term effectiveness as there are not activities that provide an increased risk to site workers or the environment during implantation of this alternative.

4.4.6 Implementability

Alternative 1 is the easiest to implement since it requires no action; however, it is not considered implementable as it is unlikely to gain approval from the public and the state. Alternatives 2 is administratively difficult to implement, though technically feasible, because the need for UXO support for intrusive activity to any depth could result in a significant need for short notice support and funding. Implementability would require land owner cooperation to give proper advanced notice. Alternative 4 is technically and administratively feasible and use proven technologies and personnel that are readily available. While the technologies and methods involved in implementing Alternative 5 are well established, this alternative would be less implementable due to the massive scale of earthwork that would be required in addition to permitting and logistics requirements for the offsite disposal of the excavated material if soil were found with concentrations exceeding the SCO commercial levels. The DGM and intrusive investigations use standard techniques common to munitions work. LUCs implemented under these alternatives are similar to those that have been successfully applied at other sites at SEDA. Alternative 3 has the additional burden of satisfying local, state, and federal permitting requirements for implementing the cap; therefore, Alternative 3 is less feasible to implement when compared to other alternatives not requiring an engineered cap.

4.4.7 Cost

The cost criterion evaluates the financial cost to implement the alternative. The cost criterion includes direct, indirect, and long-term maintenance (O&M) costs. Direct costs are those costs associated with the implementation of the alternative. Indirect costs are those costs associated with administration, oversight, and contingencies. These costs were adapted from costs associated with similar activities at the Depot. These costs presented do not include costs for SEDA to administer and provide oversight for the respective activities.

The actual costs would depend on true labor rates, actual site conditions, final project scope, and other variable factors. The alternative with the lowest cost to implement would be Alternative 1, which requires no action; therefore, no costs are incurred. Alternative 2 has low costs compared to Alternative 5 which is the costliest to implement. Alternative 3 costs about $5M dollars more to implement than Alternative 4.

Costs range from $0 (Alternative 1) to approximately $69.1M (Alternative 5). Alternative 5 has the highest cost because of the costs incurred for the excavation, transportation, and off-site disposal of the top foot of soil over the entire site. **Table 4-2** summarizes costs for all alternatives, and **Appendix D** provides additional cost information.

4.4.8 State Acceptance

State acceptance cannot be fully evaluated and assessed until comments on the FS and the proposed plan are received. Modifying criteria (i.e., state and community acceptance), however, are considered in remedy selection. It is anticipated that Alternative 1 would not be acceptable to the state due to its lack of long-term effectiveness and failure to achieve the threshold criterion of overall protection of human health and the environment for the anticipated future land use.

4.4.9 Community Acceptance

Community acceptance cannot be fully evaluated and assessed until comments on the proposed plan are received.

4.4.10 Summary of Comparative Analysis

The five alternatives were evaluated in terms of seven criteria. **Table 4-1** summarizes the alternatives and identifies the most practicable solution for reducing the risks from explosive hazards at the OD Grounds. In some cases, more than one alternative was identified within the same evaluation category, indicating that those alternatives have similar compliance with the criterion.

Alternative 1 must be ruled out because it is ineffective in long-term permanence and does not achieve the RAOs. Both Alternative 1 and 2 do not achieve the ARARs. Overall, only Alternatives 3, 4 and 5, achieve the threshold criteria. While LUCs under Alternative 2 may be effective at limiting interactions, the potential presence of MEC on the surface means that this alternative may not provide appropriate protection of human health and the environment under the planed land use conditions. Alternatives 4 and 5 have similar levels of long-term effectiveness and implementability; however, Alternative 5 has the worst short-term effectiveness and highest cost. Alternative 4 scores one rank better than Alternative 3 under each of the five balancing criteria, with Alternative 3 having a less favorable long-term effectiveness due to the need for landfill maintenance, less reduction of toxicity, mobility, or volume, less favorable short-term effectiveness due to the compaction of soils with potential MEC, lower implementability score due to the permitting and legal framework of establishing a landfill cap, and a higher cost than implementation of Alternative 4.

Based on a comparison of the criteria, the highest ranked remedy for the OD Grounds is Alternative 4, including excavation and mechanical processing of soil at OD Hill, surface and subsurface clearance over the entire site, and LUCs. Based on the analyses of remedial alternatives conducted in this FS, a proposed plan should be developed for the OD Grounds to recommend preferred alternatives for implementation to address the various media. These preferred alternatives should comprise the remedial alternatives favored by the project stakeholders to address UXO/DMM in soil and the risks posed by MC/COPCs in soil and groundwater.

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FIGURES

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Seneca Army Depot Activity

OD Grounds

Seneca Army Depot Activity

0 2.5 5 10 15 20 Miles

0 4,000 8,000 16,000 Feet

N W E S

SENECA ARMY DEPOT ACTIVITY
Feasibility Study Report

FIGURE 1-1
SEDA and OD Grounds Site Location

1 in = 4,000 ft | July 2018

Path: P:\PITProjects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS_1-1_Site_Location.mxd

Kickout Area

OD Hill Area

2500

2000

1500

1000

500

Building 2104

OB Grounds is not included in OD Grounds investigation

Legend

- OD Hill Boundary
- Kickout Area
- OB Grounds
- OD Radius Rings
- OD Radii Center Point
- Reeder Creek
- Retained Property Boundary
- 2010 OD Hill Topographic Contours
- Seneca Base Layer
- SEDA Boundary

0 250 500 1,000 1,500 2,000 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT
FOR THE OPEN
DETONATION GROUNDS

Figure 1-2
OD Grounds Site Plan

July 2018	1 in = 500 ft	TIB

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N
W E
S

NORTH END
INSTITUTIONAL AREA

DATA STORAGE /
TELECOMMUNICATIONS

OD Grounds

CONSERVATION / RECREATION

PLANNED INDUSTRIAL /
OFFICE DEVELOPMENT
AND WAREHOUSING
(PID) AREA

FARMING

FORMER AIRFIELD
COUNTY FIRE TRAINING
& FACTORY

FED TO FED
TRANSFER

PRISON AREA

Legend

OD Grounds

SEDA Boundary

0 2,500 5,000 10,000
Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-3
SEDA Future Land Use Map

NOV. 2018 | 1 " = 3,000 ' | RR

Path: P:\PITProjects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\FS_1-3_Land_Use.mxd

N
W
E
S

2500 ft

OD Hill Area

MW-3
MW-2
MW45-1
MW45-2
MW45-3
MW45-4
MW-4
MW23-3
MW-1
MW23-2
MW23-1
MW-5
MW23-4
MW23-6
MW23-5

Groundwater Divide (inferred)
Groundwater Divide

616
618
620
622
624
626
628
630
632
634
636
638

0 250 500 1,000 1,500 2,000 Feet

Legend

- Long-Term Monitoring Well (2007-2012)
- Monitoring Well Sampled in 1995 ESI
- Drainage Pathways
- Reeder Creek
- Groundwater Contours
- Groundwater Divide
- Groundwater Divide (inferred)
- OD Grounds Boundary
- OB Grounds Boundary

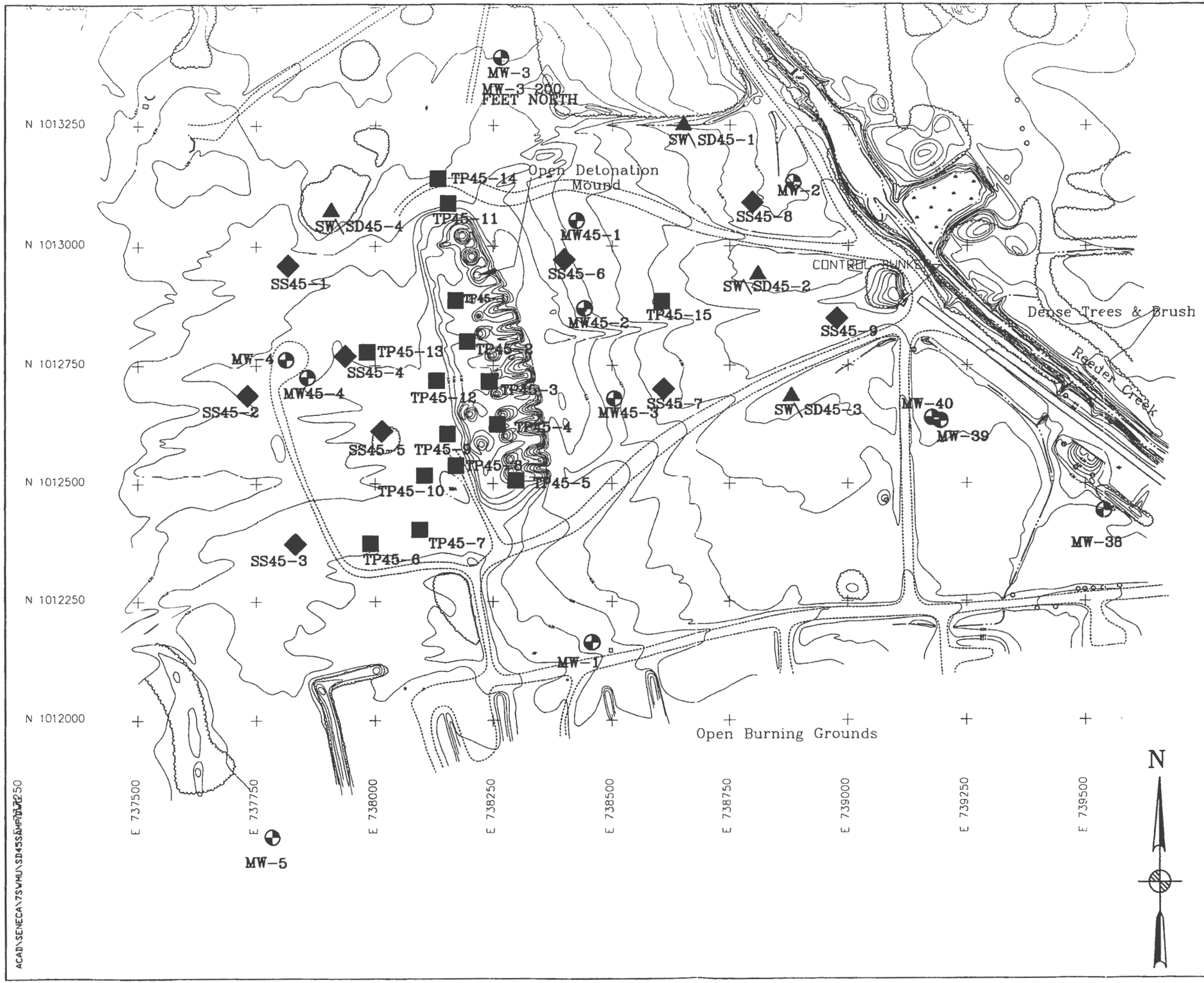
Note: OD Grounds groundwater contours are based on data collected from 4/1994 (Parsons, 1995). OB Grounds groundwater contours are based on data from 4/1993 (Parsons, 1994).

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT
FOR THE OPEN
DETONATION GROUNDS

Figure 1-4
Groundwater Elevation Data
at the OD Grounds

July 2018	1 in = 500 ft	TIB

Path: P:\PITProjects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-4.mxd



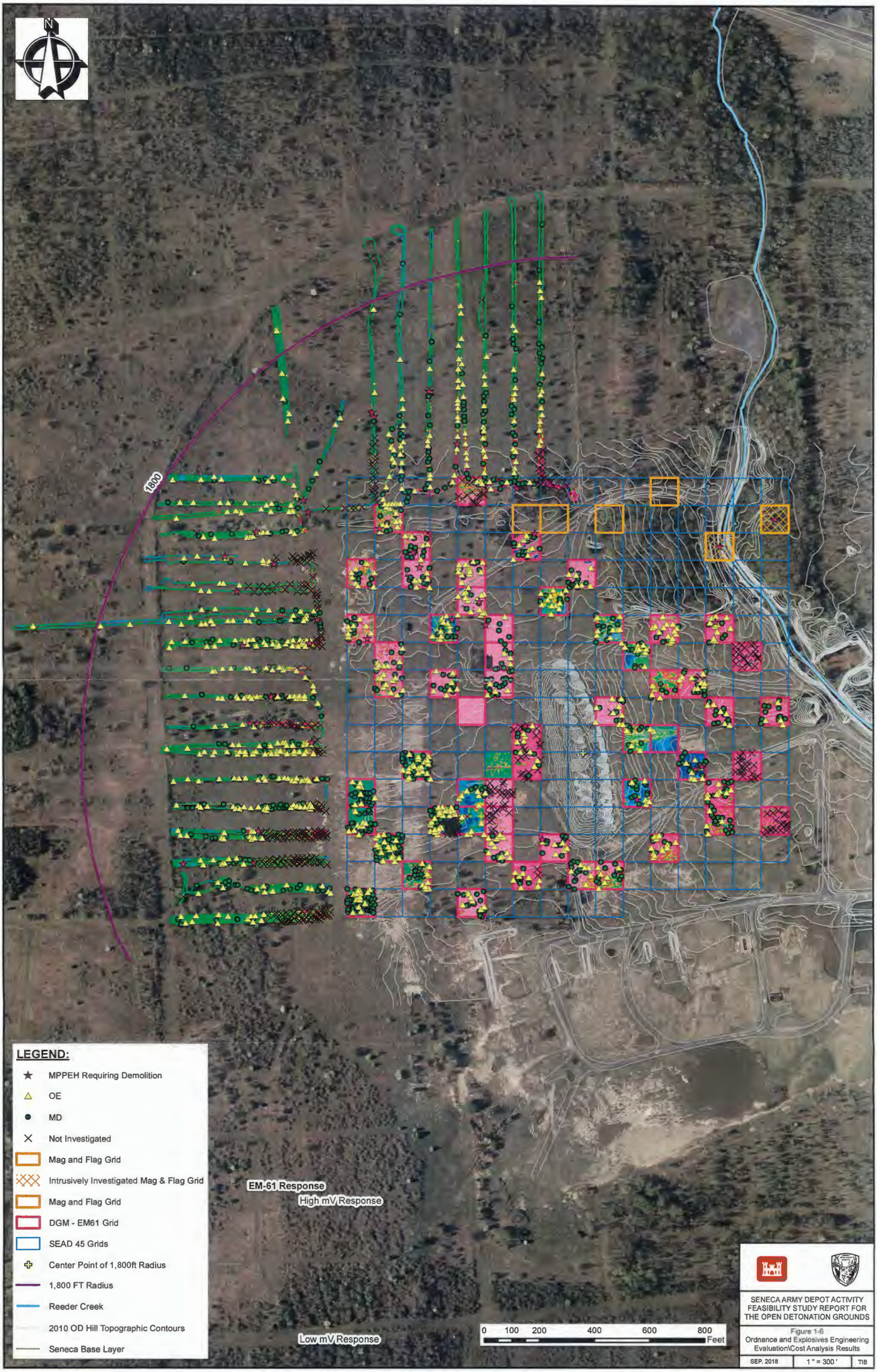
ACAD\SENECA\7SWMU\SD45SAMP250.DWG

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 HIGH-PRIORITY SWMU'S

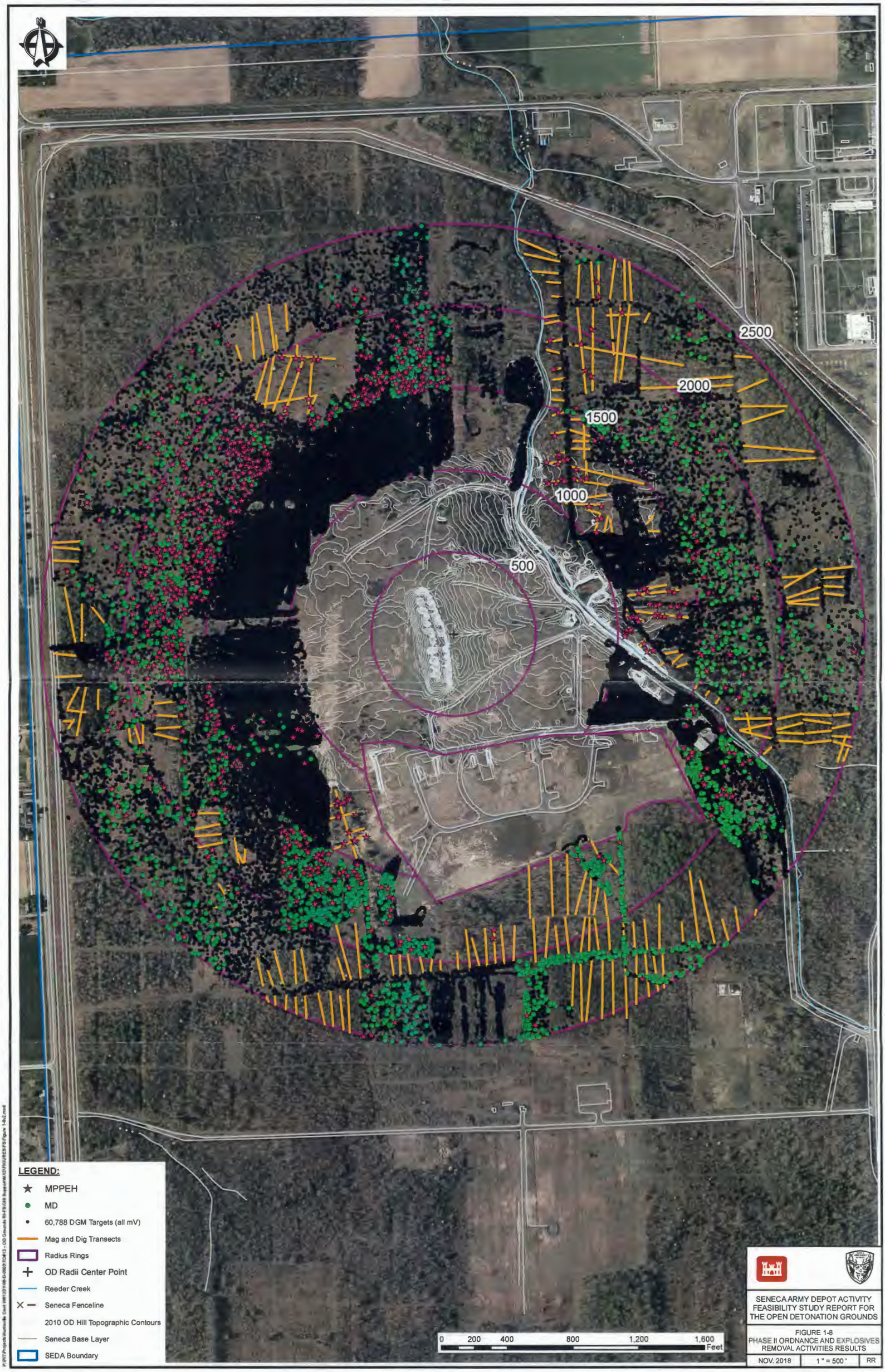
DEPT.	Dwg No
ENVIRONMENTAL ENGINEERING	720477-02000

FIGURE 1.5
SEAD-45 OPEN DETONATION GROUNDS
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 200'	MAY 1995	C


1800
LEGEND:
MPPEH Requiring Demolition
OE
MD
Not Investigated
Mag and Flag Grid
Intrusively Investigated Mag & Flag Grid
Mag and Flag Grid
DGM - EM61 Grid
SEAD 45 Grids
Center Point of 1,800ft Radius
1,800 FT Radius
Reeder Creek
2010 OD Hill Topographic Contours
Seneca Base Layer
EM-61 Response
High mV Response
Low mV Response
0 100 200 400 600 800
Feet
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS
Figure 1-6
Ordnance and Explosives Engineering
Evaluation\Cost Analysis Results
SEP. 2018
1 " = 300 '
TIB


2500
2000
1500
1000
500
LEGEND:
Mag and Dig Transects
60,788 DGM Targets (all mV)
Radius Rings
OD Radii Center Point
Reeder Creek
Seneca Fenceline
2010 OD Hill Topographic Contours
Seneca Base Layer
SEDA Boundary
0 200 400 800 1,200 1,600
Feet
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS
FIGURE 1-7
PHASE I GEOPHYSICAL
INVESTIGATION RESULTS
NOV. 2018
1 " = 500 '
RR



SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-8
PHASE II ORDNANCE AND EXPLOSIVES REMOVAL ACTIVITIES RESULTS

NOV. 2018	1 " = 500 '	RR

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-9
ADDITIONAL MUNITIONS RESPONSE
SITE INVESTIGATION RESULTS

NOV. 2018	1 " = 500 '	RR

2500

2000

1500

1000

500

LEGEND:

Radius Rings

DGM Results

- MEC
- MPPEH
- MD
- 14,688 Reacq Points

Analog Results

- MEC (140)
- MPPEH (458)
- MD (29,598)
- Analog Grids
- DGM Grids

Backhoe Areas

- Backhoe and spoils sweep
- Pits/Mounds
- Mag & Dig Coverage
- Reeder Creek
- Seneca Fenceline
- 2010 OD Hill Topographic Contours
- Seneca Base Layer
- SEDA Boundary

0 200 400 800 1,200 1,600 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-10a
MUNITIONS RESPONSE
ACTION RESULTS

SEP. 2018	1 " = 500 '	TIB

P:\PITP\Projects\Huntsville Cent\W912DY-08-D-0003\TO013 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-10.mxd

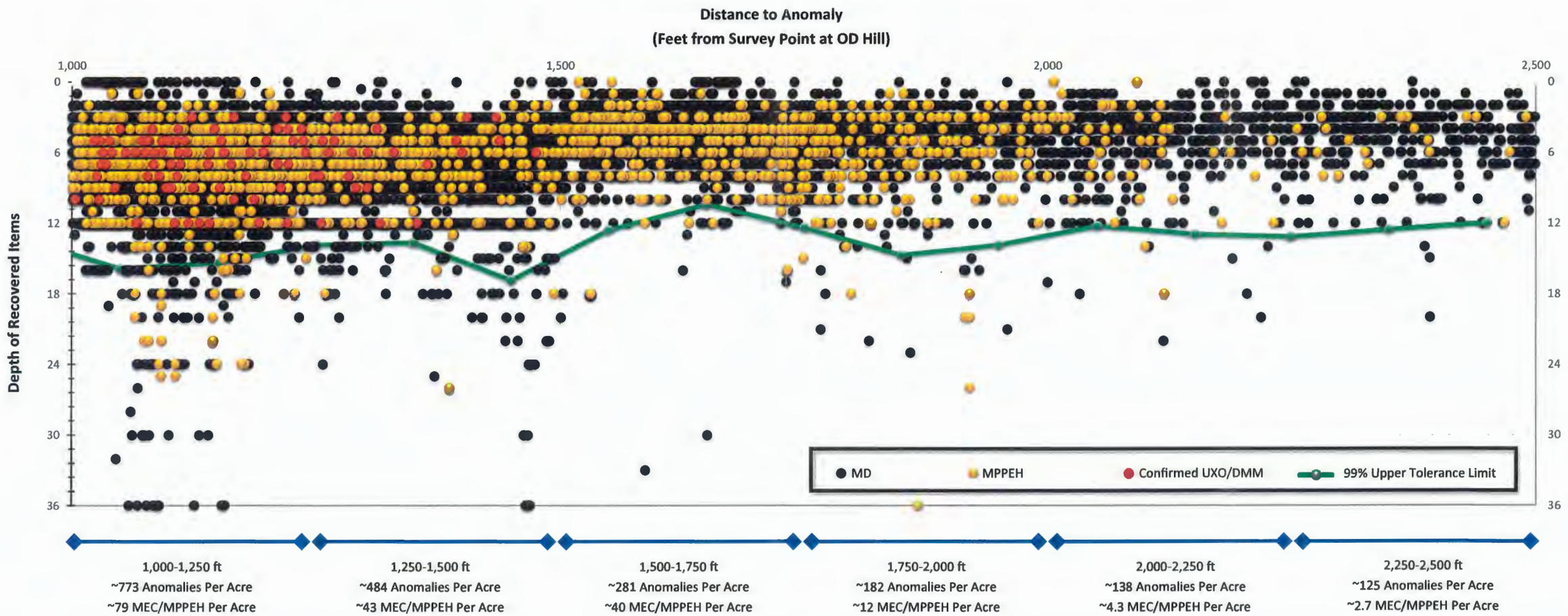
SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-10b
SELECTED TARGETS IN
OD HILL AREA

SEP. 2018	1 " = 200 '	TIB

Figure 1-11

Vertical and Horizontal Distribution of Munitions Items Recovered from DGM Anomalies



Estimates of Anomaly Density Based on Phase I, Phase II, and Munitions Response (Phase III) Digital Geophysical Data

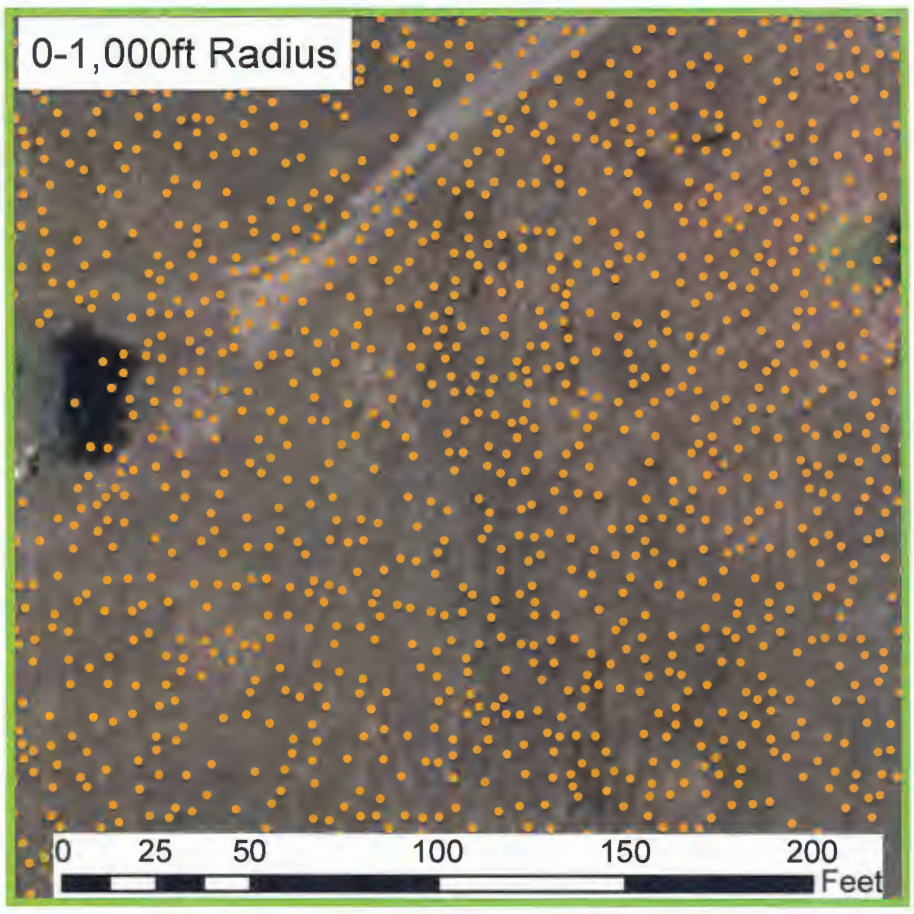
Notes:

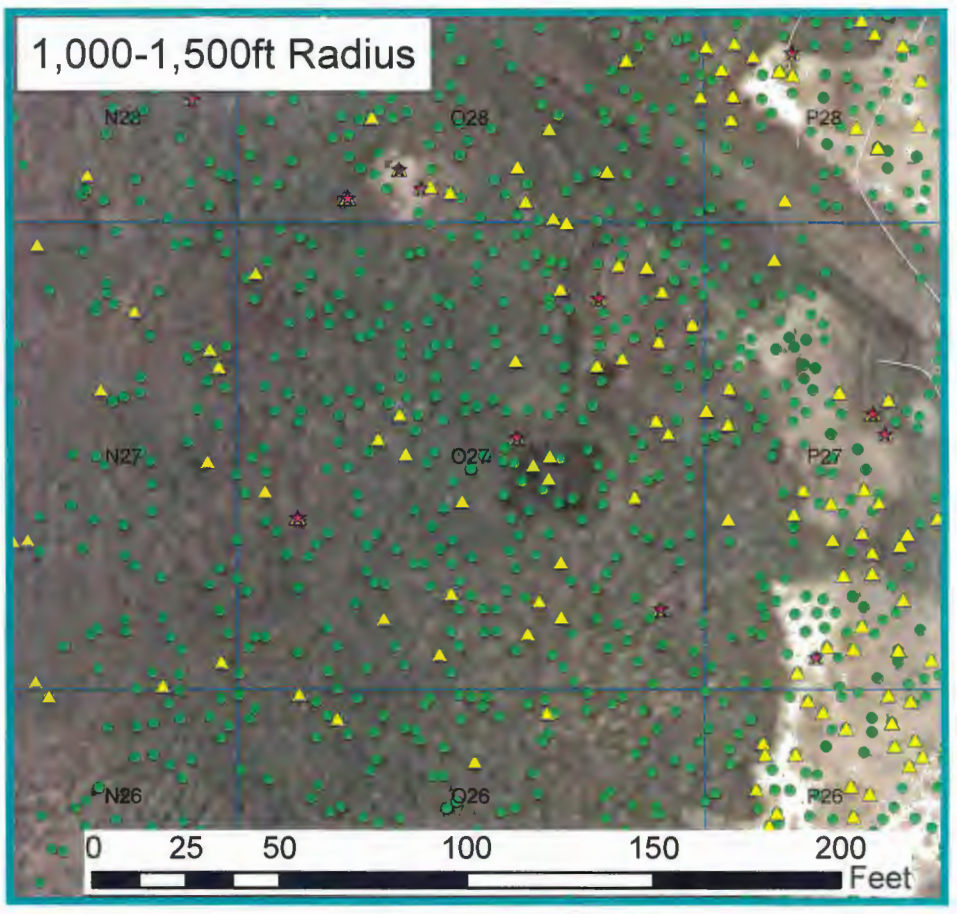
-Data shown ONLY includes intrusive results from investigation of DGM anomalies during the Phase I Investigation (Weston, 2005), the Phase II Investigation (Weston, 2006) and the Munitions Response/Phase III (Parsons, 2016)

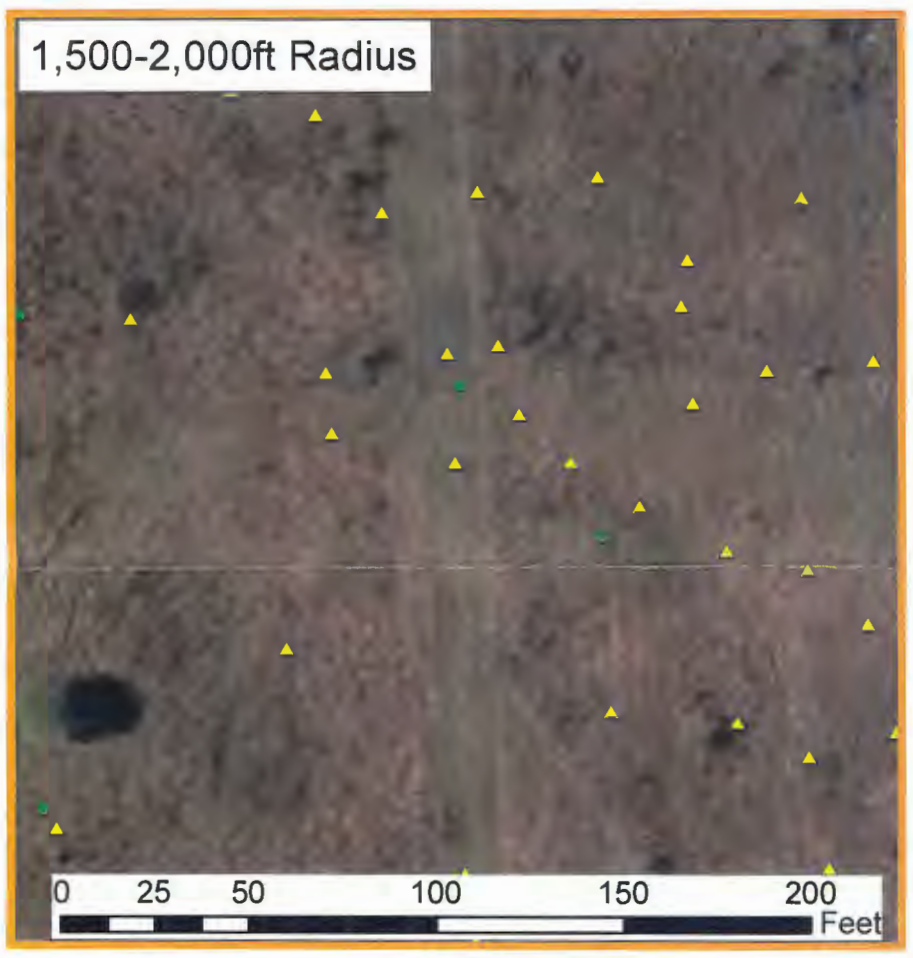
-UXO/DMM items were only confirmed based on post demolition evaluation for items disposed of during the Munitions Response Action (Phase III) between the 1,000 and 2,000 foot radius. As a result, confirmed UXO/DMM are only seen in the data for this portion of the site that was covered by the 2012-2014 action.

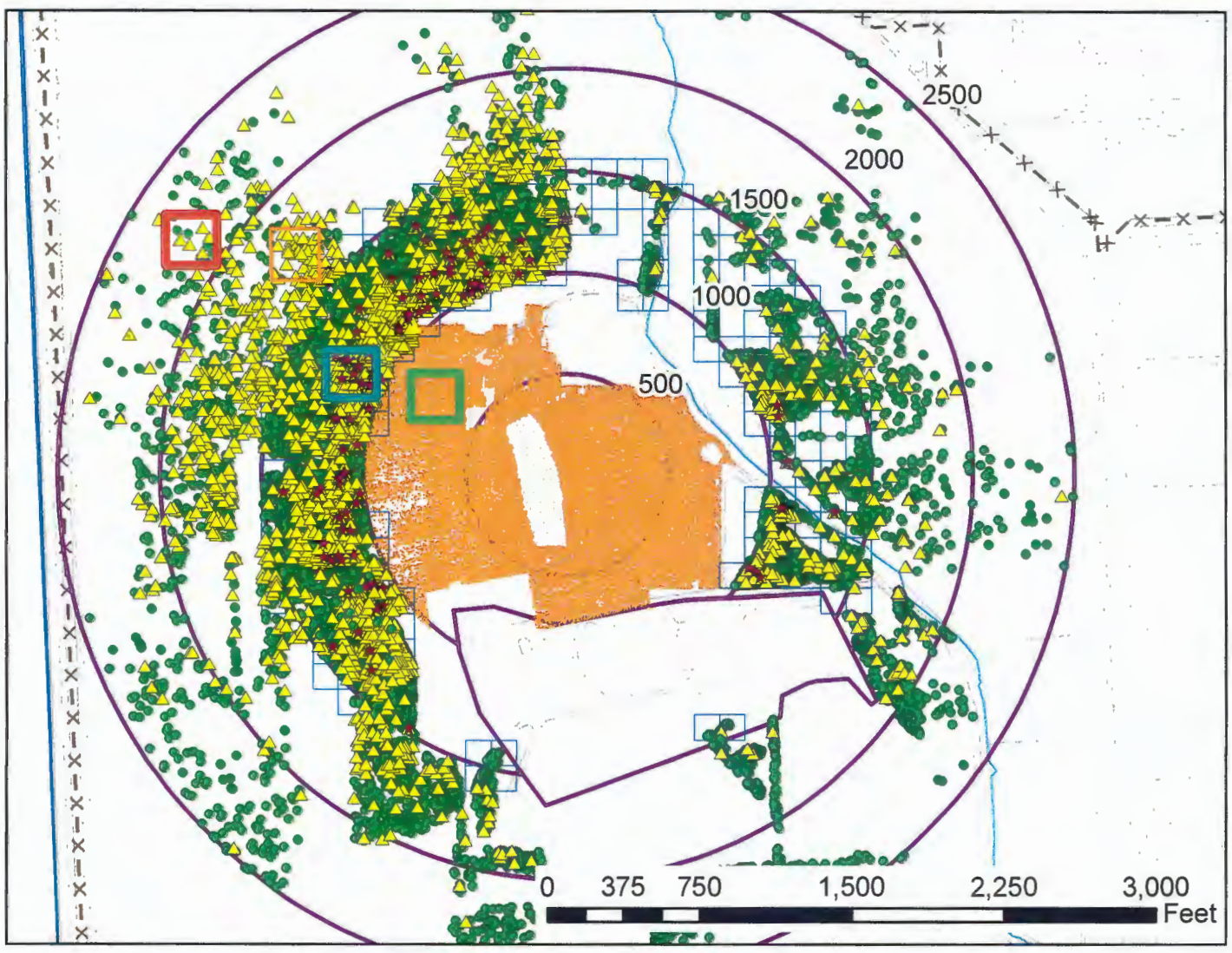
-MPPEH items were not given a final designation of UXO/DMM/MDAS; therefore, it can not be estimated how many of the MPPEH items found would be classified as UXO/DMM. Some training rounds can not be confirmed as MDAS without demolition.

-A tolerance interval was calculated on data grouped in 100 foot intervals. Based on the calculation of one-sided upper tolerance interval for normally distributed data (NIST/Sematech Engineering Statistics Handbook, Section 7.2.6.3) the data show 99% confidence that 99% of the MD/MPPEH/MEC are above the depth shown in green for each 100 foot evaluation interval.









LEGEND:

- MEC
- MPPEH
- MD
- DGM Grids
- CB&I Targets

Base Layers

- Radius Rings
- Reeder Creek
- Seneca Fenceline
- 2010 OD Hill Topographic Contours
- Seneca Base Layer
- SEDA Boundary

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

Figure 1-12
Example Grid View of
Anomalies and Results

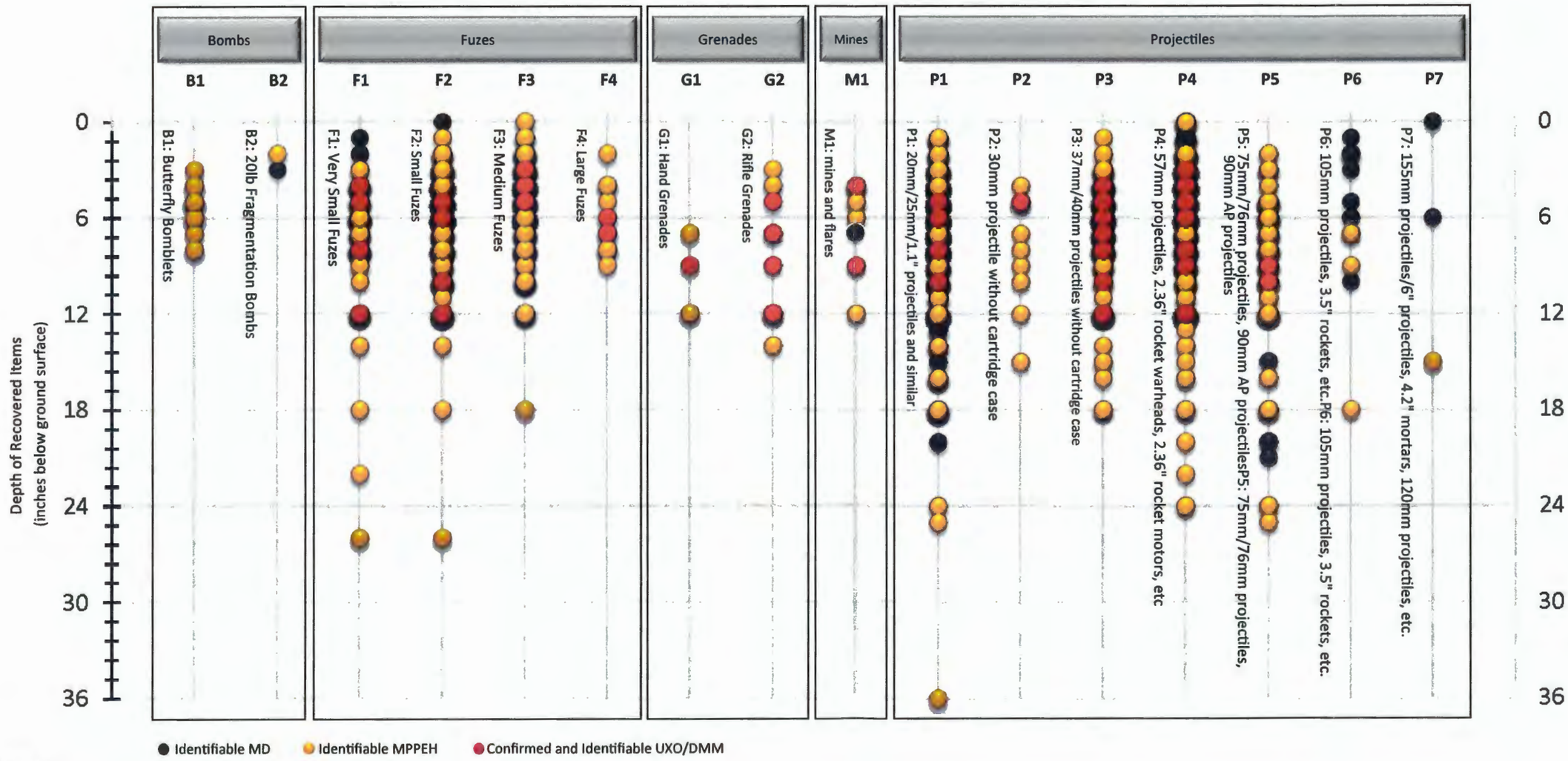
NOV. 2018	1 " = 800 '	TIB

P:\PITProjects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-12 Grid_by_Grid_v2.mxd

Figure 1-13

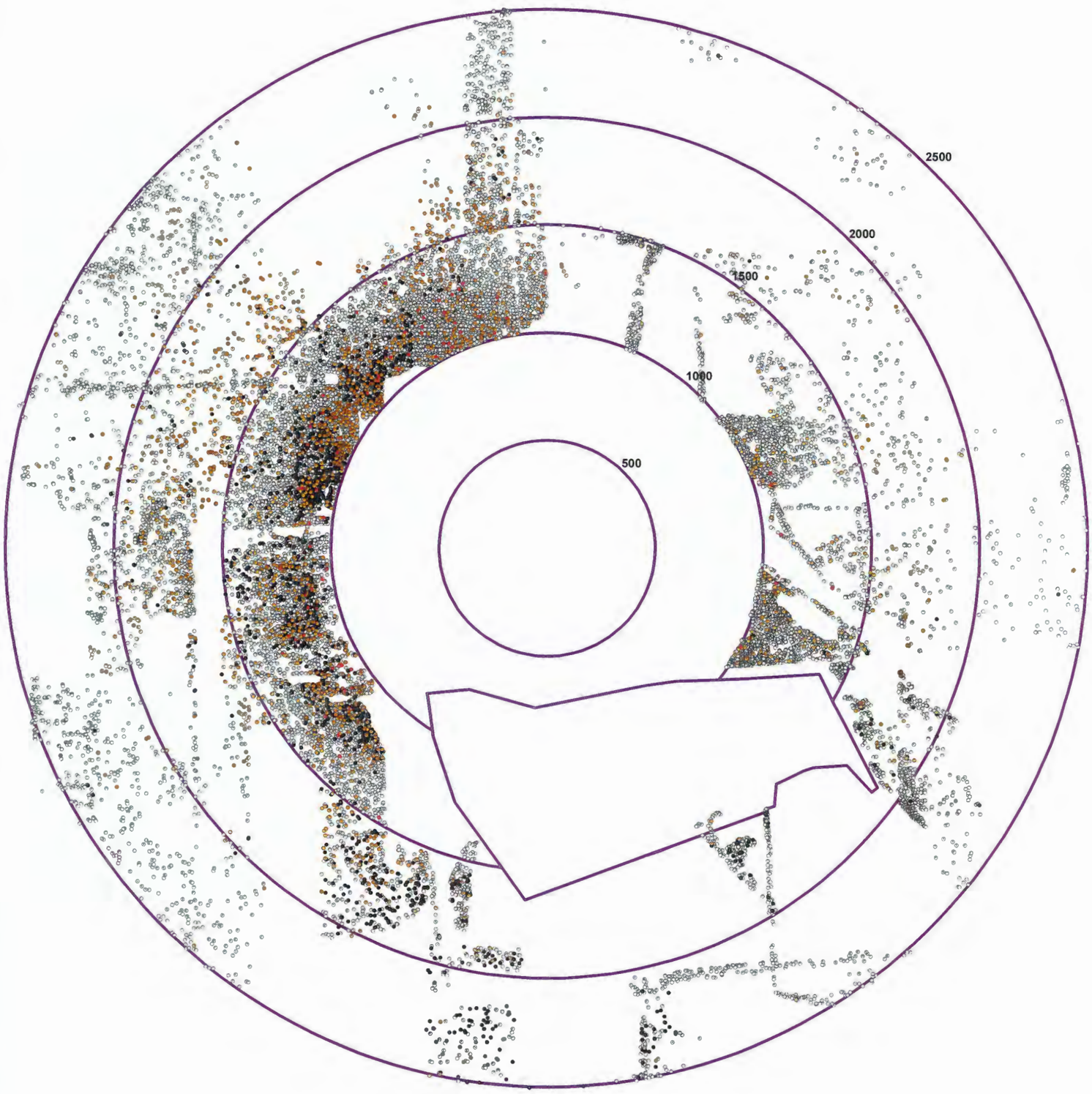
Vertical Distribution of Identifiable Items by Type

(Based on 3,041 DGM dig records with sufficient data to be categorized by type.)



Notes:

- Full descriptions of each munitions type subcategory can be found in Table 2-2
- UXO/DMM items were only confirmed based on post demolition evaluation for items disposed of during the Munitions Response Action (Phase III)
-"MPPEH" items were not given a final designation of UXO/DMM/MDAS; therefore, it can not be estimated how many of the MPPEH items may have been UXO/DMM. Some training rounds can not be confirmed as MDAS without demolition. "MPPEH" includes items that were burned to ensure any residual explosives were removed.



Legend

- MD
- MPPEH
- UXO/DMM
- All DGM digs (16,835)
- Radius Rings

0 200 400 800 1,200 1,600 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

Figure 1-14
Horizontal Distribution of Data Points from the Vertical CSM

SEP. 2018	1 in = 500 ft	TB

N
W
E
S

1500 ft

1000 ft

See Figure 1-15B for sample locations around OD Hill

OD Hill Area

500 ft

2500 ft
1500 ft
500 ft
Figure 1-15B
Figure 1-15A
N
OD Grounds Site Area of Inset

Legend

- Subsurface Soil Sample Location
- Surface Soil Sample Location
- Radius Rings
- \+ OD Radii Center Point

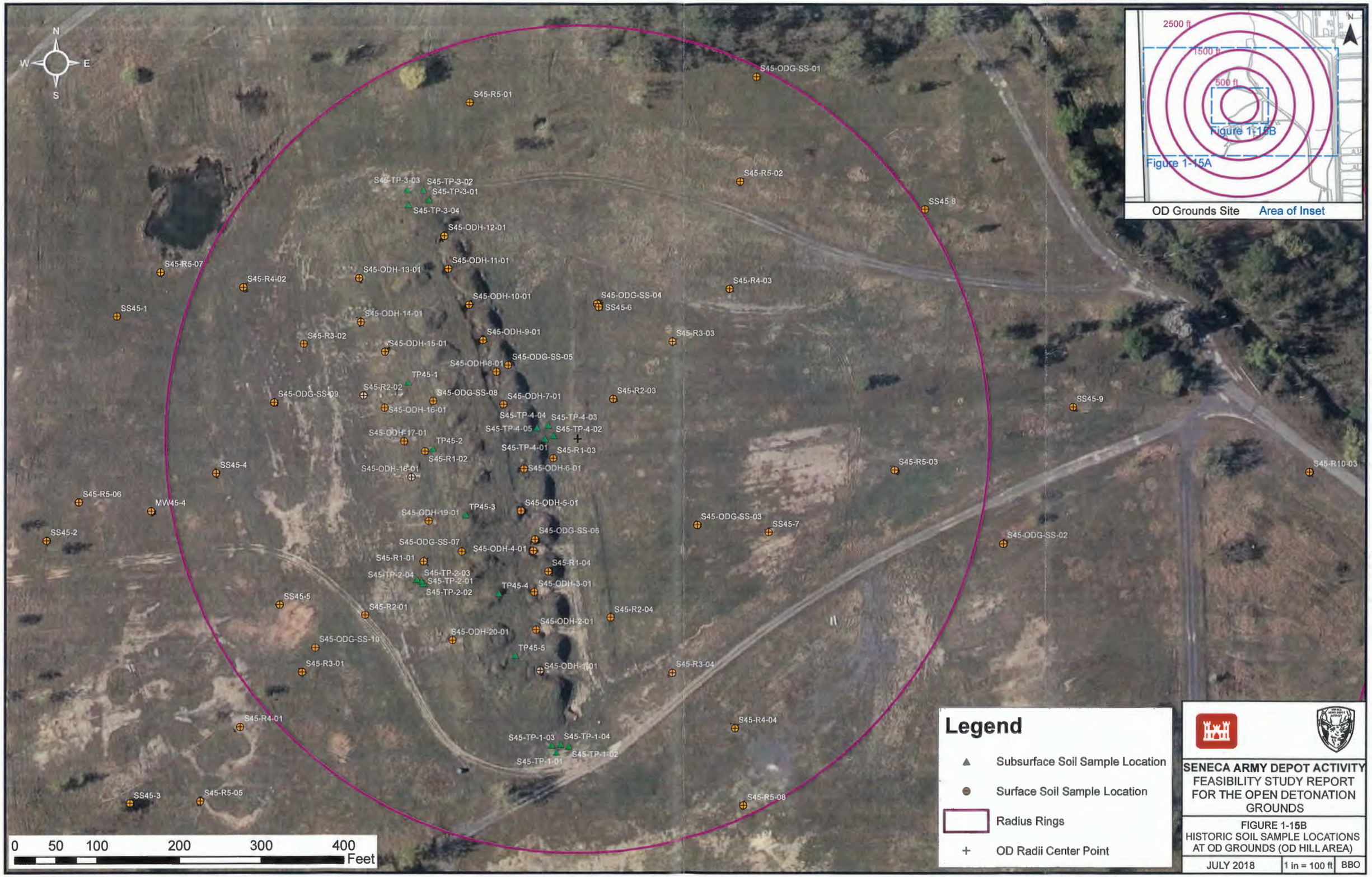
0 125 250 500 750 1,000 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT
FOR THE OPEN DETONATION GROUNDS

FIGURE 1-15A
HISTORIC SOIL SAMPLE LOCATIONS AT OD GROUNDS

JULY 2018 | | BBO

Path: P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-14A.mxd



Path: P:\PITProjects\...ville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-14B.mxd

N
W
E
S

MW3R
S45-ODG-SS-01
MW7R
MW45-1
S45-ODG-SS-04
S45-ODG-SS-05
S45-ODG-SS-09
MW45-2
S45-ODG-SS-08
MW45-4R
S45-ODG-SS-06
S45-ODG-SS-03
S45-ODG-SS-07
MW45-3
S45-ODG-SS-02
MW23-3
S45-ODG-SS-10
MW1R
MW23-4R

OD Grounds
2500 FT Radius

LEGEND:

- Existing Monitoring Well
- Replacement Monitoring Well
- Perchlorate Soil Sample, 2 depths
- Drainage Ditch
- Reeder Creek
- OD Grounds **2,500 ft Radius**
- OB Grounds Boundary
- Presumed Groundwater Flow Direction

0 200 400 800 1,200 1,600 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR
THE OPEN DETONATION GROUNDS

FIGURE 1-16 PERCHLORATE SAMPLE LOCATIONS AT OD GROUNDS

JULY 2018	1 " = 300 '	TIB

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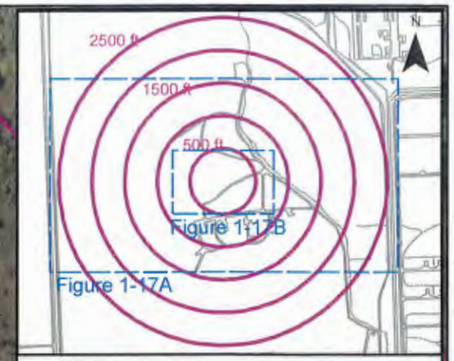
N
W
E
S

S45-R15-01
S45-R15-02
S45-R15-06
S45-R10-01
S45-R10-02
S45-R10-06
See Figure 1-17B for sample locations around OD Hill
OD Hill Area
SD45-1
S45-R15-05
S45-R10-05
S45-R5-06
S45-R10-03
S45-R15-03
S45-R5-05
S45-R5-04
S45-R10-07
S45-R10-04
S45-R15-04

1500 ft
1000 ft
500 ft



Legend

- Surface Soil Exceedance(s) of RSLs (metals)
- Subsurface Soil Exceedance(s) of RSLs (metals)
- No exceedances for metals in subsurface soil
- No exceedance for metals in surface soil
- Radius Rings
- OD Radii Center Point

Note: Aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, silver, thallium and vanadium were detected at concentrations in soil above the EPA RSLs for residential soil (HQ=0.1). All other metals were below the RSLs.

0 200 400 800 1,200 1,600 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR THE OPEN DETONATION GROUNDS

FIGURE 1-17A
METAL EXCEEDANCES IN SOIL FROM 2010 INVESTIGATION

SEPTEMBER 2018	1 in = 300 ft	TB

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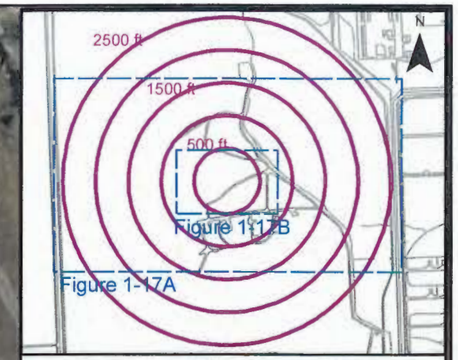
N
W
E
S

S45-R5-01
SD45-4
S45-TP-3-03
S45-TP-3-02
S45-TP-3-04
S45-TP-3-01
S45-ODH-12-01
S45-R5-07
S45-ODH-11-01
S45-ODH-13-01
S45-R4-02
S45-ODH-10-01
SS45-1
S45-ODH-14-01
S45-R3-02
S45-ODH-9-01
S45-ODH-15-01
S45-ODG-SS-05
S45-ODH-8-01
TP45-1
S45-R2-02
S45-ODG-SS-09
S45-ODH-16-01
S45-ODG-SS-08
S45-ODH-7-01
S45-TP-4-04
S45-TP-4-03
S45-TP-4-05
S45-TP-4-01
S45-ODH-17-01
S45-TP-4-02
S45-R1-02
S45-R1-03
TP45-2
S45-ODH-6-01
SS45-4
S45-ODH-18-01
S45-R5-06
MW45-4
S45-ODH-5-01
S45-ODH-19-01
TP45-3
SS45-2
S45-ODG-SS-06
S45-R1-01
S45-ODG-SS-07
S45-ODH-4-01
S45-R1-04
S45-TP-2-04
S45-TP-2-01
S45-TP-2-02
S45-TP-2-03
TP45-4
S45-ODH-3-01
SS45-5
S45-R2-01
S45-R2-04
S45-ODH-2-01
S45-ODH-20-01
S45-ODG-SS-10
TP45-5
S45-R3-01
S45-ODH-1-01
S45-R4-01
S45-TP-1-03
S45-TP-1-01
S45-TP-1-04
S45-TP-1-02
S45-R5-05
S45-ODG-SS-01
SD45-1
S45-R5-02
SS45-8
S45-R4-03
S45-ODG-SS-04
SS45-6
SD45-2
S45-R3-03
S45-R2-03
SS45-9
S45-R5-03
S45-ODG-SS-03
SS45-7
SD45-3
S45-ODG-SS-02
S45-R3-04
S45-R4-04
S45-R5-04



Note: Aluminum, antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, silver, thallium and vanadium were detected at concentrations in soil above the EPA RSLs for residential soil (HQ=0.1). All other metals were below the RSLs.

Legend

- Surface Soil Exceedance(s) of RSLs (metals)
- Subsurface Soil Exceedance(s) of RSLs (metals)
- No exceedances for metals in subsurface soil
- No exceedance for metals in surface soil
- Radius Rings
- OD Radii Center Point

0 50 100 200 300 400 Feet

SENECA ARMY DEPOT ACTIVITY
FEASIBILITY STUDY REPORT FOR THE OPEN DETONATION GROUNDS

FIGURE 1-17B
METAL EXCEEDANCES IN SOIL FROM 2010 INVESTIGATION (OD HILL AREA)

SEPTEMBER 2018	1 in = 100 ft	TB

Path: P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\GIS Support\MXD\FIGURES\FS\Figure 1-16B_rev2.mxd

APPENDICES

Appendix A	OD Grounds Analytical Data
Appendix B	B1: Human Health Risk Assessment B2: Baseline Ecological Risk Assessment
Appendix C	C1: Munitions and Explosives of Concern Hazard Assessment (MEC HA) C2: Munitions and Explosives of Concern Risk Assessment (MEC RA) and Alternatives Analysis
Appendix D	Detailed Cost Estimate
Appendix E	Compilation of Previous Investigations and Studies
Appendix F	Perchlorate Boring and Monitoring Well Construction Logs
Appendix G	Response to Comments

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APPENDIX A
OD GROUNDS ANALYTICAL DATA

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Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06		S45-ODG-SS-07
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													45-FS-SS-10001-0-0.5		45-FS-SS-10002-0-0.5		45-FS-SS-10003-0-0.5		45-FS-SS-10004-0-0.5		45-FS-SS-10005-0-0.5		45-FS-SS-10006-0-0.5		45-FS-SS-10007-0
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0													
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0													
2,4-D	UG/KG	0				0%	0	29			70,000	0													
2,4-DB	UG/KG	0				0%	0	29			190,000	0													
Dalapon	UG/KG	0				0%	0	29			190,000	0													
Dicamba	UG/KG	0				0%	0	29			190,000	0													
Dichloroprop	UG/KG	0				0%	0	29																	
Dinoseb	UG/KG	0				0%	0	29			6,300	0													
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2													
MCPP	UG/KG	0				0%	0	29			6,300	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06		S45-ODG-SS-07
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													45-FS-SS-10001-0-0.5		45-FS-SS-10002-0-0.5		45-FS-SS-10003-0-0.5		45-FS-SS-10004-0-0.5		45-FS-SS-10005-0-0.5		45-FS-SS-10006-0-0.5		45-FS-SS-10007-0-
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0													
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0													
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0													
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0													
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0													
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0													
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0													
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0													
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0													
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0													
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0													
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0													
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0															
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0													
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0													
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0													
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0													
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0													
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0													
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1													
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0													
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0													
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0													
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0													
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0													
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0													
2-Nitrophenol	UG/KG	0				0%	0	29																	
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0													
3-Nitroaniline	UG/KG	0				0%	0	29																	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0													
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0													
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0													
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0													
4-Nitrophenol	UG/KG	0				0%	0	29																	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06		S45-ODG-SS-07
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													45-FS-SS-10001-0-0.5		45-FS-SS-10002-0-0.5		45-FS-SS-10003-0-0.5		45-FS-SS-10004-0-0.5		45-FS-SS-10005-0-0.5		45-FS-SS-10006-0-0.5		45-FS-SS-10007-0
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0													
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0															
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0													
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0													
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0													
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0													
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0															
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0													
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0													
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0													
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0													
Butylbenzylphthalate	UG/KG	0				0%	0	29																	
Carbazole	UG/KG	0				0%	0	29																	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0													
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0													
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0													
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0													
Dimethylphthalate	UG/KG	0				0%	0	29																	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0													
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0													
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0													
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0													
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0													
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0													
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0													
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0													
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0													
Isophorone	UG/KG	0				0%	0	29			570,000	0													
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0													
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0													
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0													
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0													
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0															
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0													
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06		S45-ODG-SS-07
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													45-FS-SS-10001-0-0.5		45-FS-SS-10002-0-0.5		45-FS-SS-10003-0-0.5		45-FS-SS-10004-0-0.5		45-FS-SS-10005-0-0.5		45-FS-SS-10006-0-0.5		45-FS-SS-10007-0-
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0													
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0													
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0													
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1													
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0													
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06		S45-ODG-SS-07
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													45-FS-SS-10001-0-0.5		45-FS-SS-10002-0-0.5		45-FS-SS-10003-0-0.5		45-FS-SS-10004-0-0.5		45-FS-SS-10005-0-0.5		45-FS-SS-10006-0-0.5		45-FS-SS-10007-0
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5		0-0.5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75													
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0													
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76													
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0													
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0													
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30													
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76																	
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0															
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76													
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36													
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76													
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1													
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76																	
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76													
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49													
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0													
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55																	
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0													
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1													
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76																	
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4													
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2													
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0													
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0	0.049	U	0.49	J	0.71		0.42	J	0.05	U	8.2		0.68

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dde432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													0.5	45-FS-SS-10008-0-0.5		45-FS-SS-10009-0-0.5		45-FS-SS-10010-0-0.5		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Sample Depth Interval (FT)														0-0.5		0-0.5		0-0.5		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0											18	U	18	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0											14	U	14	U
2,4-D	UG/KG	0				0%	0	29			70,000	0											36	U	37	U
2,4-DB	UG/KG	0				0%	0	29			190,000	0											26	U	27	U
Dalapon	UG/KG	0				0%	0	29			190,000	0											9.2	U	9.6	U
Dicamba	UG/KG	0				0%	0	29			190,000	0											12	U	13	U
Dichloroprop	UG/KG	0				0%	0	29															21	U	22	U
Dinoseb	UG/KG	0				0%	0	29			6,300	0											2.9	U	3	U
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2											2,600	U	2,700	U
MCPP	UG/KG	0				0%	0	29			6,300	0											2,500	U	2,600	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area															SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID															S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Matrix															SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														0.5	45-FS-SS-10008-0-0.5		45-FS-SS-10009-0-0.5		45-FS-SS-10010-0-0.5		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Sample Depth Interval (FT)															0-0.5		0-0.5		0-0.5		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date															5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010		3/12/2010	
QC Type															SA		SA		SA		SA		SA		SA	
Study ID															2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered															Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual		Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																										
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0									55	J	51	JN	120	U
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0									7.7	U	6.7	U	7.3	U
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0									58	JN	45	JN	46	J
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0									110	J	150		88	J
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0									34	U	29	U	32	U
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0									130	J	130	J	170	JN
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0									15	U	13	U	14	U
3,5-Dinitroaniline	UG/KG	0				0%	0	31													4.4	U	3.8	U	4.4	U
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0									9.8	UJ	8.5	UJ	9.4	UJ
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0									120	J	120		150	JN
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0									34	U	29	U	32	U
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0									87	JN	72	JN	160	JN
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0									27	U	24	U	26	U
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1									150	U	130	U	150	U
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0									300	U	260	U	280	U
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0									190	JN	170		440	JN
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0									6.7	U	5.8	U	6.4	U
Semivolatile Organic Compounds																										
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0											93	U	78	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0											100	U	85	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0													90	U	76	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0											99	U	83	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																		
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0											180	U	150	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0											180	U	150	U
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0											170	U	140	U
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0											190	U	160	U
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0											430	U	360	U
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1											98	U	82	U
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0											91	U	76	U
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0											100	U	84	U
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0											190	U	160	U
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0											100	U	89	U
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0											230	U	190	U
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0											86	U	73	U
2-Nitrophenol	UG/KG	0				0%	0	29															190	U	160	U
3 or 4-Methylphenol	UG/KG	0				0%	0	19															210	U	180	U
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0											130	U	110	U
3-Nitroaniline	UG/KG	0				0%	0	29															110	U	91	U
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0											390	U	330	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29															98	U	82	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0											190	U	160	U
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0											140	U	120	U
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29															90	U	76	U
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0														
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0											150	U	130	U
4-Nitrophenol	UG/KG	0				0%	0	29															360	U	300	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													0.5	45-FS-SS-10008-0-0.5		45-FS-SS-10009-0-0.5		45-FS-SS-10010-0-0.5		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Sample Depth Interval (FT)														0-0.5		0-0.5		0-0.5		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0										75	U	63	U
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0												80	U	68	U
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0										96	U	81	U
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0										99	U	83	U
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0										110	U	90	U
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0										150	U	130	U
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0												120	UJ	100	UJ
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0										95	U	80	U
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0										110	U	93	U
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0										93	U	78	U
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0										100	U	86	U
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0										110	U	95	U
Butylbenzylphthalate	UG/KG	0				0%	0	29														110	U	90	U
Carbazole	UG/KG	0				0%	0	29														130	U	110	U
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0										110	U	92	U
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0										150	U	120	U
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0										91	U	76	U
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0										92	U	78	U
Dimethylphthalate	UG/KG	0				0%	0	29														90	U	76	U
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0										120	U	98	U
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0										240	U	200	U
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0										120	U	100	U
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0										93	U	78	U
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0										94	U	79	U
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0										95	U	80	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0										94	U	79	U
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0										110	U	93	U
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0										140	U	120	U
Isophorone	UG/KG	0				0%	0	29			570,000	0										86	U	73	U
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0										100	U	84	U
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0										100	U	88	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0										310	J	210	U
N-Nitrosodipropylamine	UG/KG	0				0%	0	19														95	U	80	U
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0										270	UJ	230	UJ
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0												95	U	80	U
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0										180	U	150	U
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0										120	U	98	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													0.5	45-FS-SS-10008-0-0.5		45-FS-SS-10009-0-0.5		45-FS-SS-10010-0-0.5		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Sample Depth Interval (FT)														0-0.5		0-0.5		0-0.5		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0										0.23	U	0.23	U
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0										0.82	J	1.3	J
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0										0.87	J	1.3	JN
Aldrin	UG/KG	0				0%	0	19	680	0	39	0										0.33	U	0.32	U
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0										0.4	U	0.39	U
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0												0.24	U	0.24	U
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0										0.38	U	0.38	U
Delta-BHC	UG/KG	0				0%	0	19	500,000	0												0.37	U	0.37	U
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0										0.77	J	1	J
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0												0.79	J	32	JN
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0												0.4	UJ	0.39	UJ
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0												0.68	U	0.67	U
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0										0.99	U	0.98	U
Endrin aldehyde	UG/KG	0				0%	0	19														0.57	U	0.56	U
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19														0.46	U	0.58	J
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0										0.31	U	0.31	U
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19														0.27	U	0.26	U
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0										0.34	U	0.33	U
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0										0.26	U	0.25	U
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0										0.58	U	0.57	U
Toxaphene	UG/KG	0				0%	0	19			490	0										8.2	U	8	U
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0										7	U	6.9	U
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0										16	U	16	U
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0										11	U	11	U
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0										6.8	U	6.7	U
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0										7.1	U	7	U
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1										5.5	U	5.4	U
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0										7	U	6.9	U
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													0.5	45-FS-SS-10008-0-0.5		45-FS-SS-10009-0-0.5		45-FS-SS-10010-0-0.5		S45-ODH-10-01		S45-ODH-1-01		S45-ODH-11-01	
Sample Depth Interval (FT)														0-0.5		0-0.5		0-0.5		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75								18,000		19,100		17,900	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0								0.13	UJ	0.16	J	0.2	UJ
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76								5	J	5.1	J	8.6	J
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0								195		186		193	
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0								0.8		0.85		0.79	
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30								8.1		7		**23.6**	
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76												24,400		27,800		23,200	
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0										28.1		28.5		446	
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76								13.5		11.2		13.1	
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36								**448**		**436**		**1,060**	
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76								25,800		27,200		53,100	
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1								62.6		55.6		64	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76												6,780		7,140		7,040	
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76								742		581		799	
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49								**3.8**		**4**		**4.5**	
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0								39.5		37.3		59.3	
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55												2,760	R	3,400	R	2,880	R
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0								0.29	U	0.25	U	0.44	U
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1								3.6		3.8		5	
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76												106	J	131	J	112	J
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4								0.12	U	0.23	J	0.19	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2								29.2		31.4		30.6	
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0								359		327		421	
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0		0.27	J	0.26	J	0.25	J						

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1, 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0					19	U					18	U	
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0					15	U					14	U	
2,4-D	UG/KG	0				0%	0	29			70,000	0					38	U					36	U	
2,4-DB	UG/KG	0				0%	0	29			190,000	0					28	U					26	U	
Dalapon	UG/KG	0				0%	0	29			190,000	0					9.7	U					9.4	U	
Dicamba	UG/KG	0				0%	0	29			190,000	0					13	U					12	U	
Dichloroprop	UG/KG	0				0%	0	29									22	U					21	U	
Dinoseb	UG/KG	0				0%	0	29			6,300	0					3	U					2.9	U	
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2					2,700	U					2,600	U	
MCPP	UG/KG	0				0%	0	29			6,300	0					2,600	U					2,500	U	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	70	J	51	J	120	U	54	JN	53	JN	64	JN	120
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	7	U	7.2	U	7.8	U	7.1	U	6.5	U	6.7	U	7.4
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	48	JN	40	J	55	JN	44	JN	41	JN	42	JN	62
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0	100	J	110	J	92	J	220		110		96	J	1,100
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	30	U	31	U	34	U	31	U	28	U	29	U	32
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0	190	J	120		200	JN	150	J	160	J	150	J	160
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0	13	U	14	U	15	U	14	U	12	U	13	U	14
3,5-Dinitroaniline	UG/KG	0				0%	0	31					4	U	4.1	U	4.4	U	4	U	3.7	U	3.8	U	4.2
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0	8.9	UJ	9.2	UJ	9.9	UJ	9	UJ	8.2	UJ	8.6	UJ	9.4
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0	150	J	120		190	J	160	J	180		160		120
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0	30	U	31	U	34	U	31	U	28	U	29	U	32
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	100	J	79	J	190	JN	98	JN	100	J	100	J	87
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0	25	U	26	U	28	U	25	U	23	U	24	U	26
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1	140	U	140	U	160	U	140	U	130	U	130	U	150
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0	270	U	280	U	300	U	270	U	250	U	260	U	280
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0	290	J	130	JN	350	JN	180		230		180		160
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	6.1	U	6.3	U	6.8	U	6.2	U	5.6	U	5.9	U	6.5
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0					91	U					89	U	
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0					99	U					97	U	
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0							88	U					86	U	
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0					97	U					94	U	
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0					170	U					170	U	
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0					170	U					170	U	
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0					170	U					160	U	
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0					190	U					180	U	
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0					420	U					410	U	
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1					96	U					260	J	
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0					89	U					87	U	
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0					98	U					96	U	
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0					180	U					180	U	
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0					100	U					100	U	
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0					220	U					220	U	
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0					84	U					82	U	
2-Nitrophenol	UG/KG	0				0%	0	29									190	U					180	U	
3 or 4-Methylphenol	UG/KG	0				0%	0	19									210	U					200	U	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0					130	U					120	U	
3-Nitroaniline	UG/KG	0				0%	0	29									100	U					100	U	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0					380	U					370	U	
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29									96	U					93	U	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0					190	U					180	U	
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0					130	U					130	U	
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29									88	U					86	U	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0					150	U					150	U	
4-Nitrophenol	UG/KG	0				0%	0	29									350	U					340	U	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0					73	U					71	U	
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0							79	U					77	U	
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0					95	U					92	U	
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0					97	U					94	U	
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0					100	U					100	U	
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0					150	U					150	U	
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0							120	UJ					110	UJ	
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0					94	U					91	U	
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0					110	U					100	U	
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0					91	U					89	U	
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0					100	U					98	U	
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0					110	U					110	U	
Butylbenzylphthalate	UG/KG	0				0%	0	29									100	U					100	U	
Carbazole	UG/KG	0				0%	0	29									120	U					120	U	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0					110	U					100	U	
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0					140	U					140	U	
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0					89	U					87	U	
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0					90	U					88	U	
Dimethylphthalate	UG/KG	0				0%	0	29									88	U					86	U	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0					110	U					330	J	
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0					240	U					230	U	
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0					120	U					120	U	
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0					91	U					89	U	
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0					92	U					90	U	
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0					94	U					91	U	
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0					92	U					90	U	
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0					110	U					100	U	
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0					140	U					130	U	
Isophorone	UG/KG	0				0%	0	29			570,000	0					84	U					82	U	
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0					98	U					96	U	
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0					100	U					100	U	
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0					250	U					240	U	
N-Nitrosodipropylamine	UG/KG	0				0%	0	19									94	U					91	U	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0					270	UJ					260	UJ	
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0							94	U					91	U	
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0					180	U					170	U	
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0					110	U					110	U	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0					0.23	U					0.2	U	
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0					1.2	J					0.95	J	
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0					1.2	J					1.1	J	
Aldrin	UG/KG	0				0%	0	19	680	0	39	0					0.33	U					0.28	U	
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0					0.4	U					0.34	U	
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0							0.24	U					0.21	U	
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0					0.38	U					0.33	U	
Delta-BHC	UG/KG	0				0%	0	19	500,000	0							0.37	U					0.32	U	
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0					0.96	J					0.22	U	
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0							1	J					0.24	UJ	
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0							0.4	UJ					0.34	UJ	
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0							0.68	U					0.58	U	
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0					0.99	U					0.84	U	
Endrin aldehyde	UG/KG	0				0%	0	19									0.57	U					0.49	U	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19									0.47	U					0.4	U	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0					0.31	U					0.27	U	
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19									0.27	U					0.75	J	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0					0.34	U					0.29	U	
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0					0.26	U					0.22	U	
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0					0.58	U					0.5	U	
Toxaphene	UG/KG	0				0%	0	19			490	0					8.2	U					7	U	
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0					7	U					6	U	
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0					16	U					14	U	
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0					11	U					9.2	U	
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0					6.8	U					5.8	U	
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0					7.1	U					6.1	U	
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1					5.5	U					4.7	U	
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0					7	U					6	U	
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-12-01		S45-ODH-13-01		S45-ODH-14-01		S45-ODH-15-01		S45-ODH-16-01		S45-ODH-17-01		S45-ODH-18-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75	16,500		19,000		23,600		19,400		17,100		16,000		14,400
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	0.2	UJ	0.89	UJ	0.19	UJ	0.19	UJ	0.18	UJ	0.15	UJ	0.76
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	6.2	J	4.7	J	4.6	J	4.7	J	4.9	J	4.9	J	4
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	189		171		182		222		161		160		138
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	0.73		0.85		0.8		0.83		0.78		0.71		0.65
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	6.3		7.8		7.4		8.6		5		4.7		4.8
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					19,400		31,400		26,700		25,300		22,200		26,000		27,600
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			30.1		27.8		30.5		32.4		25.9		25.3		22
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	10.8		11.2		12.6		12.3		12.6		11.2		9
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	314		515		633		537		209		393		323
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	27,700		26,300		26,500		27,200		24,200		24,700		21,800
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1	43.1		51.7		56.7		67.8		38.4		54.8		41.5
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					5,860		7,710		7,000		6,760		6,260		6,220		6,830
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	655		590		624		627		653		555		458
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49	3.7		1.6		4.4		2		1.4		6.6		3.4
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	37.8		36.6		39.6		41.8		35		35.1		31.4
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					2,400	R	3,320	R	2,980	R	2,960	R	2,550	R	2,460	R	2,310
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	0.43	U	0.24	U	0.43	U	0.42	U	0.4	U	0.32	U	0.21
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	3	U	3.6		3.5		3.5		2.8	U	2.6		2.6
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					103	J	128	J	135	J	125	J	115	J	106	J	116
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	0.18	U	0.1	J	0.18	U	0.18	U	0.17	U	0.14	U	0.2
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	25.9		31.7		29.8		29.6		27.6		27.7		23.7
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	225		314		312		321		291		356		290
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODH-19-01		S45-ODH-19-01		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-ODH-19-01		S45-ODH-19-01D		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0		18	U	18	U							17	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0		14	U	14	U							13	U
2,4-D	UG/KG	0				0%	0	29			70,000	0		36	U	35	U							34	U
2,4-DB	UG/KG	0				0%	0	29			190,000	0		26	U	26	U							25	U
Dalapon	UG/KG	0				0%	0	29			190,000	0		9.2	U	9.1	U							8.7	U
Dicamba	UG/KG	0				0%	0	29			190,000	0		12	U	12	U							12	U
Dichloroprop	UG/KG	0				0%	0	29						21	U	21	U							20	U
Dinoseb	UG/KG	0				0%	0	29			6,300	0		2.9	U	2.8	U							2.7	U
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2		2,600	U	2,600	U							2,400	U
MCPP	UG/KG	0				0%	0	29			6,300	0		2,500	U	2,400	U							2,300	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area															SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID															S45-ODH-19-01		S45-ODH-19-01		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Matrix															SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID															S45-ODH-19-01		S45-ODH-19-01D		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Sample Depth Interval (FT)															0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date															3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	
QC Type															SA		DU		SA		SA		SA		SA	
Study ID															OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered															Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual		Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																										
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	U		56	J	60	JN	100	U	79	JN	49	JN	62	JN
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	U		7.3	U	6.5	U	6	U	6.1	U	6.1	U	7.5	U
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	J		59	J	50	JN	51	J	29	JN	36	JN	45	JN
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0			150		100	J	220		99		120		83	J
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	U		32	U	28	U	28	U	26	U	26	U	33	U
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0			190	J	220		130	J	130	J	140		160	J
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0	U		14	U	13	U	13	U	12	U	12	U	14	U
3,5-Dinitroaniline	UG/KG	0				0%	0	31					U		4.2	U	3.7	U	3.7	U	3.4	U	3.5	U	4.3	U
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0	UJ		9.3	UJ	8.3	UJ	8.3	U	7.7	UJ	7.8	UJ	9.6	UJ
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0			180		220		120		130		140		150	J
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0	U		32	U	28	U	28	U	26	U	26	U	33	U
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	JN		180	J	92	J	68	JN	100	J	120	J	110	JN
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0	U		26	U	23	U	23	U	21	U	22	U	27	U
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1	U		1,500	J	130	U	130	U	120	U	120	U	150	U
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0	U		280	U	250	U	250	U	230	U	240	U	290	U
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0			540	J	200	J	140		180		220		210	
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	U		6.4	U	5.7	U	5.7	U	5.3	U	5.3	U	6.6	U
Semivolatile Organic Compounds																										
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0			94	U	87	U							93	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0			100	U	94	U							100	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0					91	U	84	U							89	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0			100	U	92	U							98	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																		
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0			180	U	170	U							180	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0			180	U	170	U							180	U
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0			180	U	160	U							170	U
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0			190	U	180	U							190	U
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0			440	U	400	U							430	U
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1			280	J	91	U							97	U
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0			92	U	85	U							90	U
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0			100	U	93	U							100	U
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0			190	U	180	U							190	U
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0			110	U	99	U							100	U
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0			230	U	210	U							230	U
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0			88	U	80	U							86	U
2-Nitrophenol	UG/KG	0				0%	0	29							190	U	180	U							190	U
3 or 4-Methylphenol	UG/KG	0				0%	0	19							220	U	200	U							210	U
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0			130	U	120	U							130	U
3-Nitroaniline	UG/KG	0				0%	0	29							110	U	100	U							110	U
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0			390	U	360	U							390	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29							99	U	91	U							97	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0			190	U	180	U							190	U
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0			140	U	130	U							140	U
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29							91	U	84	U							89	U
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0														
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0			160	U	140	U							150	U
4-Nitrophenol	UG/KG	0				0%	0	29							360	U	330	U							350	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODH-19-01		S45-ODH-19-01		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-ODH-19-01		S45-ODH-19-01D		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0		76	U	70	U							74	U
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0				82	U	75	U							80	U
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0		98	U	90	U							96	U
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0		100	U	92	U							98	U
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0		110	U	100	U							110	U
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0		160	U	140	U							150	U
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0				120	UJ	110	UJ							120	UJ
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0		97	U	89	U							95	U
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0		110	U	100	U							110	U
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0		94	U	87	U							93	U
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0		100	U	96	U							100	U
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0		110	U	100	U							110	U
Butylbenzylphthalate	UG/KG	0				0%	0	29						110	U	100	U							110	U
Carbazole	UG/KG	0				0%	0	29						130	U	120	U							130	U
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0		110	U	100	U							110	U
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0		150	U	140	U							150	U
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0		92	U	85	U							90	U
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0		93	U	86	U							92	U
Dimethylphthalate	UG/KG	0				0%	0	29						91	U	84	U							89	U
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0		120	U	110	U							120	U
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0		250	U	230	U							240	U
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0		120	U	110	U							120	U
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0		94	U	87	U							93	U
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0		96	U	88	U							94	U
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0		97	U	89	U							95	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0		96	U	88	U							94	U
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0		110	U	100	U							110	U
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0		140	U	130	U							140	U
Isophorone	UG/KG	0				0%	0	29			570,000	0		88	U	80	U							86	U
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0		100	U	93	U							100	U
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0		110	U	98	U							100	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0		260	U	240	U							250	U
N-Nitrosodipropylamine	UG/KG	0				0%	0	19						97	U	89	U							95	U
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0		280	UJ	250	UJ							270	UJ
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0				97	U	89	U							95	U
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0		180	U	170	U							180	U
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0		120	U	110	U							120	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODH-19-01		S45-ODH-19-01		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-ODH-19-01		S45-ODH-19-01D		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0		1.4	J	0.22	U							0.22	U
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0		2	J	1.6	J							0.21	U
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0		1.9	J	1.2	J							0.34	U
Aldrin	UG/KG	0				0%	0	19	680	0	39	0		0.33	U	0.31	U							0.31	U
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0		0.4	U	0.38	U							0.38	U
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0				0.24	U	0.24	U							0.23	U
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0		0.39	U	0.37	U							0.36	U
Delta-BHC	UG/KG	0				0%	0	19	500,000	0				0.37	U	0.36	U							0.35	U
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0		0.26	U	0.25	U							0.24	U
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0				1.6	J	1.2	J							0.26	UJ
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0				0.4	UJ	0.88	JN							0.38	UJ
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0				0.68	U	0.65	U							0.64	U
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0		1	U	0.95	U							0.94	U
Endrin aldehyde	UG/KG	0				0%	0	19						0.57	U	0.55	U							0.54	U
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19						0.47	U	0.45	U							0.44	U
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0		0.32	U	0.3	U							0.3	U
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19						0.27	U	0.26	U							0.25	U
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0		0.34	U	0.32	U							0.32	U
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0		0.26	U	0.25	U							0.24	U
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0		0.58	U	0.56	U							45	
Toxaphene	UG/KG	0				0%	0	19			490	0		8.2	U	7.8	U							7.7	U
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0		7	U	6.7	U							6.6	U
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0		16	U	16	U							15	U
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0		11	U	10	U							10	U
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0		6.8	U	6.5	U							6.4	U
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0		7.1	U	6.8	U							6.6	U
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1		5.5	U	5.3	U							2,000	
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0		7	U	6.7	U							6.6	U
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODH-19-01		S45-ODH-19-01		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-ODH-19-01		S45-ODH-19-01D		S45-ODH-20-01		S45-ODH-2-01		S45-ODH-3-01		S45-ODH-4-01	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		17,500		16,600		18,000		17,500		17,200		15,000	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	UJ	0.21	UJ	1.6	J	1.3	UJ	0.19	UJ	0.2	UJ	0.47	UJ
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	J	5.6	J	7.3	J	5.3	J	12.4	J	11	J	12.6	J
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0		176		203		150		190		179		220	
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0		0.8		0.79		0.79		0.78		0.77		0.67	
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30		**10.1**		**10.6**		7.4		8.7		8.6		**1,100**	
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76						24,400	J	18,600		22,900		26,600		43,900		23,200	
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0				28.8		32		30		29.9		29.8		37.8	
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76		14.2		14.9		12.7		12		12.9		14	
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36		**411**	**J**	**536**		**434**		**433**		**477**		**1,780**	
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76		35,100		44,700		27,900		34,200		29,600		118,000	
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		81.4	J	74.9		50.8		56.3		59.9		57.2	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76						6,430		6,180		7,310		6,720		6,410		5,680	
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76		581	J	1,080	J	580		610		642		648	
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		**3.3**		**3.6**		**3.5**		**4.3**		**4.3**		**3.1**	
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0		41.9		49.6		41.3		41.2		39.5		46.2	
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					R	2,720	R	2,430	R	2,580	R	2,850	R	2,850	R	2,160	R
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.56	J	0.36	U	0.35	U	0.42	U	0.45	U	1.03	U
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1		3.3		4		3.8		3.4		4		205	
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					J	114	J	103	J	107	J	110	J	110	J	103	J
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	J	0.2	U	0.15	U	0.15	U	0.18	U	0.19	U	0.44	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2		27.4		26.9		28.7		28.5		28.7		24.4	
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0		369		330		299		327		368		1,270	
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID														S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID														S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/16/2010		3/16/2010
QC Type														SA		SA		SA		SA		SA		SA		SA
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																										
Filtered														Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above		Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																										
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0														
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0														
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0														
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0														
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0														
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0														
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0																
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0														
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0														
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0														
Bromodichloromethane	UG/KG	0				0%	0	10			290	0														
Bromoform	UG/KG	0				0%	0	10			19,000	0														
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0														
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0														
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0														
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0														
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0														
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0														
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																		
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0														
Methyl bromide	UG/KG	0				0%	0	10			680	0														
Methyl butyl ketone	UG/KG	0				0%	0	10																		
Methyl chloride	UG/KG	0				0%	0	10			11,000	0														
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0														
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0														
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0														
Styrene	UG/KG	0				0%	0	10			600,000	0														
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0														
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0														
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0														
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																		
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0														
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0														
Herbicides																										
2,4,5-T	UG/KG	0				0%	0	29			63,000	0		19	U											
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0		15	U					17	U					
2,4-D	UG/KG	0				0%	0	29			70,000	0		38	U					35	U					
2,4-DB	UG/KG	0				0%	0	29			190,000	0		28	U					25	U					
Dalapon	UG/KG	0				0%	0	29			190,000	0		9.7	U					9	U					
Dicamba	UG/KG	0				0%	0	29			190,000	0		13	U					12	U					
Dichloroprop	UG/KG	0				0%	0	29						22	U					20	U					
Dinoseb	UG/KG	0				0%	0	29			6,300	0		3	U					2.8	UJ					
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2		2,700	U					2,500	U					
MCPP	UG/KG	0				0%	0	29			6,300	0		2,600	U					2,400	U					

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/16/2010		3/16/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	57	JN	46	J	65	JN	60	JN	68	J			
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	6.8	U	7.2	U	7.7	U	5.7	U	7.1	U			
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	40	JN	39	JN	49	JN	51	J	47	J			
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0	100	J	64	J	91	J	86	J	110	J			
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	29	U	31	U	34	U	25	U	31	U			
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0	160	J	99	J	190	J	180		220				
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0	13	U	14	U	15	U	11	U	14	U			
3,5-Dinitroaniline	UG/KG	0				0%	0	31					3.8	U	4.1	U	4.4	U	3.2	U	4	U			
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0	8.6	UJ	9.1	UJ	9.8	UJ	7.2	UJ	9	UJ			
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0	160	J	94	J	160	J	160		220				
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0	29	U	31	U	34	U	25	U	31	U			
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	120	J	120	U	150	J	150		190				
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0	24	U	25	U	27	U	20	U	25	U			
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1	140	U	140	U	150	U	110	U	140	U			
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0	260	U	280	U	300	U	220	U	270	U			
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0	210		120	J	310		340		420				
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	5.9	U	6.2	U	6.7	U	5	U	6.2	U			
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0			98	U			93	U					
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0			100	U			100	U					
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0					94	U			89	U					
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0			100	U			98	U					
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0			190	U			180	U					
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0			190	U			180	U					
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0			180	U			170	U					
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0			200	U			190	U					
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0			450	U			430	U					
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1			100	U			97	U					
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0			95	U			90	U					
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0			100	U			99	U					
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0			200	U			190	U					
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0			110	U			100	U					
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0			240	U			230	U					
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0			90	U			86	U					
2-Nitrophenol	UG/KG	0				0%	0	29							200	U			190	U					
3 or 4-Methylphenol	UG/KG	0				0%	0	19							220	U			210	U					
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0			140	U			130	U					
3-Nitroaniline	UG/KG	0				0%	0	29							110	U			110	U					
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0			400	U			380	U					
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29							100	U			97	U					
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0			200	U			190	U					
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0			140	U			140	U					
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29							94	U			89	U					
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0			160	U			150	U					
4-Nitrophenol	UG/KG	0				0%	0	29							370	U			350	U					

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/16/2010		3/16/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0			78	U			74	U					
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0					84	U			80	U					
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0			100	U			96	U					
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0			100	U			98	U					
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0			110	U			110	U					
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0			160	U			150	U					
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0					120	UJ			120	UJ					
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0			100	U			95	U					
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0			120	U			110	U					
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0			98	U			93	U					
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0			110	U			100	U					
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0			120	U			110	U					
Butylbenzylphthalate	UG/KG	0				0%	0	29							110	U			110	U					
Carbazole	UG/KG	0				0%	0	29							130	U			130	U					
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0			110	U			130	J					
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0			150	U			150	U					
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0			95	U			90	U					
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0			96	U			91	U					
Dimethylphthalate	UG/KG	0				0%	0	29							94	U			89	U					
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0			120	U			120	U					
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0			250	U			240	U					
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0			130	U			120	U					
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0			98	U			93	U					
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0			99	U			94	U					
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0			100	U			95	U					
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0			99	U			94	U					
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0			120	U			110	U					
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0			150	U			140	U					
Isophorone	UG/KG	0				0%	0	29			570,000	0			90	U			86	U					
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0			100	U			99	U					
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0			110	U			100	U					
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0			260	U			250	U					
N-Nitrosodipropylamine	UG/KG	0				0%	0	19							100	U			95	U					
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0			280	UJ			270	UJ					
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0					100	U			95	U					
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0			190	U			180	U					
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0			120	U			120	U					

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/16/2010		3/16/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0			0.24	U			0.23	U					
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0			0.89	J			1.1	J					
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0			0.88	J			1.1	J					
Aldrin	UG/KG	0				0%	0	19	680	0	39	0			0.34	U			0.33	U					
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0			0.41	U			0.4	U					
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0					0.25	U			0.25	U					
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0			0.4	U			0.39	U					
Delta-BHC	UG/KG	0				0%	0	19	500,000	0					0.38	U			0.38	U					
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0			0.84	J			0.87	J					
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0					0.79	J			1	J					
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0					0.41	UJ			0.4	UJ					
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0					0.7	U			0.68	U					
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0			1	U			1	U					
Endrin aldehyde	UG/KG	0				0%	0	19							0.59	U			0.57	U					
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19							0.48	U			0.47	U					
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0			0.32	U			0.32	U					
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19							0.28	U			0.27	U					
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0			0.35	U			0.34	U					
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0			0.26	U			0.26	U					
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0			0.6	U			0.59	U					
Toxaphene	UG/KG	0				0%	0	19			490	0			8.4	U			8.2	U					
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0			7.2	U			7	U					
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0			17	U			16	U					
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0			11	U			11	U					
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0			7	U			6.8	U					
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0			7.3	U			7.2	U					
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1			5.6	U			5.5	U					
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0			7.2	U			7	U					
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-ODH-5-01		S45-ODH-6-01		S45-ODH-7-01		S45-ODH-8-01		S45-ODH-9-01		S45-R10-01		S45-R10-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/16/2010		3/16/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75	19,400		18,000		22,200		17,700		20,300		20,700		22,100
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	0.2	UJ	0.19	UJ	0.28	J	0.2	UJ	0.22	UJ	0.12	UJ	0.13
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	5.6	J	4.6	J	4.8	J	4.9	J	5.5	J	5.3		5.1
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	194		163		174		187		266		141	J	109
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	0.86		0.8		0.82		0.81		0.88		0.87	J	0.88
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	7.5		6.9		8		8.9		8		1	J	1.3
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					23,400		25,500		24,500		23,300		22,800		3,790	J	2,750
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			29.7		28		40.8		30.9		30.8		24.1	J	29.6
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	12.3		11.9		10.6		14		12.4		8.9	J	9.9
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	411		4,180		648		442		490		32.8		47.2
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	27,200		24,700		25,900		28,000		27,700		22,500	J	24,900
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1	61.9		217		59.3		61.2		62.5		19.4	J	46.4
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					7,010		7,190		6,420		6,870		7,090		4,320	J	4,480
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	618		582		557		710		601		682	J	256
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49	4.3		3.6		6		3		3.6		0.38		0.28
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	41.2		37		36.1		43.4		40.9		23.5	J	32.2
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					3,410	R	3,190	R	3,200	R	2,700	R	3,440	R	2,920	J	3,400
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	0.44	U	0.41	U	0.23	U	0.45	U	0.73	J	0.26	U	0.28
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	3.2		2.8	U	3.8		3.4		4		0.08	U	0.18
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					116	J	121	J	120	J	110	J	135	J	138		130
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	0.19	U	0.17	U	0.1	U	0.19	U	0.2	U	0.11	U	1.9
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	31.7		29.4		28.4		27.8		32.5		33.3	J	37.8
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	337		319		433		356		357		85.6	J	140
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

E (or ER) = Estimated result.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

D = Results from dilution of sample.

R = Rejected, data validation rejected the results.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U = non-detect, i.e. not detected at or above this value.

JN = Tentatively identified compound, estimated concentration.

U-DL = Elevated sample detection limit due to difficult sample matrix.

UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

J+ = The result is an estimated quantity, but the result may be biased high.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ######
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R10-03		S45-R10-03		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R10-03		S45-R10-03D		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0													
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0													
2,4-D	UG/KG	0				0%	0	29			70,000	0													
2,4-DB	UG/KG	0				0%	0	29			190,000	0													
Dalapon	UG/KG	0				0%	0	29			190,000	0													
Dicamba	UG/KG	0				0%	0	29			190,000	0													
Dichloroprop	UG/KG	0				0%	0	29																	
Dinoseb	UG/KG	0				0%	0	29			6,300	0													
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2													
MCPP	UG/KG	0				0%	0	29			6,300	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R10-03		S45-R10-03		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R10-03		S45-R10-03D		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0													
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0													
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0													
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0													
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0													
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0													
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0													
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0													
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0													
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0													
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0													
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0													
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0															
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0													
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0													
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0													
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0													
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0													
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0													
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1													
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0													
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0													
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0													
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0													
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0													
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0													
2-Nitrophenol	UG/KG	0				0%	0	29																	
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0													
3-Nitroaniline	UG/KG	0				0%	0	29																	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0													
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0													
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0													
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0													
4-Nitrophenol	UG/KG	0				0%	0	29																	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R10-03		S45-R10-03		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R10-03		S45-R10-03D		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0													
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0															
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0													
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0													
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0													
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0													
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0															
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0													
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0													
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0													
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0													
Butylbenzylphthalate	UG/KG	0				0%	0	29																	
Carbazole	UG/KG	0				0%	0	29																	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0													
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0													
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0													
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0													
Dimethylphthalate	UG/KG	0				0%	0	29																	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0													
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0													
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0													
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0													
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0													
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0													
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0													
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0													
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0													
Isophorone	UG/KG	0				0%	0	29			570,000	0													
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0													
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0													
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0													
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0													
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0															
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0													
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R10-03		S45-R10-03		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R10-03		S45-R10-03D		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0													
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0													
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0													
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1													
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0													
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R10-03		S45-R10-03		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R10-03		S45-R10-03D		S45-R10-04		S45-R10-05		S45-R10-06		S45-R10-07	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		18,100		16,700		19,100		19,900		17,400		16,500	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	UJ	0.88	J	2.4		0.09	UJ	0.14	UJ	0.11	UJ	1.8	J
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76		5.1		5		4.8		4.6		4		4.5	
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	J	167	J	256	J	108	J	134	J	107	J	263	J
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	J	0.8	J	0.76	J	0.77	J	0.86	J	0.68	J	0.76	J
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	U	1.8		1.6	U	0.96	U	1.4	U	1.2	U	1.6	U
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					J	27,800	J	28,500	J	2,840	J	4,100	J	3,700	J	14,500	J
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			J	31.4	J	29.2	J	23.9	J	25.5	J	22.4	J	29.2	J
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	J	12.4	J	12.5	J	10.5	J	9.6	J	7.7	J	12.1	J
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	J	92.6	J	132		24.9	J	44.7	J	64	J	129	J
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	J	28,300	J	28,800	J	21,900	J	22,700	J	20,500	J	27,500	J
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		123		189		21.7		25.2		35.4		198	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					J	7,560	J	6,880	J	3,630	J	4,050	J	3,650	J	6,640	J
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	J	437	J	436	J	999	J	627	J	446	J	393	J
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		0.79		1		0.17		0.45		0.71		0.38	
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	J	49.7	J	46.9	J	21.6	J	27.1	J	21.4	J	47.4	J
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					J	2,950	J	2,610	J	2,580	J	3,250	J	2,320	J	2,400	J
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.38	U	0.34	U	0.21	U	0.3	U	0.25	U	0.92	J
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	J	0.11	U	0.1	U	0.06	U	0.09	U	0.08	U	0.11	U
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					U	126		110		96	U	140	U	120	U	97.1	
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	U	2.6	U	0.14	U	0.09	U	0.13	U	0.11	U	2.4	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	J	26.9	J	25.3	J	32.4	J	33	J	29.6	J	24.5	J
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	J	185	J	298		85.7	J	130	J	136	J	237	J
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1, 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/15/2010		3/16/2010
QC Type													SA		SA		SA		SA		DU		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0													
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0													
2,4-D	UG/KG	0				0%	0	29			70,000	0													
2,4-DB	UG/KG	0				0%	0	29			190,000	0													
Dalapon	UG/KG	0				0%	0	29			190,000	0													
Dicamba	UG/KG	0				0%	0	29			190,000	0													
Dichloroprop	UG/KG	0				0%	0	29																	
Dinoseb	UG/KG	0				0%	0	29			6,300	0													
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2													
MCPP	UG/KG	0				0%	0	29			6,300	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/15/2010		3/16/2010
QC Type													SA		SA		SA		SA		DU		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0													
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0													
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0													
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0													
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0													
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0													
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0													
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0													
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0													
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0													
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0													
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0													
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0															
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0													
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0													
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0													
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0													
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0													
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0													
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1													
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0													
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0													
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0													
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0													
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0													
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0													
2-Nitrophenol	UG/KG	0				0%	0	29																	
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0													
3-Nitroaniline	UG/KG	0				0%	0	29																	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0													
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0													
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0													
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0													
4-Nitrophenol	UG/KG	0				0%	0	29																	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/15/2010		3/16/2010
QC Type													SA		SA		SA		SA		DU		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0													
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0															
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0													
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0													
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0													
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0													
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0															
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0													
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0													
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0													
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0													
Butylbenzylphthalate	UG/KG	0				0%	0	29																	
Carbazole	UG/KG	0				0%	0	29																	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0													
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0													
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0													
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0													
Dimethylphthalate	UG/KG	0				0%	0	29																	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0													
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0													
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0													
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0													
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0													
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0													
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0													
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0													
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0													
Isophorone	UG/KG	0				0%	0	29			570,000	0													
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0													
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0													
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0													
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0													
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0															
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0													
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/15/2010		3/16/2010
QC Type													SA		SA		SA		DU		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0													
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0													
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0													
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1													
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0													
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R1-01		S45-R1-02		S45-R1-03		S45-R1-04		S45-R1-04D		S45-R15-01		S45-R15-02
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/15/2010		3/16/2010
QC Type													SA		SA		SA		SA		DU		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75	17,200		16,200		18,200		16,800		20,200		19,900		25,000
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	0.52	J	0.64	J	0.65	J	0.81	J	0.37	J	0.25	UJ	0.12
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	5.9		5.1		5.5		4.9		5.5		7.6		5.4
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	259		150		168		161		182		287	J	175
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	0.75		0.72		0.81		0.89	U	0.85		1	J	1
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	7.6		7.7		8.2		7.9		8.1		2.6	U	1.2
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					23,200		26,900		21,700		40,600	U	22,000		3,630	J	4,370
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			35.3		27.4		30.3		27		30.7		24.6	J	30.8
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	12.2		12.3		12.7		11.4		12.2		26.8	J	10
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	475		794		478		467		433		22.8	J	25.6
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	31,400		25,200		25,800		26,700		28,100		35,300	J	26,200
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1	54.7		69.2		62.2		63.8		58		22		26.6
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					6,460		7,910		6,520		6,890		6,920		4,080	J	4,460
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	657		676		664		557		561		5,040	J	552
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49	5.5		3.5		3.5		3.1		4.4		0.21		0.1
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	43		39.6		41.8		37		40.5		29.8	J	27.1
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					2,590		2,450		2,690		2,600		3,370		2,780	J	3,850
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	1.7	U	0.7	U	0.75	U	0.7	U	0.85	U	0.56	U	0.27
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	4.4		3.2		4		3.9		3.2	J	0.17	U	0.08
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					86	U	89	U	95.6		93.3		86.8	J	130	U	120
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	0.28	U	0.29	U	0.32	U	0.3	U	0.36	U	0.24	U	0.12
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	28.5		27.3		29.8		28.3		32.8		30.7	J	41.9
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	319		1,350		328		404		347		101	J	104
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/17/2010		3/15/2010		3/15/2010		3/15/2010		4/1/2010		4/1/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0													
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0													
2,4-D	UG/KG	0				0%	0	29			70,000	0													
2,4-DB	UG/KG	0				0%	0	29			190,000	0													
Dalapon	UG/KG	0				0%	0	29			190,000	0													
Dicamba	UG/KG	0				0%	0	29			190,000	0													
Dichloroprop	UG/KG	0				0%	0	29																	
Dinoseb	UG/KG	0				0%	0	29			6,300	0													
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2													
MCPP	UG/KG	0				0%	0	29			6,300	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/17/2010		3/15/2010		3/15/2010		3/15/2010		4/1/2010		4/1/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0													
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0													
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0													
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0													
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0													
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0													
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0													
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0													
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0													
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0													
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0													
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0													
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0															
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0													
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0													
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0													
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0													
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0													
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0													
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1													
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0													
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0													
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0													
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0													
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0													
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0													
2-Nitrophenol	UG/KG	0				0%	0	29																	
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0													
3-Nitroaniline	UG/KG	0				0%	0	29																	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0													
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0													
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0													
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0													
4-Nitrophenol	UG/KG	0				0%	0	29																	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/17/2010		3/15/2010		3/15/2010		3/15/2010		4/1/2010		4/1/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0													
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0															
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0													
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0													
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0													
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0													
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0															
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0													
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0													
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0													
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0													
Butylbenzylphthalate	UG/KG	0				0%	0	29																	
Carbazole	UG/KG	0				0%	0	29																	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0													
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0													
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0													
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0													
Dimethylphthalate	UG/KG	0				0%	0	29																	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0													
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0													
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0													
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0													
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0													
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0													
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0													
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0													
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0													
Isophorone	UG/KG	0				0%	0	29			570,000	0													
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0													
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0													
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0													
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0													
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0															
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0													
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/17/2010		3/15/2010		3/15/2010		3/15/2010		4/1/2010		4/1/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0													
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0													
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0													
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1													
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0													
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R15-03		S45-R15-04		S45-R15-05		S45-R15-06		S45-R2-01		S45-R2-02	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														3/17/2010		3/15/2010		3/15/2010		3/15/2010		4/1/2010		4/1/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		14,200	J	18,700		17,000		20,700		17,800		17,700	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	UJ	0.41	UJ	0.1	UJ	0.09	UJ	0.12	UJ	0.26	J	0.62	J
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76		4.9	J	4.8		3.9		5.1		6.3		5.4	
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	J	55.4	J	108	J	107	J	135	J	144		164	
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	J	0.65	J	0.85	J	0.77	J	1	J	0.77		0.86	
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	U	4.1	UJ	0.98	U	0.94	U	1.2	U	4.2		9.1	
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					J	9,010	J	2,150	J	3,560	J	2,340	J	28,100		20,800	
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			J	26.6	J	24.2	J	23.3	J	27.5	J	27.2		27.7	
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	J	12.1	J	10.1	J	9.1	J	12.9	J	12		11.8	
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	J	43.1	J	20	J	23.4	J	23.3	J	192		**462**	
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	J	26,000	J	22,500	J	20,400	J	24,000	J	24,400		27,600	
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		53.2	J	20.6		22.8		27.9		50		72.3	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					J	6,180	J	3,770	J	3,800	J	4,210	J	7,290		6,560	
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	J	328	J	735	J	466	J	1,080	J	581		618	
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		0.1	J	0.06		0.09		0.1		1.2		**3**	
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	J	52.1	J	24.8	J	29.4	J	32.7	J	39.9		39.8	
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					J	2,140	J	2,740	J	2,780	J	3,410	J	2,540		2,920	
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.9	UJ	0.21	U	0.21	U	0.26	U	0.59	U	0.72	U
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	U	0.27	UJ	0.06	U	0.06	U	0.08	U	1.4	J	3.6	
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					U	82	UJ	98	U	94	U	120	U	99.2		92	U
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	U	0.38	UJ	0.09	U	0.09	U	0.11	U	0.25	U	0.3	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	J	22.5	J	31.3	J	27.1	J	33.8	J	29.7		30.9	
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	J	114	J	76	J	80	J	114	J	382		321	
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value.	####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1).	###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1) 2018-05.	###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0													
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0													
2,4-D	UG/KG	0				0%	0	29			70,000	0													
2,4-DB	UG/KG	0				0%	0	29			190,000	0													
Dalapon	UG/KG	0				0%	0	29			190,000	0													
Dicamba	UG/KG	0				0%	0	29			190,000	0													
Dichloroprop	UG/KG	0				0%	0	29																	
Dinoseb	UG/KG	0				0%	0	29			6,300	0													
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2													
MCPP	UG/KG	0				0%	0	29			6,300	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0													
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0													
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0													
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0													
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0													
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0													
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0													
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0													
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0													
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0													
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0													
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0													
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0															
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0													
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0													
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0													
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0													
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0													
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0													
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1													
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0													
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0													
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0													
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0													
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0													
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0													
2-Nitrophenol	UG/KG	0				0%	0	29																	
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0													
3-Nitroaniline	UG/KG	0				0%	0	29																	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0													
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0													
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0													
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29																	
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0													
4-Nitrophenol	UG/KG	0				0%	0	29																	

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0													
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0															
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0													
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0													
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0													
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0													
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0															
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0													
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0													
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0													
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0													
Butylbenzylphthalate	UG/KG	0				0%	0	29																	
Carbazole	UG/KG	0				0%	0	29																	
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0													
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0													
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0													
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0													
Dimethylphthalate	UG/KG	0				0%	0	29																	
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0													
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0													
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0													
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0													
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0													
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0													
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0													
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0													
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0													
Isophorone	UG/KG	0				0%	0	29			570,000	0													
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0													
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0													
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0													
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0													
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0															
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0													
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0													
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0													
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0													
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0													
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1													
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0													
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R2-03		S45-R2-04		S45-R3-01		S45-R3-02		S45-R3-03		S45-R3-04		S45-R4-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010		4/1/2010
QC Type													SA		SA		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75	19,000		17,900		20,800		16,800		24,600		18,500		19,000
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	0.98	J	0.32	J	0.24	J	0.87	J	0.68	J	0.13	U	0.18
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	5.1		5.2		5.7		5.2		5.1		4.2		5.7
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	166		150		140		194		205		122		140
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	0.83		0.78		0.78		0.72		1		0.78		0.88
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	6.6		6.4		6		8.3		8.2		1.1	U	1.6
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					16,900		22,300		32,600		36,400		18,400		8,950		13,200
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			28.6		29.3		27.9		27.4		35.4		24.7		28.4
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	12.3		11.7		12		10.8		12.6		9.8		10.9
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	217		364		284		233		429		41.3		82.6
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	26,600		26,500		25,300		25,400		29,100		22,900		24,000
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1	51		52.9		48.9		70.3		69.4		28.2		22.5
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					6,530		7,100		7,260		9,130		7,340		4,720		6,750
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	676		518		651		530		470		549		428
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49	3.1		5.3		1.7		6.4		4.2		2.2		1.4
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	40.1		41.4		37.4		38.3		46.6		28.9		37
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					3,240		2,920		2,980		2,550		4,020		2,260		2,970
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	0.81	U	0.69	U	1.7	U	0.76	U	0.9	U	0.45	U	0.63
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	2.5	J	3		0.82	J	1.9	J	3	J	0.29	J	0.42
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					77	J	90.2		92.2		120		93.7	J	66.2	J	81
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	0.34	U	0.29	U	0.28	U	0.32	U	0.38	U	0.19	U	0.27
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	31.7		28.6		30.2		27		38.9		30.8		33.6
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	274		324		392		588		421		91.2		160
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0								20	U			21	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0								16	U			17	U
2,4-D	UG/KG	0				0%	0	29			70,000	0								40	U			43	U
2,4-DB	UG/KG	0				0%	0	29			190,000	0								29	U			31	U
Dalapon	UG/KG	0				0%	0	29			190,000	0								10	U			11	U
Dicamba	UG/KG	0				0%	0	29			190,000	0								14	U			15	U
Dichloroprop	UG/KG	0				0%	0	29												23	U			25	U
Dinoseb	UG/KG	0				0%	0	29			6,300	0								3.2	UJ			3.4	UJ
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2								2,900	U			3,100	U
MCPP	UG/KG	0				0%	0	29			6,300	0								2,800	U			2,900	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area																								
Loc ID														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		
Matrix														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample ID														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample Depth Interval (FT)														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample Date														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
QC Type														4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010	
Study ID														SA		SA		SA		SA		SA		SA	
Sample Round														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Filtered																									
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)			Total		Total		Total		Total		Total		Total	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0								8.5	U			8	U
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0								7.9	U			7.4	U
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0								8.5	U			8	U
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0								19	U			18	U
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0								34	U			32	U
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0								27	U			25	U
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0								15	U			14	U
3,5-Dinitroaniline	UG/KG	0				0%	0	31												4.5	U			4.2	U
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0								10	UJ			9.5	UJ
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0								22	U			20	U
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0								34	U			32	U
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0								11	U			10	U
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0								28	U			26	U
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1								160	U			150	U
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0								300	U			290	U
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0								8.6	U			8.2	U
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0								6.9	UJ			6.5	UJ
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0								100	U			100	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0								110	U			110	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0										98	U			100	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0								110	U			110	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0								200	U			200	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0								200	UJ			200	UJ
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0								190	UJ			190	UJ
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0								210	UJ			210	UJ
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0								470	UJ			490	UJ
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1								110	U			110	U
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0								99	U			100	U
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0								110	UJ			110	UJ
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0								210	UJ			210	UJ
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0								120	U			120	U
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0								250	UJ			260	UJ
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0								94	U			97	U
2-Nitrophenol	UG/KG	0				0%	0	29												210	UJ			220	UJ
3 or 4-Methylphenol	UG/KG	0				0%	0	19												240	UJ			240	UJ
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0								140	UJ			150	UJ
3-Nitroaniline	UG/KG	0				0%	0	29												120	UJ			120	UJ
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0								420	U			440	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29												110	U			110	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0								210	U			220	U
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0								150	UJ			150	UJ
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29												98	U			100	U
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0								170	UJ			170	UJ
4-Nitrophenol	UG/KG	0				0%	0	29												390	U			400	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0								82	U			84	U
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0										88	U			91	U
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0								100	U			110	U
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0								110	U			110	U
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0								120	U			120	U
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0								170	U			170	U
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0										130	U			130	U
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0								100	U			110	U
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0								120	UJ			120	UJ
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0								100	U			100	U
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0								110	U			120	U
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0								120	U			130	U
Butylbenzylphthalate	UG/KG	0				0%	0	29												120	U			120	U
Carbazole	UG/KG	0				0%	0	29												140	U			140	U
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0								120	U			120	U
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0								160	U			170	U
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0								99	U			100	U
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0								100	U			100	U
Dimethylphthalate	UG/KG	0				0%	0	29												98	U			100	U
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0								130	U			130	U
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0								260	U			270	U
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0								130	U			140	U
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0								100	U			100	U
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0								100	U			110	U
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0								100	U			110	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0								100	UJ			110	UJ
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0								120	U			120	U
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0								150	U			160	U
Isophorone	UG/KG	0				0%	0	29			570,000	0								94	U			97	U
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,600	0								110	U			110	U
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0								110	U			120	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0								280	UJ			280	UJ
N-Nitrosodipropylamine	UG/KG	0				0%	0	19												100	U			110	U
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0								300	UJ			310	UJ
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0										100	U			110	U
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0								200	U			200	U
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0								130	U			130	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0								0.24	U			0.28	U
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0								1.6	J			1.7	J
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0								0.38	U			1.2	J
Aldrin	UG/KG	0				0%	0	19	680	0	39	0								0.34	U			0.38	U
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0								0.42	U			0.47	U
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0										0.26	U			0.29	U
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0								0.4	U			0.45	U
Delta-BHC	UG/KG	0				0%	0	19	500,000	0										0.39	U			0.44	U
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0								0.96	J			1.1	J
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0										23	J			1.3	JN
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0										0.42	UJ			0.47	UJ
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0										0.71	U			0.8	U
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0								1	U			1.2	U
Endrin aldehyde	UG/KG	0				0%	0	19												0.6	UJ			0.68	UJ
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19												0.49	U			0.55	U
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0								0.33	U			0.37	U
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19												0.28	U			0.32	U
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0								0.36	U			0.4	U
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0								0.27	U			0.3	U
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0								0.61	U			0.69	U
Toxaphene	UG/KG	0				0%	0	19			490	0								8.6	U			9.6	U
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0								7.4	U			8.3	U
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0								17	U			19	U
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0								11	U			13	U
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0								7.1	U			8	U
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0								7.5	U			8.4	U
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1								5.8	U			6.5	U
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0								7.4	U			8.3	U
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-R4-02		S45-R4-03		S45-R4-04		S45-R5-01		S45-R5-02		S45-R5-03	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6	
Sample Date														4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010	
QC Type														SA		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		21,300		19,400		5,910		17,200		16,700		18,900	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	U	0.42	J	0.11	U	2.2		0.14	J	3.1		0.15	U
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76		5		4.6		4		5		5.1		5.4	
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0		299		89.7		27.9		152	J	257	J	177	J
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0		0.81		0.69		0.43	U	0.74	J	0.71	J	0.85	J
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	U	4.1		1	U	0.86	U	6		3.3		6.4	
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76						40,500		2,900		193,000		31,200	J	17,100	J	20,600	J
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0				29.7		25.1		10.6		26.1	J	25.6	J	29.7	J
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76		11.4		9.4		9.5		11.1	J	10	J	13.4	J
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36		263		39.1		38.9		221		**289**		**350**	
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76		26,500		23,100		7,600		26,000	J	24,300	J	25,400	J
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		28.3		21		29.7		86.2		352		60	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76						7,880		4,460		15,000		7,210	J	6,870	J	7,260	J
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76		606		361		363		583	J	438	J	662	J
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		0.9		0.48		0.15		**3.7**		1.6		**4.7**	
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0		42.5		26.2		23.8		38.1	J	32.5	J	40.1	J
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55						2,880		2,610		2,620		2,780	J	2,470	J	3,060	J
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.82	U	0.4	U	0.34	U	0.23	U	0.23	U	0.33	U
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	J	0.47	J	0.23	J	0.04	U	1.6	U	1.6	U	2.6	
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					U	112		59.1	J	179		135		110		103	
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	U	0.35	U	0.17	U	0.14	U	0.1	U	0.1	U	0.14	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2		29.5		32.2		16.6		26.7	J	27.5	J	31.8	J
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0		938		99.2		66.8		284	J	335	J	304	J
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value.	####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1).	###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05.	###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R5-04		S45-R5-04		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R5-04		S45-R5-04D		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/12/2010
QC Type													SA		DU		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria								NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0													
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0													
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0													
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0													
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0													
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0													
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0															
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0													
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0													
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0													
Bromodichloromethane	UG/KG	0				0%	0	10			290	0													
Bromoform	UG/KG	0				0%	0	10			19,000	0													
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0													
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0													
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0													
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0													
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0													
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0													
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0													
Methyl bromide	UG/KG	0				0%	0	10			680	0													
Methyl butyl ketone	UG/KG	0				0%	0	10																	
Methyl chloride	UG/KG	0				0%	0	10			11,000	0													
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0													
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0													
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0													
Styrene	UG/KG	0				0%	0	10			600,000	0													
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0													
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0													
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0													
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10																	
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0													
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0													
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0	20	U	19	U	18	U							17
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0	16	U	15	U	14	U							14
2,4-D	UG/KG	0				0%	0	29			70,000	0	41	U	38	U	37	U							35
2,4-DB	UG/KG	0				0%	0	29			190,000	0	30	U	28	U	27	U							25
Dalapon	UG/KG	0				0%	0	29			190,000	0	10	U	9.8	U	9.5	U							9
Dicamba	UG/KG	0				0%	0	29			190,000	0	14	U	13	U	13	U							12
Dichloroprop	UG/KG	0				0%	0	29					24	U	22	U	22	U							20
Dinoseb	UG/KG	0				0%	0	29			6,300	0	3.3	UJ	3	UJ	3	UJ							2.8
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2	3,000	U	2,800	U	2,700	U							2,500
MCPP	UG/KG	0				0%	0	29			6,300	0	2,800	U	2,600	U	2,500	U							2,400

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R5-04		S45-R5-04		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R5-04		S45-R5-04D		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/12/2010
QC Type													SA		DU		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	7.4	U	7.5	U	7.3	U							55
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	6.8	U	6.9	U	6.7	U							7.1
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	7.4	U	7.5	U	470								44
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0	16	U	17	U	840								98
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	30	U	30	U	29	U							31
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0	23	U	23	U	23	U							170
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0	13	U	13	U	13	U							14
3,5-Dinitroaniline	UG/KG	0				0%	0	31					3.9	U	3.9	U	3.8	U							4
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0	8.7	UJ	8.8	UJ	8.6	UJ							9.1
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0	19	U	19	U	18	U							180
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0	30	U	30	U	29	U							31
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	9.5	U	9.6	U	9.3	U							97
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0	24	U	24	U	24	U							25
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1	140	U	140	U	130	U							140
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0	260	U	270	U	260	U							280
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0	7.5	U	7.6	U	7.4	U							190
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	6	UJ	6	UJ	5.9	UJ							6.2
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0	98	U	100	U	97	U							92
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0	110	U	110	U	100	U							100
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0			94	U	97	U	93	U							88
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0	100	U	110	U	100	U							97
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10																	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0	190	U	190	U	180	U							180
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0	190	UJ	190	UJ	180	UJ							180
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0	180	UJ	190	UJ	180	UJ							170
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0	200	UJ	200	UJ	200	UJ							190
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0	450	UJ	470	UJ	450	UJ							430
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1	100	U	110	U	100	U							380
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0	95	U	99	U	95	U							90
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0	100	UJ	110	UJ	100	UJ							99
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0	200	UJ	200	UJ	200	UJ							180
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0	110	U	110	U	110	U							100
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0	240	UJ	250	UJ	240	UJ							230
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0	90	U	94	U	90	U							85
2-Nitrophenol	UG/KG	0				0%	0	29					200	UJ	210	UJ	200	UJ							190
3 or 4-Methylphenol	UG/KG	0				0%	0	19					220	UJ	230	UJ	220	UJ							210
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0	140	UJ	140	UJ	140	UJ							130
3-Nitroaniline	UG/KG	0				0%	0	29					110	UJ	120	UJ	110	UJ							110
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0	410	U	420	U	400	U							380
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29					100	U	110	U	100	U							96
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0	200	U	210	U	200	U							190
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0	140	UJ	150	UJ	140	UJ							130
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29					94	U	97	U	93	U							88
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0													
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0	160	UJ	170	UJ	160	UJ							150
4-Nitrophenol	UG/KG	0				0%	0	29					370	U	380	U	370	U							350

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R5-04		S45-R5-04		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R5-04		S45-R5-04D		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/12/2010
QC Type													SA		DU		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0	78	U	81	U	78	U							74
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0			84	U	87	U	84	U							79
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0	100	U	100	U	100	U							95
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0	100	U	110	U	100	U							97
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0	110	U	120	U	110	U							100
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0	160	U	170	U	160	U							150
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0			120	U	130	U	120	U							120
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0	100	U	100	U	99	U							94
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0	120	UJ	120	UJ	120	UJ							110
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0	98	U	100	U	97	U							92
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0	110	U	110	U	110	U							100
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0	120	U	120	U	120	U							110
Butylbenzylphthalate	UG/KG	0				0%	0	29					110	U	120	U	110	U							100
Carbazole	UG/KG	0				0%	0	29					130	U	140	U	130	U							120
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0	110	U	120	U	110	U							110
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0	150	U	160	U	150	U							140
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0	95	U	99	U	95	U							90
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0	96	U	100	U	96	U							91
Dimethylphthalate	UG/KG	0				0%	0	29					94	U	97	U	93	U							88
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0	120	U	130	U	120	U							410
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0	250	U	260	U	250	U							240
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0	130	U	130	U	130	U							120
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0	98	U	100	U	97	U							92
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0	99	U	100	U	98	U							93
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0	100	U	100	U	99	U							94
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0	99	UJ	100	UJ	98	UJ							93
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0	120	U	120	U	120	U							110
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0	150	U	150	U	150	U							140
Isophorone	UG/KG	0				0%	0	29			570,000	0	90	U	94	U	90	U							85
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0	100	U	110	U	100	U							99
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0	110	U	110	U	110	U							100
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0													
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0	260	UJ	270	UJ	260	UJ							250
N-Nitrosodipropylamine	UG/KG	0				0%	0	19					100	U	100	U	99	U							94
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0	280	UJ	300	UJ	280	UJ							270
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0			100	U	100	U	99	U							94
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0	190	U	190	U	190	U							180
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0	120	U	130	U	120	U							110

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R5-04		S45-R5-04		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R5-04		S45-R5-04D		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/12/2010
QC Type													SA		DU		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0	0.24	U	0.26	U	0.24	U							0.23
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0	0.23	U	0.24	U	0.85	J							1.2
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0	0.37	U	0.4	U	0.37	U							1
Aldrin	UG/KG	0				0%	0	19	680	0	39	0	0.33	U	0.36	U	0.34	U							0.32
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0	0.4	U	0.44	U	0.41	U							0.39
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0			0.25	U	0.27	U	0.25	U							0.59
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0	0.39	U	0.42	U	0.4	U							0.38
Delta-BHC	UG/KG	0				0%	0	19	500,000	0			0.38	U	0.41	U	0.38	U							0.37
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0	0.26	U	0.28	U	0.79	J							0.25
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0			0.28	UJ	55	J	0.29	UJ							0.8
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0			0.4	UJ	0.44	UJ	0.41	UJ							0.39
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0			0.69	U	0.74	U	0.69	U							0.66
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0	1	U	1.1	U	1	U							0.97
Endrin aldehyde	UG/KG	0				0%	0	19					0.58	UJ	0.63	UJ	0.59	UJ							0.56
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19					0.48	U	0.51	U	0.48	U							0.46
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0	0.32	U	0.35	U	0.32	U							0.31
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19					0.27	U	0.3	U	0.28	U							0.68
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0	0.34	U	0.37	U	0.35	U							0.33
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0	0.26	U	0.28	U	0.26	U							0.25
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0	0.6	U	0.64	U	0.6	U							0.57
Toxaphene	UG/KG	0				0%	0	19			490	0	8.3	U	9	U	8.4	U							8
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0													
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0													
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	9	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0													
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0															
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0	7.1	U	7.7	U	7.2	U							6.9
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0	17	U	18	U	17	U							16
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0	11	U	12	U	11	U							11
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0	6.9	U	7.4	U	6.9	U							6.6
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0	7.3	U	7.8	U	7.3	U							7
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1	5.6	U	6	U	5.6	U							5.4
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0	7.1	U	7.7	U	7.2	U							6.9
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	9	500,000	0															
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0													
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0															
Endosulfan II	UG/KG	0				0%	0	9	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0															
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	9																	
Endrin ketone	UG/KG	0				0%	0	9																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0													
Gamma-Chlordane	UG/KG	0				0%	0	9																	
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0													
Methoxychlor	UG/KG	0				0%	0	9			32,000	0													
Toxaphene	UG/KG	0				0%	0	9			490	0													

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID													S45-R5-04		S45-R5-04		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID													S45-R5-04		S45-R5-04D		S45-R5-05		S45-R5-06		S45-R5-07		S45-R5-08		S45-TP-1-01
Sample Depth Interval (FT)													0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6
Sample Date													3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010		3/12/2010
QC Type													SA		DU		SA		SA		SA		SA		SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest
Sample Round																									
Filtered													Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75	18,100		18,800		18,700		21,600		16,100		27,900		14,400
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	0.09	UJ	0.12	UJ	0.11	U	0.11	U	0.18	J	2.8	J	0.14
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76	5.5		7		5.2		5.2		5.1		6.4		5.4
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0	106	J	114	J	165	J	148	J	111	J	229	J	134
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	0.9	J	0.95	J	0.79	J	0.86	J	0.75	J	1.2	J	0.67
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30	0.86	U	0.46	J	5.1		0.62	J	8.3		1.1		9
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76					3,290	J	3,490	J	29,300	J	5,100	J	41,300	J	14,800	J	34,600
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0			26.4	J	28	J	26.7	J	28.8	J	25.6	J	33.3	J	25.4
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76	11	J	16.4	J	10	J	9.2	J	11.8	J	12.5	J	11.8
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36	31.5		33.6		219		44.4		210		142		853
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0													
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76	25,800	J	30,400	J	25,400	J	25,200	J	26,800	J	30,600	J	24,800
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1	11.9	J	15.4	J	42.9		12.9		44.6		998	J	54.3
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76					4,980	J	5,330	J	7,140	J	5,740	J	8,440	J	8,740	J	8,140
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76	336	J	787	J	489	J	395	J	591	J	506	J	519
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49	0.03	J	0.039	U	1.3		0.23		1		0.17		2.9
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	43	J	56	J	33.4	J	29.8	J	38.9	J	38.6	J	37.7
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					2,670	J	2,960	J	3,220	J	4,140	J	2,640	J	4,880	J	1,820
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	0.19	U	0.26	U	0.24	U	0.25	U	0.25	U	0.21	U	0.32
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	0.06	U	0.08	U	1.7	U	1.7	U	1.7	U	0.06	U	8.7
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					86	U	70.2	J	127		110	U	132		113		113
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	0.08	U	0.11	U	0.1	U	0.11	U	0.1	U	0.09	U	0.27
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2	29.7	J	31.2	J	30.1	J	37.3	J	25	J	40	J	23.8
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	80.2	J	83.9	J	360	J	89.5	J	230	J	153	J	272
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01D		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0-0.2		0-0.2		0-0.2		0-0.2
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		10/25/1993		10/25/1993		10/25/1993		10/25/1993
QC Type														SA		SA		DU		SA		SA		SA		SA		SA
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI		ESI		ESI		ESI
Sample Round																												
Filtered														Total		Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Volatile Organic Compounds																												
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0										12	U	11	U	12	U	11
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0										12	U	11	U	12	U	11
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0										12	U	11	U	12	U	11
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0										12	U	11	U	12	U	11
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0										12	U	11	U	12	U	11
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0										12	U	11	U	12	U	11
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0												12	U	11	U	12	U	11
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0										12	U	11	U	12	U	11
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0										12	U	11	U	12	U	11
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0										12	U	11	U	12	U	11
Bromodichloromethane	UG/KG	0				0%	0	10			290	0										12	U	11	U	12	U	11
Bromoform	UG/KG	0				0%	0	10			19,000	0										12	U	11	U	12	U	11
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0										12	U	11	U	12	U	11
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0										12	U	11	U	12	U	11
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0										12	U	11	U	12	U	11
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0										12	U	11	U	12	U	11
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0										12	U	11	U	12	U	11
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0										12	U	11	U	12	U	11
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10														12	U	11	U	12	U	11
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0										12	U	11	U	12	U	11
Methyl bromide	UG/KG	0				0%	0	10			680	0										12	U	11	U	12	U	11
Methyl butyl ketone	UG/KG	0				0%	0	10														12	U	11	U	12	U	11
Methyl chloride	UG/KG	0				0%	0	10			11,000	0										12	U	11	U	12	U	11
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0										12	U	11	U	12	U	11
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0										12	U	11	U	12	U	11
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0										12	U	11	U	12	U	11
Styrene	UG/KG	0				0%	0	10			600,000	0										12	U	11	U	12	U	11
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0										12	U	11	U	12	U	11
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0										12	U	11	U	12	U	11
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0										12	U	11	U	12	U	11
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10														12	U	11	U	12	U	11
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0										12	U	11	U	12	U	11
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0										12	U	11	U	12	U	11
Herbicides																												
2,4,5-T	UG/KG	0				0%	0	29			63,000	0	U	17	U	16	U	18	U	18	U	6.3	U	5.8	U	6	U	5.4
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0	U	14	U	13	U	14	U	14	U	6.3	U	5.8	U	6	U	5.4
2,4-D	UG/KG	0				0%	0	29			70,000	0	U	35	U	33	U	37	U	36	U	63	U	58	U	60	U	54
2,4-DB	UG/KG	0				0%	0	29			190,000	0	U	26	U	24	U	27	U	26	U	63	U	58	U	60	U	54
Dalapon	UG/KG	0				0%	0	29			190,000	0	U	9.1	U	8.6	U	9.5	U	9.2	U	150	U	140	U	150	U	130
Dicamba	UG/KG	0				0%	0	29			190,000	0	U	12	U	11	U	13	U	12	U	6.3	U	5.8	U	6	U	5.4
Dichloroprop	UG/KG	0				0%	0	29					U	21	U	19	U	22	U	21	U	63	U	58	U	60	U	54
Dinoseb	UG/KG	0				0%	0	29			6,300	0	U	2.8	U	2.7	U	3	U	2.9	U	32	U	29	U	30	U	27
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2	U	2,600	U	2,400	U	2,700	U	2,600	U	9,400		6,300		6,000	U	5,400
MCPP	UG/KG	0				0%	0	29			6,300	0	U	2,400	U	2,300	U	2,500	U	2,400	U	6,300	U	5,800	U	6,000	U	5,400

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01D		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0-0.2		0-0.2		0-0.2		0-0.2
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		10/25/1993		10/25/1993		10/25/1993		10/25/1993
QC Type														SA		SA		DU		SA		SA		SA		SA		SA
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI		ESI		ESI		ESI
Sample Round																												
Filtered														Total		Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Explosives																												
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	NJ	59	J	7.1	UJ	50	NJ	45	J	130	U	130	U	100	J	100
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	U	6.6	U	6.5	U	6	U	6.4	U	130	U	130	U	130	U	130
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	J	50	J	68	J	49	J	37	J	130	U	130	U	96	J	130
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0	J	91	J	120		57	J	86	J	130	U	130	U	130	U	110
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	U	29	U	28	U	26	U	28	U	130	U	130	U	130	U	130
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0	J	190	J	330		110	J	150	J	130	U	130	U	99	J	130
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0	U	13	U	13	U	12	U	12	U							
3,5-Dinitroaniline	UG/KG	0				0%	0	31					U	3.8	U	3.7	U	3.4	U	3.6	U							
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0	UJ	8.5	UJ	8.3	UJ	7.6	UJ	8.2	UJ							
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0		200		500		150		150	J	130	U	130	U	130	U	130
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0	U	29	U	28	U	26	U	28	U							
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	J	160		9.1	UJ	43	J	180		130	U	130	U	130	U	130
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0	U	24	U	23	U	21	U	23	U							
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1	U	130	U	130	U	120	U	130	U							
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0	U	260	U	250	U	230	U	250	U							
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0		220		230	NJ	75	J	310		130	U	130	U	100	J	82
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	U	5.8	U	5.7	U	5.2	U	5.6	U	130	U	130	U	130	U	90
Semivolatile Organic Compounds																												
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0	U	90	U	83	U	89	U	94	U	410	U	380	U	400	U	360
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0	U	98	U	90	U	97	U	100	U	410	U	380	U	400	U	360
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0			U	87	U	80	U	86	U	90	U	410	U	380	U	400	U	360
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0	U	96	U	88	U	95	U	100	U	410	U	380	U	400	U	360
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10														410	U	380	U	400	U	360
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0	U	170	U	160	U	170	U	180	U	1,000	U	930	U	960	U	870
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0	U	170	U	160	U	170	U	180	U	410	U	380	U	400	U	360
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0	U	170	U	150	U	160	U	170	U	410	U	380	U	400	U	360
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0	U	180	U	170	U	180	U	190	U	410	U	380	U	400	U	360
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0	U	420	U	390	U	410	U	440	U	1,000	U	930	U	960	U	870
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1		94	U	87	U	94	U	2,500		410	U	380	U	400	U	360
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0	U	88	U	81	U	87	U	92	U	410	U	380	U	400	U	360
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0	U	97	U	89	U	96	U	100	U	410	U	380	U	400	U	360
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0	U	180	U	170	U	180	U	190	U	410	U	380	U	400	U	360
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0	U	100	U	94	U	100	U	110	U	410	U	380	U	400	U	360
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0	U	220	U	200	U	220	U	230	U	410	U	380	U	400	U	360
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0	U	83	U	77	U	82	U	87	U	1,000	U	930	U	960	U	870
2-Nitrophenol	UG/KG	0				0%	0	29					U	180	U	170	U	180	U	190	U	410	U	380	U	400	U	360
3 or 4-Methylphenol	UG/KG	0				0%	0	19					U	210	U	190	U	200	U	220	U							
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0	U	130	U	120	U	120	U	130	U	410	U	380	U	400	U	360
3-Nitroaniline	UG/KG	0				0%	0	29					U	100	U	96	U	100	U	110	U	1,000	U	930	U	960	U	870
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0	U	370	U	340	U	370	U	390	U	1,000	U	930	U	960	U	870
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29					U	94	U	87	U	94	U	99	U	410	U	380	U	400	U	360
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0	U	180	U	170	U	180	U	190	U	410	U	380	U	400	U	360
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0	U	130	U	120	U	130	U	140	U	410	U	380	U	400	U	360
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29					U	87	U	80	U	86	U	90	U	410	U	380	U	400	U	360
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0										410	U	380	U	400	U	360
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0	U	150	U	140	U	150	U	160	U	1,000	U	930	U	960	U	870
4-Nitrophenol	UG/KG	0				0%	0	29					U	340	U	320	U	340	U	360	U	1,000	U	930	U	960	U	870

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01D		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0-0.2		0-0.2		0-0.2		0-0.2
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		10/25/1993		10/25/1993		10/25/1993		10/25/1993
QC Type														SA		SA		DU		SA		SA		SA		SA		SA
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI		ESI		ESI		ESI
Sample Round																												
Filtered														Total		Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0	U	72	U	67	U	72	U	75	U	410	U	380	U	400	U	360
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0			U	78	U	72	U	77	U	81	U	410	U	380	U	400	U	360
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0	U	93	U	86	U	92	U	97	U	410	U	380	U	400	U	360
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0	U	96	U	88	U	95	U	100	U	410	U	380	U	400	U	360
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0	U	100	U	95	U	100	U	110	U	410	U	380	U	400	U	360
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0	U	150	U	140	U	150	U	160	U	410	U	380	U	400	U	360
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0			UJ	120	UJ	110	UJ	110	UJ	120	UJ	410	U	380	U	400	U	360
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0	U	92	U	85	U	91	U	96	U	410	U	380	U	400	U	360
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0	U	110	U	98	U	100	U	110	U	410	U	380	U	400	U	360
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0	U	90	U	83	U	89	U	94	U	410	U	380	U	400	U	360
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0	U	99	U	91	U	98	U	100	U							
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0	U	110	U	100	U	110	U	110	U	410	U	380	U	700		430
Butylbenzylphthalate	UG/KG	0				0%	0	29					U	100	U	95	U	100	U	110	U	410	U	380	U	400	U	360
Carbazole	UG/KG	0				0%	0	29					U	120	U	110	U	120	U	130	U	410	U	380	U	400	U	360
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0	U	100	U	97	U	100	U	110	U	410	U	380	U	400	U	19
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0	U	140	U	130	U	140	U	150	U	410	U	380	U	400	U	360
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0	U	88	U	81	U	87	U	92	U	410	U	380	U	400	U	360
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0	U	89	U	82	U	88	U	93	U	410	U	380	U	400	U	360
Dimethylphthalate	UG/KG	0				0%	0	29					U	87	U	80	U	86	U	90	U	410	U	380	U	400	U	360
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0		110	U	100	U	110	U	2,600		410	U	380	U	400	U	360
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0	U	230	U	220	U	230	U	240	U	410	U	380	U	400	U	360
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0	U	120	U	110	U	120	U	120	U	410	U	380	U	400	U	23
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0	U	90	U	83	U	89	U	94	U	410	U	380	U	400	U	360
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0	U	91	U	110	J	90	UJ	95	U	410	U	380	U	400	U	20
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0	U	92	U	85	U	91	U	96	U	410	U	380	U	400	U	360
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0	U	91	U	84	U	90	U	95	U	410	U	380	U	400	U	360
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0	U	110	U	98	U	100	U	110	U	410	U	380	U	400	U	360
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0	U	140	U	120	U	130	U	140	U	410	U	380	U	400	U	360
Isophorone	UG/KG	0				0%	0	29			570,000	0	U	83	U	77	U	82	U	87	U	410	U	380	U	400	U	360
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0	U	97	U	89	U	96	U	100	U	410	U	380	U	400	U	360
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0	U	100	U	93	U	100	U	100	U	410	U	380	U	400	U	360
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0										410	U	380	U	400	U	360
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0	U	240	U	220	U	240	U	320	J	410	U	380	U	400	U	360
N-Nitrosodipropylamine	UG/KG	0				0%	0	19					U	92	U	85	U	91	U	96	U							
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0	U	260	U	240	U	260	U	280	U	1,000	U	930	U	960	U	870
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0			U	92	U	85	U	91	U	96	U	410	U	380	U	400	U	360
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0	U	170	U	160	U	170	U	180	U	410	U	380	U	400	U	360
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0	U	110	U	100	U	110	U	120	U	410	U	380	U	400	U	35

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01D		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4	
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		SA		DU		SA		SA		SA		SA		SA	
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI		ESI		ESI		ESI	
Sample Round																													
Filtered														Total		Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Pesticides																											
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0	U	2.4	JN	0.2	U	0.23	U	0.24	U							
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0	J	1.5	J	1.1	J	0.67	J	0.9	J							
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0	J	2.2	JN	0.31	U	0.68	J	0.77	J							
Aldrin	UG/KG	0				0%	0	19	680	0	39	0	U	0.31	U	0.28	U	0.32	U	0.33	U							
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0	U	0.38	U	0.34	U	0.39	U	0.4	U							
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0			J	0.24	U	0.21	U	0.24	U	0.25	U							
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0	U	0.37	U	0.33	U	0.38	U	0.39	U							
Delta-BHC	UG/KG	0				0%	0	19	500,000	0			U	0.36	U	0.32	U	0.37	U	0.38	U							
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0	U	1.2	J	0.22	U	0.81	J	0.79	J							
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0			J	1.3	J	1.2	J	0.77	J	0.74	J							
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0			U	0.38	U	0.34	U	0.39	U	0.4	U							
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0			U	0.65	U	0.57	U	0.67	U	0.68	U							
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0	U	3.6	J	0.84	U	0.98	U	1	U							
Endrin aldehyde	UG/KG	0				0%	0	19					U	0.55	U	0.48	U	0.56	U	0.58	U							
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19					U	0.45	U	0.4	U	0.46	U	0.47	U							
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0	U	0.3	U	0.27	U	0.31	U	0.32	U							
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19					J	1.1	J	0.23	U	0.26	U	0.27	U							
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0	U	0.32	U	0.29	U	0.33	U	0.34	U							
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0	U	0.25	U	0.22	U	0.25	U	0.26	U							
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0	U	0.56	U	0.5	U	0.58	U	0.59	U							
Toxaphene	UG/KG	0				0%	0	19			490	0	U	7.8	U	6.9	U	8	U	8.2	U							
PCBs																											
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0										4.1	U	3.8	U	4	U	3.6
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0										4.1	U	3.8	U	4	U	3.2
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0										4.1	U	3.8	U	4	U	3.6
Aldrin	UG/KG	0				0%	0	9	680	0	39	0										2.1	U	2	U	2	U	1.8
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0										2.1	U	2	U	2	U	1.8
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0												2.1	U	2	U	2	U	1.5
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0	U	6.7	U	5.9	U	6.9	U	7.1	U	41	U	38	U	40	U	36
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0	U	16	U	14	U	16	U	16	U	84	U	78	U	81	U	73
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0	U	10	U	9.2	U	11	U	11	U	41	U	38	U	40	U	36
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0	U	6.5	U	5.7	U	6.7	U	6.8	U	41	U	38	U	40	U	36
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0	U	6.8	U	6	U	7	U	7.2	U	41	U	38	U	40	U	36
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1	U	5.3	U	4.6	U	5.4	U	5.5	U	41	U	38	U	40	U	36
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0	U	6.7	U	5.9	U	6.9	U	7.1	U	41	U	38	U	40	U	36
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0										2.1	U	2	U	2	U	1.8
Delta-BHC	UG/KG	0				0%	0	9	500,000	0												2.1	U	2	U	2	U	1.8
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0										4.1	U	3.8	U	4	U	2.5
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0												2.1	U	2	U	2	U	1.8
Endosulfan II	UG/KG	0				0%	0	9	200,000	0												4.1	U	3.8	U	4	U	3.6
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0												4.1	U	3.8	U	4	U	3.6
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0										4.1	U	3.8	U	4	U	3.6
Endrin aldehyde	UG/KG	0				0%	0	9														4.1	U	3.8	U	4	U	3.6
Endrin ketone	UG/KG	0				0%	0	9														4.1	U	3.8	U	4	U	3.6
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0										2.1	U	2	U	2	U	1.8
Gamma-Chlordane	UG/KG	0				0%	0	9														2.1	U	2	U	2	U	1.8
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0										2.1	U	2	U	2	U	1.8
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0										2.1	U	2	U	2	U	1.8
Methoxychlor	UG/KG	0				0%	0	9			32,000	0										21	U	20	U	20	U	18
Toxaphene	UG/KG	0				0%	0	9			490	0										210	U	200	U	200	U	180

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45
Loc ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL
Sample ID														S45-TP-2-01		S45-TP-3-01		S45-TP-3-01D		S45-TP-4-01		SS45-1		SS45-2		SS45-3		SS45-4
Sample Depth Interval (FT)														0.2-0.6		0.2-0.6		0.2-0.6		0.2-0.6		0-0.2		0-0.2		0-0.2		0-0.2
Sample Date														3/12/2010		3/12/2010		3/12/2010		3/12/2010		10/25/1993		10/25/1993		10/25/1993		10/25/1993
QC Type														SA		SA		DU		SA		SA		SA		SA		SA
Study ID														OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI		ESI		ESI		ESI
Sample Round																												
Filtered														Total		Total		Total		Total		Total		Total		Total		Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																	
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value
Inorganics																												
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		16,700		11,900		17,100		17,800		17,300		19,400		18,900		14,900
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	UJ	0.21	UJ	0.15	UJ	0.2	UJ	0.12	UJ	10	UJ	11.5	UJ	10.8	UJ	7.9
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76		5.5		4.3		5.1		5		5		5.5		5.1		5.1
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0		146		159		187		170		122		194		115		143
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0		0.79		0.53		0.76		0.79		0.7	J	0.77	J	0.83	J	0.63
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30		6.8		5.6		7.7		7.3		2.8		2.4		1.1		3.9
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76						25,200		24,400		28,100		27,600		8,510		10,300		21,800		47,000
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0				27.9		20.9		27.3		27.4		24.1		39.3		27.4		22.9
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76		12.3		9.3		11.4		10.8		10.8		24.3		14.1		12.4
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36		**365**		143		**330**		**343**		79.4		192		55.8		155
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0										0.56	U	0.57	U	0.58	U	0.54
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76		30,200		22,200		25,600		27,500		25,800		75,700		30,500		26,700
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		54.6		86.3		70.9		64.9		20.4		15.7		12		34.9
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76						6,780		6,170		7,980		7,170		5,530		5,950		6,790		8,420
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76		572		423		515		531		562		1,150		627		530
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		2.7		**7**		**6.8**		2.4		0.43		0.63		0.17		0.43
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0		40.7		30.6		37.7		37.9		29.4	UR	41.3	UR	40.5	UR	35.2
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55					J	2,090	J	1,700	J	2,680	J	2,710	J	2,310		3,140		2,720		2,100
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.46	U	0.33	U	0.45	U	0.26	U	0.27	U	0.18	U	0.21	U	0.23
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1		3	J	0.56	J	2.2	J	2.4		1.3	UJ	1.5	UJ	2.1		1
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76						88.2	J	146		211		198		67.1	J	100	J	114	J	142
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	J	0.19	U	0.14	U	0.19	U	0.11	U	0.29	UJ	0.2	UJ	0.23	UJ	0.25
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2		26.9		20.8		28.5		28.1		28.6		35.4		30.5		23.7
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0		336		387		434		317		148	UR	122	UR	115	UR	208
Wet Chemistry																												
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0																

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SS45-5		SS45-5		SS45-6		SS45-7		SS45-8		SS45-9	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														SS45-5		SS45-10		SS45-6		SS45-7		SS45-8		SS45-9	
Sample Depth Interval (FT)														0-0.2		0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI		ESI		ESI	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	10	500,000	0	810,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	10			600	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,1,2-Trichloroethane	UG/KG	0				0%	0	10			150	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,1-Dichloroethane	UG/KG	0				0%	0	10	240,000	0	3,600	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,1-Dichloroethene	UG/KG	0				0%	0	10	500,000	0	23,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,2-Dichloroethane	UG/KG	0				0%	0	10	30,000	0	460	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,2-Dichloroethene (total)	UG/KG	0				0%	0	10	500,000	0			UJ	12	U	12	U	11	U	11	U	12	U	12	U
1,2-Dichloropropane	UG/KG	0				0%	0	10			1,600	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Acetone	UG/KG	0				0%	0	10	500,000	0	6,100,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Benzene	UG/KG	0				0%	0	10	44,000	0	1,200	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Bromodichloromethane	UG/KG	0				0%	0	10			290	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Bromoform	UG/KG	0				0%	0	10			19,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Carbon disulfide	UG/KG	0				0%	0	10			77,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Carbon tetrachloride	UG/KG	0				0%	0	10	22,000	0	650	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Chlorobenzene	UG/KG	0				0%	0	10	500,000	0	28,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Chlorodibromomethane	UG/KG	0				0%	0	10			8,300	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Chloroethane	UG/KG	0				0%	0	10			1,400,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Chloroform	UG/KG	0				0%	0	10	350,000	0	320	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	10					UJ	12	U	12	U	11	U	11	U	12	U	12	U
Ethyl benzene	UG/KG	0				0%	0	10	390,000	0	5,800	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methyl bromide	UG/KG	0				0%	0	10			680	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methyl butyl ketone	UG/KG	0				0%	0	10					UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methyl chloride	UG/KG	0				0%	0	10			11,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methyl ethyl ketone	UG/KG	0				0%	0	10	500,000	0	2,700,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methyl isobutyl ketone	UG/KG	0				0%	0	10			3,300,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Methylene chloride	UG/KG	0				0%	0	10	500,000	0	35,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Styrene	UG/KG	0				0%	0	10			600,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Tetrachloroethene	UG/KG	0				0%	0	10	150,000	0	8,100	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Toluene	UG/KG	0				0%	0	10	500,000	0	490,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Total Xylenes	UG/KG	0				0%	0	10	500,000	0	58,000	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	10					UJ	12	U	12	U	11	U	11	U	12	U	12	U
Trichloroethene	UG/KG	0				0%	0	10	200,000	0	410	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Vinyl chloride	UG/KG	0				0%	0	10	13,000	0	59	0	UJ	12	U	12	U	11	U	11	U	12	U	12	U
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	29			63,000	0	U	5.9	U	6	U	5.5	U	5.7	U	6.3	U	5.9	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	29	500,000	0	51,000	0	U	5.9	UJ	6	U	5.5	U	5.7	U	6.3	U	5.9	U
2,4-D	UG/KG	0				0%	0	29			70,000	0	U	59	U	60	U	55	U	57	U	63	U	59	U
2,4-DB	UG/KG	0				0%	0	29			190,000	0	U	59	U	60	U	55	U	57	U	63	U	59	U
Dalapon	UG/KG	0				0%	0	29			190,000	0	U	150	U	150	U	130	U	140	U	160	U	150	U
Dicamba	UG/KG	0				0%	0	29			190,000	0	U	5.9	U	6	U	5.5	U	5.7	U	6.3	U	5.9	U
Dichloroprop	UG/KG	0				0%	0	29					U	59	U	60	U	55	U	57	U	63	U	59	U
Dinoseb	UG/KG	0				0%	0	29			6,300	0	U	30	UJ	30	U	28	U	29	U	32	U	30	U
MCPA	UG/KG	9,400		SS45-1	10/25/1993	7%	2	29			3,200	2	U	5,900	U	6,000	U	5,500	U	5,700	U	6,300	U	5,900	U
MCPP	UG/KG	0				0%	0	29			6,300	0	U	5,900	U	6,000	U	5,500	U	5,700	U	6,300	U	5,900	U

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Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SS45-5		SS45-5		SS45-6		SS45-7		SS45-8		SS45-9	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														SS45-5		SS45-10		SS45-6		SS45-7		SS45-8		SS45-9	
Sample Depth Interval (FT)														0-0.2		0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI		ESI		ESI	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	120	J	SS45-6	10/25/1993	56%	23	41			220,000	0	U	130	UJ	130	UJ	120	J	130	UJ	130	UJ	130	UJ
1,3-Dinitrobenzene	UG/KG	0				0%	0	41			630	0	U	130	UJ	130	UJ	130	U	130	UJ	130	UJ	130	UJ
2,4,6-Trinitrotoluene	UG/KG	1,400	J	SS45-9	10/25/1993	78%	32	41			3,600	0	U	84	J	80	J	190		130	UJ	130	UJ	1,400	J
2,4-Dinitrotoluene	UG/KG	1,100		S45-ODH-18-01	3/12/2010	76%	31	41			1,700	0	J	150	J	140	J	160		130	UJ	130	UJ	130	UJ
2,6-Dinitrotoluene	UG/KG	0				0%	0	41			360	0	U	130	UJ	130	UJ	130	U	130	UJ	130	UJ	130	UJ
2-amino-4,6-Dinitrotoluene	UG/KG	590		SS45-6	10/25/1993	73%	30	41			15,000	0	U	280	J	270	J	590		130	UJ	130	UJ	130	UJ
2-Nitrotoluene	UG/KG	0				0%	0	31			3,200	0													
3,5-Dinitroaniline	UG/KG	0				0%	0	31																	
3-Nitrotoluene	UG/KG	0				0%	0	31			630	0													
4-amino-2,6-Dinitrotoluene	UG/KG	500		S45-TP-3-01	3/12/2010	66%	27	41			15,000	0	U	130	UJ	130	UJ	130	U	130	UJ	130	UJ	270	J
4-Nitrotoluene	UG/KG	0				0%	0	31			25,000	0													
HMX	UG/KG	190	JN	S45-ODH-14-01 S45-ODH-9-01	3/12/2010 3/12/2010	63%	26	41			390,000	0	U	120	J	140	J	130	U	130	UJ	130	UJ	130	UJ
Nitrobenzene	UG/KG	0				0%	0	31			5,100	0													
Nitroglycerine	UG/KG	1,500	J	S45-ODH-19-01	3/12/2010	3%	1	31			630	1													
Pentaerythritol Tetranitrate	UG/KG	0				0%	0	31			13,000	0													
RDX	UG/KG	5,800	J	SS45-9	10/25/1993	80%	33	41			6,100	0	J	280	J	290	J	1,800		83	J	130	UJ	5,800	J
Tetryl	UG/KG	330		SS45-6	10/25/1993	7%	3	41			16,000	0	J	130	UJ	130	J	330		130	UJ	130	UJ	130	UJ
Semivolatile Organic Compounds																									
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	29			5,800	0	U	390	U	390	U	360	U	380	U	420	U	390	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	29	500,000	0	180,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	29	280,000	0			U	390	U	390	U	360	U	380	U	420	U	390	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	29	130,000	0	2,600	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	10					U	390	U	390	U	360	U	380	U	420	U	390	U
2,4,5-Trichlorophenol	UG/KG	0				0%	0	29			630,000	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	29			6,300	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2,4-Dichlorophenol	UG/KG	0				0%	0	29			19,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2,4-Dimethylphenol	UG/KG	0				0%	0	29			130,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2,4-Dinitrophenol	UG/KG	0				0%	0	29			13,000	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
2,4-Dinitrotoluene	UG/KG	2,500		S45-TP-4-01	3/12/2010	24%	7	29			1,700	1	U	160	J	75	J	830		380	U	420	U	390	U
2,6-Dinitrotoluene	UG/KG	41	J	SS45-6	10/25/1993	3%	1	29			360	0	U	390	U	390	U	41	J	380	U	420	U	390	U
2-Chloronaphthalene	UG/KG	0				0%	0	29			480,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2-Chlorophenol	UG/KG	0				0%	0	29			39,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2-Methylnaphthalene	UG/KG	0				0%	0	29			24,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2-Methylphenol	UG/KG	0				0%	0	29	500,000	0	320,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
2-Nitroaniline	UG/KG	0				0%	0	29			63,000	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
2-Nitrophenol	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
3 or 4-Methylphenol	UG/KG	0				0%	0	19																	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	29			1,200	0	U	390	U	390	U	360	U	380	U	420	U	390	U
3-Nitroaniline	UG/KG	0				0%	0	29					U	950	U	950	U	870	U	920	U	1,000	U	940	U
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	29			510	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	29			630,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
4-Chloroaniline	UG/KG	0				0%	0	29			2,700	0	U	390	U	390	U	360	U	380	U	420	U	390	U
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
4-Methylphenol	UG/KG	0				0%	0	10	500,000	0	630,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
4-Nitroaniline	UG/KG	0				0%	0	29			25,000	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
4-Nitrophenol	UG/KG	0				0%	0	29					U	950	U	950	U	870	U	920	U	1,000	U	940	U

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SS45-5		SS45-5		SS45-6		SS45-7		SS45-8		SS45-9	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														SS45-5		SS45-10		SS45-6		SS45-7		SS45-8		SS45-9	
Sample Depth Interval (FT)														0-0.2		0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI		ESI		ESI	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Acenaphthene	UG/KG	0				0%	0	29	500,000	0	360,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Acenaphthylene	UG/KG	30	J	SS45-5	10/25/1993	3%	1	29	500,000	0			U	30	J	390	U	360	U	380	U	420	U	390	U
Anthracene	UG/KG	18	J	SS45-5	10/25/1993	3%	1	29	500,000	0	1,800,000	0	U	18	J	390	U	360	U	380	U	420	U	390	U
Benzo(a)anthracene	UG/KG	50	J	SS45-5	10/25/1993	10%	3	29	5,600	0	1,100	0	U	50	J	32	J	31	J	380	U	420	U	390	U
Benzo(a)pyrene	UG/KG	82	J	SS45-5	10/25/1993	10%	3	29	1,000	0	110	0	U	82	J	44	J	45	J	380	U	420	U	390	U
Benzo(b)fluoranthene	UG/KG	55	J	SS45-5	10/25/1993	14%	4	29	5,600	0	1,100	0	U	55	J	33	J	36	J	380	U	420	U	20	J
Benzo(ghi)perylene	UG/KG	39	J	SS45-5	10/25/1993	7%	2	29	500,000	0			U	39	J	27	J	360	U	380	U	420	U	390	U
Benzo(k)fluoranthene	UG/KG	58	J	SS45-5	10/25/1993	7%	2	29	56,000	0	11,000	0	U	58	J	18	J	360	U	380	U	420	U	390	U
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	29			19,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	29			230	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Bis(2-Chloroisopropyl)ether	UG/KG	0				0%	0	19			310,000	0													
Bis(2-Ethylhexyl)phthalate	UG/KG	740		SS45-5	10/25/1993	24%	7	29			39,000	0		740		700		360	U	210	J	470		350	J
Butylbenzylphthalate	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
Carbazole	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
Chrysene	UG/KG	130	J	S45-ODH-8-01	3/12/2010	24%	7	29	56,000	0	110,000	0	J	68	J	55	J	52	J	380	U	20	J	27	J
Dibenz(a,h)anthracene	UG/KG	0				0%	0	29	560	0	110	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Dibenzofuran	UG/KG	0				0%	0	29	350,000	0	7,300	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Diethyl phthalate	UG/KG	0				0%	0	29			5,100,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Dimethylphthalate	UG/KG	0				0%	0	29					U	390	U	390	U	360	U	380	U	420	U	390	U
Di-n-butylphthalate	UG/KG	2,600		S45-TP-4-01	3/12/2010	21%	6	29			630,000	0	U	110	J	31	J	900		380	U	420	U	390	U
Di-n-octylphthalate	UG/KG	0				0%	0	29			63,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Fluoranthene	UG/KG	66	J	SS45-5	10/25/1993	21%	6	29	500,000	0	240,000	0	J	66	J	44	J	42	J	380	U	22	J	30	J
Fluorene	UG/KG	0				0%	0	29	500,000	0	240,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Hexachlorobenzene	UG/KG	110	J	S45-TP-3-01	3/12/2010	21%	6	29	6,000	0	210	0	J	43	J	41	J	55	J	380	U	420	U	30	J
Hexachlorobutadiene	UG/KG	0				0%	0	29			1,200	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	29			180	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Hexachloroethane	UG/KG	21	J	SS45-6	10/25/1993	3%	1	29			1,800	0	U	390	U	390	U	21	J	380	U	420	U	390	U
Indeno(1,2,3-cd)pyrene	UG/KG	52	J	SS45-5	10/25/1993	3%	1	29	5,600	0	1,100	0	U	52	J	390	U	360	U	380	U	420	U	390	U
Isophorone	UG/KG	0				0%	0	29			570,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Naphthalene	UG/KG	21	J	SS45-5	10/25/1993	3%	1	29	500,000	0	3,800	0	U	21	J	390	U	360	U	380	U	420	U	390	U
Nitrobenzene	UG/KG	0				0%	0	29			5,100	0	U	390	U	390	U	360	U	380	U	420	U	390	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	10			78	0	U	390	U	390	U	360	U	380	U	420	U	390	U
N-Nitrosodiphenylamine	UG/KG	320	J	S45-TP-4-01	3/12/2010	10%	3	29			110,000	0	U	390	U	390	U	110	J	380	U	420	U	390	U
N-Nitrosodipropylamine	UG/KG	0				0%	0	19																	
Pentachlorophenol	UG/KG	0				0%	0	29	6,700	0	1,000	0	U	950	U	950	U	870	U	920	U	1,000	U	940	U
Phenanthrene	UG/KG	38	J	SS45-5	10/25/1993	14%	4	29	500,000	0			U	38	J	31	J	25	J	380	U	420	U	18	J
Phenol	UG/KG	0				0%	0	29	500,000	0	1,900,000	0	U	390	U	390	U	360	U	380	U	420	U	390	U
Pyrene	UG/KG	100	J	SS45-5	10/25/1993	21%	6	29	500,000	0	180,000	0	J	100	J	76	J	79	J	380	U	30	J	36	J

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SS45-5		SS45-5		SS45-6		SS45-7		SS45-8		SS45-9	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														SS45-5		SS45-10		SS45-6		SS45-7		SS45-8		SS45-9	
Sample Depth Interval (FT)														0-0.2		0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI		ESI		ESI	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides																									
4,4'-DDD	UG/KG	2.4	JN	S45-TP-2-01	3/12/2010	11%	2	19	92,000	0	190	0													
4,4'-DDE	UG/KG	2	J	S45-ODH-19-01	3/12/2010	84%	16	19	62,000	0	2,000	0													
4,4'-DDT	UG/KG	2.2	JN	S45-TP-2-01	3/12/2010	68%	13	19	47,000	0	1,900	0													
Aldrin	UG/KG	0				0%	0	19	680	0	39	0													
Alpha-BHC	UG/KG	0				0%	0	19	3,400	0	86	0													
Alpha-Chlordane	UG/KG	0.59	J	S45-TP-1-01	3/12/2010	5%	1	19	24,000	0															
Beta-BHC	UG/KG	0				0%	0	19	3,000	0	300	0													
Delta-BHC	UG/KG	0				0%	0	19	500,000	0															
Dieldrin	UG/KG	1.2	J	S45-TP-2-01	3/12/2010	58%	11	19	1,400	0	34	0													
Endosulfan I	UG/KG	55	J	S45-R5-04	3/16/2010	79%	15	19	200,000	0															
Endosulfan II	UG/KG	0.88	JN	S45-ODH-19-01	3/12/2010	5%	1	19	200,000	0															
Endosulfan sulfate	UG/KG	0				0%	0	19	200,000	0															
Endrin	UG/KG	3.6	J	S45-TP-2-01	3/12/2010	5%	1	19	89,000	0	1,900	0													
Endrin aldehyde	UG/KG	0				0%	0	19																	
Endrin ketone	UG/KG	0.58	J	S45-ODH-11-01	3/12/2010	5%	1	19																	
Gamma-BHC/Lindane	UG/KG	0				0%	0	19	9,200	0	570	0													
Gamma-Chlordane	UG/KG	1.1	J	S45-TP-2-01	3/12/2010	16%	3	19																	
Heptachlor	UG/KG	0				0%	0	19	15,000	0	130	0													
Heptachlor epoxide	UG/KG	0				0%	0	19			70	0													
Methoxychlor	UG/KG	45		S45-ODH-4-01	3/12/2010	5%	1	19			32,000	0													
Toxaphene	UG/KG	0				0%	0	19			490	0													
PCBs																									
4,4'-DDD	UG/KG	0				0%	0	9	92,000	0	190	0	U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
4,4'-DDE	UG/KG	4.2	J	SS45-6	10/25/1993	40%	4	10	62,000	0	2,000	0	J	3.9	U	3.4	J	4.2	J	3.8	U	4.1	U	3.3	J
4,4'-DDT	UG/KG	3.4	J	SS45-5	10/25/1993	22%	2	9	47,000	0	1,900	0	U	3.9	U	3.4	J	2.8	J	3.8	U	4.1	U	3.8	UR
Aldrin	UG/KG	0				0%	0	9	680	0	39	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Alpha-BHC	UG/KG	0				0%	0	9	3,400	0	86	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Alpha-Chlordane	UG/KG	2	J	SS45-6	10/25/1993	33%	3	9	24,000	0			J	2	U	1.1	J	2	J	1.9	U	2.1	U	2	UR
Aroclor-1016	UG/KG	0				0%	0	28	1,000	0	410	0	U	39	U	38	U	36	U	38	U	41	U	38	UR
Aroclor-1221	UG/KG	0				0%	0	28	1,000	0	200	0	U	80	U	78	U	73	U	77	U	84	U	78	UR
Aroclor-1232	UG/KG	0				0%	0	28	1,000	0	170	0	U	39	U	38	U	36	U	38	U	41	U	38	UR
Aroclor-1242	UG/KG	0				0%	0	28	1,000	0	230	0	U	39	U	38	U	36	U	38	U	41	U	38	UR
Aroclor-1248	UG/KG	0				0%	0	28	1,000	0	230	0	U	39	U	38	U	36	U	38	U	41	U	38	UR
Aroclor-1254	UG/KG	2,000		S45-ODH-4-01	3/12/2010	7%	2	28	1,000	1	120	1	U	39	U	110	J	36	U	38	U	41	U	38	UR
Aroclor-1260	UG/KG	0				0%	0	28	1,000	0	240	0	U	39	U	38	U	36	U	38	U	41	U	38	UR
Beta-BHC	UG/KG	0				0%	0	9	3,000	0	300	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Delta-BHC	UG/KG	0				0%	0	9	500,000	0			U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Dieldrin	UG/KG	3.2	J	SS45-6	10/25/1993	22%	2	9	1,400	0	34	0	J	3.9	U	3.8	U	3.2	J	3.8	U	4.1	U	3.8	UR
Endosulfan I	UG/KG	1.8	J	SS45-5	10/25/1993	20%	2	10	200,000	0			U	1.8	J	2	U	1.8	U	1.9	U	2.1	U	1	J
Endosulfan II	UG/KG	0				0%	0	9	200,000	0			U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
Endosulfan sulfate	UG/KG	0				0%	0	9	200,000	0			U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
Endrin	UG/KG	0				0%	0	9	89,000	0	1,900	0	U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
Endrin aldehyde	UG/KG	0				0%	0	9					U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
Endrin ketone	UG/KG	0				0%	0	9					U	3.9	U	3.8	U	3.6	U	3.8	U	4.1	U	3.8	UR
Gamma-BHC/Lindane	UG/KG	0				0%	0	9	9,200	0	570	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Gamma-Chlordane	UG/KG	0				0%	0	9					U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Heptachlor	UG/KG	0				0%	0	9	15,000	0	130	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Heptachlor epoxide	UG/KG	0				0%	0	9			70	0	U	2	U	2	U	1.8	U	1.9	U	2.1	U	2	UR
Methoxychlor	UG/KG	0				0%	0	9			32,000	0	U	20	U	20	U	18	U	19	U	21	U	20	UR
Toxaphene	UG/KG	0				0%	0	9			490	0	U	200	U	200	U	180	U	190	U	210	U	200	UR

Table A-1
Analytical Data for Surface Soil at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SS45-5		SS45-5		SS45-6		SS45-7		SS45-8		SS45-9	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														SS45-5		SS45-10		SS45-6		SS45-7		SS45-8		SS45-9	
Sample Depth Interval (FT)														0-0.2		0-0.2		0-0.2		0-0.2		0-0.2		0-0.2	
Sample Date														10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993		10/25/1993	
QC Type														SA		DU		SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI		ESI		ESI	
Sample Round																									
Filtered														Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)														
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																									
Aluminum	MG/KG	27,900		S45-R5-08	3/16/2010	100%	76	76			7,700	75		17,600		15,600		16,300		18,000		18,600		17,800	
Antimony	MG/KG	3.1		S45-R5-02	3/16/2010	32%	24	76			3.1	0	UJ	9.3	UJ	10.1	UJ	8.5	UJ	9.7	UJ	11.4	UJ	9.4	UJ
Arsenic	MG/KG	12.6	J	S45-ODH-4-01	3/12/2010	100%	76	76	16	0	0.68	76		6.2		6.4		5.5		6.8		6.4		6.1	
Barium	MG/KG	365		SS45-8	10/25/1993	100%	76	76	400	0	1,500	0		161		151		160		163		365		202	
Beryllium	MG/KG	1.2	J	S45-R5-08	3/16/2010	97%	74	76	590	0	16	0	J	0.72	J	0.7	J	0.71	J	0.82	J	0.69	J	0.79	J
Cadmium	MG/KG	1,100		S45-ODH-4-01	3/12/2010	78%	59	76	9.3	6	7.1	30		9.5	J	9.5	J	8.8		1.6	J	4.8	J	5.5	J
Calcium	MG/KG	193,000		S45-R4-04	4/1/2010	99%	75	76						26,000		47,000		23,400		6,930		16,800		22,600	
Chromium	MG/KG	446		S45-ODH-11-01	3/12/2010	100%	76	76	1,500	0				26.9		23.8		24.2		24.8		27.2		27.4	
Cobalt	MG/KG	26.8	J	S45-R15-01	3/15/2010	100%	76	76			2.3	76		12.9		12.2		11.7		13.1		12.1		15	
Copper	MG/KG	4,180		S45-ODH-6-01	3/12/2010	100%	76	76	270	39	310	36		538		405		491		69.8		293		267	
Cyanide	MG/KG	0				0%	0	10	27	0	2.3	0	U	0.72	U	0.67	U	0.52	U	0.66	U	0.72	U	0.7	U
Iron	MG/KG	118,000		S45-ODH-4-01	3/12/2010	100%	76	76			5,500	76		31,400		30,400		28,100		29,900		29,400		32,500	
Lead	MG/KG	998	J	S45-R5-08	3/16/2010	100%	76	76	1,000	0	400	1		63.6		54.9		63.2		21.9		66.9		77.7	
Magnesium	MG/KG	15,000		S45-R4-04	4/1/2010	100%	76	76						7,320		7,000		6,440		5,170		6,740		7,110	
Manganese	MG/KG	5,040	J	S45-R15-01	3/15/2010	100%	76	76	10,000	0	180	76		575		599		555		1,050		489		912	
Mercury	MG/KG	7		S45-TP-3-01	3/12/2010	99%	75	76	2.8	33	1.1	49		1.5	J	2.1	J	2.4		0.41	J	1.9	J	1.9	J
Nickel	MG/KG	59.3		S45-ODH-11-01	3/12/2010	100%	71	71	310	0	150	0	UR	40.5		36.4		34.2	UR	35.1		39.4		42.5	
Potassium	MG/KG	4,880	J	S45-R5-08	3/16/2010	100%	55	55						2,140		1,980		2,060		2,080		2,530		2,260	
Selenium	MG/KG	0.92	J	S45-R10-07	3/16/2010	4%	3	76	1,500	0	39	0	U	0.18	UJ	0.22	UJ	0.18	U	0.22	UJ	0.24	UJ	0.24	UJ
Silver	MG/KG	205		S45-ODH-4-01	3/12/2010	62%	47	76	1,500	0	39	1	UJ	3.5	J	2.7	J	4.3		1.2	UJ	2.3	J	1.3	J
Sodium	MG/KG	211		S45-TP-3-01	3/12/2010	79%	60	76					J	110	J	104	J	112	J	136	J	93.5	J	93.4	J
Thallium	MG/KG	0.27	J	S45-TP-1-01	3/12/2010	5%	4	76			0.078	4	UJ	0.19	U	0.24	U	0.2	UJ	0.24	U	0.26	U	0.26	U
Vanadium	MG/KG	41.9	J	S45-R15-02	3/16/2010	100%	76	76			39	2		27.9		25.8		27.3		32.5		30		28.9	
Zinc	MG/KG	1,350		S45-R1-02	4/1/2010	100%	71	71	10,000	0	2,300	0	UR	427		361		347	UR	126		306		383	
Wet Chemistry																									
Perchlorate	UG/KG	8.2		S45-ODG-SS-06	5/30/2018	80%	8	10			5,500	0													

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) Bold chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

R = Rejected, data validation rejected the results.

U = non-detect, i.e. not detected at or above this value.

U-DL = Elevated sample detection limit due to difficult sample matrix.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

E (or ER) = Estimated result.

D = Results from dilution of sample.

J-DL = Elevated sample detection limit due to difficult sample matrix.

JN = Tentatively identified compound, estimated concentration.

UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

J+ = The result is an estimated quantity, but the result may be biased high.

J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL Residential Soil (HQ=0.1), 2018-05. ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10001-1.5-2.0		45-FS-SB-10002-1.5-2.0		45-FS-SB-10011-1.5-2.0		45-FS-SB-10003-1.5-2.0		45-FS-SB-10004-1.0-1.5		45-FS-SB-10005-1.5-2.0		45-FS-SB-10006-1.5-2.0	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1-1.5		1.5-2		1.5-2	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018	
QC Type													SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																										
1,1,1-Trichloroethane	UG/KG	0				0%	0	6	500,000	0	810,000	0														
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	6			600	0														
1,1,2-Trichloroethane	UG/KG	0				0%	0	6			150	0														
1,1-Dichloroethane	UG/KG	0				0%	0	6	240,000	0	3,600	0														
1,1-Dichloroethene	UG/KG	0				0%	0	6	500,000	0	23,000	0														
1,2-Dichloroethane	UG/KG	0				0%	0	6	30,000	0	460	0														
1,2-Dichloroethene (total)	UG/KG	0				0%	0	6	500,000	0																
1,2-Dichloropropane	UG/KG	0				0%	0	6			1,600	0														
Acetone	UG/KG	0				0%	0	6	500,000	0	6,100,000	0														
Benzene	UG/KG	0				0%	0	6	44,000	0	1,200	0														
Bromodichloromethane	UG/KG	0				0%	0	6			290	0														
Bromoform	UG/KG	0				0%	0	6			19,000	0														
Carbon disulfide	UG/KG	0				0%	0	6			77,000	0														
Carbon tetrachloride	UG/KG	0				0%	0	6	22,000	0	650	0														
Chlorobenzene	UG/KG	0				0%	0	6	500,000	0	28,000	0														
Chlorodibromomethane	UG/KG	0				0%	0	6			8,300	0														
Chloroethane	UG/KG	0				0%	0	6			1,400,000	0														
Chloroform	UG/KG	0				0%	0	6	350,000	0	320	0														
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	6																		
Ethyl benzene	UG/KG	0				0%	0	6	390,000	0	5,800	0														
Methyl bromide	UG/KG	0				0%	0	6			680	0														
Methyl butyl ketone	UG/KG	0				0%	0	6																		
Methyl chloride	UG/KG	0				0%	0	6			11,000	0														
Methyl ethyl ketone	UG/KG	0				0%	0	6	500,000	0	2,700,000	0														
Methyl isobutyl ketone	UG/KG	0				0%	0	6			3,300,000	0														
Methylene chloride	UG/KG	0				0%	0	6	500,000	0	35,000	0														
Styrene	UG/KG	0				0%	0	6			600,000	0														
Tetrachloroethene	UG/KG	19		TP45-3	11/11/1993	100%	6	6	150,000	0	8,100	0														
Toluene	UG/KG	0				0%	0	6	500,000	0	490,000	0														
Total Xylenes	UG/KG	0				0%	0	6	500,000	0	58,000	0														
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	6																		
Trichloroethene	UG/KG	0				0%	0	6	200,000	0	410	0														
Vinyl chloride	UG/KG	0				0%	0	6	13,000	0	59	0														
Herbicides																										
2,4,5-T	UG/KG	0				0%	0	6			63,000	0														
2,4,5-TP/Silvex	UG/KG	0				0%	0	6	500,000	0	51,000	0														
2,4-D	UG/KG	0				0%	0	6			70,000	0														
2,4-DB	UG/KG	0				0%	0	6			190,000	0														
Dalapon	UG/KG	0				0%	0	6			190,000	0														
Dicamba	UG/KG	0				0%	0	6			190,000	0														
Dichloroprop	UG/KG	0				0%	0	6																		
Dinoseb	UG/KG	0				0%	0	6			6,300	0														
MCPA	UG/KG	0				0%	0	6			3,200	0														
MCPP	UG/KG	0				0%	0	6			6,300	0														
Explosives																										
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			220,000	0														
1,3-Dinitrobenzene	UG/KG	0				0%	0	6			630	0														
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	11/11/1993	100%	6	6			3,600	0														
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			1,700	0														
2,6-Dinitrotoluene	UG/KG	0				0%	0	6			360	0														
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	11/11/1993	100%	6	6			15,000	0														
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	6			15,000	0														
HMX	UG/KG	470	J	TP45-2	11/11/1993	100%	6	6			390,000	0														
RDX	UG/KG	4,300		TP45-4	11/9/1993	100%	6	6			6,100	0														
Tetryl	UG/KG	180	J	TP45-5	11/9/1993	17%	1	6			16,000	0														

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10001-1.5-2.0		45-FS-SB-10002-1.5-2.0		45-FS-SB-10011-1.5-2.0		45-FS-SB-10003-1.5-2.0		45-FS-SB-10004-1.0-1.5		45-FS-SB-10005-1.5-2.0		45-FS-SB-10006-1.5-2.0	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1-1.5		1.5-2		1.5-2	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018	
QC Type													SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Semivolatile Organic Compounds																										
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	6			5,800	0														
1,2-Dichlorobenzene	UG/KG	0				0%	0	6	500,000	0	180,000	0														
1,3-Dichlorobenzene	UG/KG	0				0%	0	6	280,000	0																
1,4-Dichlorobenzene	UG/KG	0				0%	0	6	130,000	0	2,600	0														
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	6																		
2,4,5-Trichlorophenol	UG/KG	0				0%	0	6			630,000	0														
2,4,6-Trichlorophenol	UG/KG	0				0%	0	6			6,300	0														
2,4-Dichlorophenol	UG/KG	0				0%	0	6			19,000	0														
2,4-Dimethylphenol	UG/KG	0				0%	0	6			130,000	0														
2,4-Dinitrophenol	UG/KG	0				0%	0	6			13,000	0														
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	11/11/1993	100%	6	6			1,700	1														
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	11/11/1993	17%	1	6			360	1														
2-Chloronaphthalene	UG/KG	0				0%	0	6			480,000	0														
2-Chlorophenol	UG/KG	0				0%	0	6			39,000	0														
2-Methylnaphthalene	UG/KG	0				0%	0	6			24,000	0														
2-Methylphenol	UG/KG	0				0%	0	6	500,000	0	320,000	0														
2-Nitroaniline	UG/KG	0				0%	0	6			63,000	0														
2-Nitrophenol	UG/KG	0				0%	0	6																		
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	6			1,200	0														
3-Nitroaniline	UG/KG	0				0%	0	6																		
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	6			510	0														
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	6																		
4-Chloro-3-methylphenol	UG/KG	0				0%	0	6			630,000	0														
4-Chloroaniline	UG/KG	0				0%	0	6			2,700	0														
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	6																		
4-Methylphenol	UG/KG	0				0%	0	6	500,000	0	630,000	0														
4-Nitroaniline	UG/KG	0				0%	0	6			25,000	0														
4-Nitrophenol	UG/KG	0				0%	0	6																		
Acenaphthene	UG/KG	0				0%	0	6	500,000	0	360,000	0														
Acenaphthylene	UG/KG	19	J	TP45-1	11/11/1993	33%	2	6	500,000	0																
Anthracene	UG/KG	17	J	TP45-1	11/11/1993	17%	1	6	500,000	0	1,800,000	0														
Benzo(a)anthracene	UG/KG	36	J	TP45-4	11/9/1993	83%	5	6	5,600	0	1,100	0														
Benzo(a)pyrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	1,000	0	110	0														
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	11/9/1993	83%	5	6	5,600	0	1,100	0														
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	11/11/1993	83%	5	6	500,000	0																
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	11/9/1993	83%	5	6	56,000	0	11,000	0														
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	6			19,000	0														
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	6			230	0														
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	11/11/1993	33%	2	6			39,000	0														
Butylbenzylphthalate	UG/KG	0				0%	0	6																		
Carbazole	UG/KG	0				0%	0	6																		
Chrysene	UG/KG	51	J	TP45-4	11/9/1993	83%	5	6	56,000	0	110,000	0														
Dibenz(a,h)anthracene	UG/KG	0				0%	0	6	560	0	110	0														
Dibenzofuran	UG/KG	0				0%	0	6	350,000	0	7,300	0														
Diethyl phthalate	UG/KG	35	J	TP45-4	11/9/1993	17%	1	6			5,100,000	0														
Dimethylphthalate	UG/KG	0				0%	0	6																		
Di-n-butylphthalate	UG/KG	6,800		TP45-2	11/11/1993	100%	6	6			630,000	0														
Di-n-octylphthalate	UG/KG	0				0%	0	6			63,000	0														
Fluoranthene	UG/KG	68	J	TP45-4	11/9/1993	83%	5	6	500,000	0	240,000	0														
Fluorene	UG/KG	0				0%	0	6	500,000	0	240,000	0														
Hexachlorobenzene	UG/KG	62	J	TP45-1	11/11/1993	83%	5	6	6,000	0	210	0														
Hexachlorobutadiene	UG/KG	0				0%	0	6			1,200	0														
Hexachlorocyclopentadiene	UG/KG	0				0%	0	6			180	0														
Hexachloroethane	UG/KG	1,100		TP45-3	11/11/1993	83%	5	6			1,800	0														
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	11/11/1993	50%	3	6	5,600	0	1,100	0														
Isophorone	UG/KG	0				0%	0	6			570,000	0														
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	67%	4	6	500,000	0	3,800	0														
Nitrobenzene	UG/KG	0				0%	0	6			5,100	0														
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	6			78	0														
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	11/11/1993	67%	4	6			110,000	0														
Pentachlorophenol	UG/KG	0				0%	0	6	6,700	0	1,000	0														
Phenanthrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	500,000	0																
Phenol	UG/KG	0				0%	0	6	500,000	0	1,900,000	0														
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	100%	6	6	500,000	0	180,000	0														

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10001-1.5-2.0		45-FS-SB-10002-1.5-2.0		45-FS-SB-10011-1.5-2.0		45-FS-SB-10003-1.5-2.0		45-FS-SB-10004-1.0-1.5		45-FS-SB-10005-1.5-2.0		45-FS-SB-10006-1.5-2.0	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1-1.5		1.5-2		1.5-2	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018	
QC Type													SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																										
4,4'-DDD	UG/KG	0				0%	0	6	92,000	0	190	0														
4,4'-DDE	UG/KG	3.2	J	TP45-4	11/9/1993	33%	2	6	62,000	0	2,000	0														
4,4'-DDT	UG/KG	2.9	J	TP45-3	11/11/1993	33%	2	6	47,000	0	1,900	0														
Aldrin	UG/KG	0				0%	0	6	680	0	39	0														
Alpha-BHC	UG/KG	0				0%	0	6	3,400	0	86	0														
Alpha-Chlordane	UG/KG	0				0%	0	6	24,000	0																
Aroclor-1016	UG/KG	0				0%	0	6	1,000	0	410	0														
Aroclor-1221	UG/KG	0				0%	0	6	1,000	0	200	0														
Aroclor-1232	UG/KG	0				0%	0	6	1,000	0	170	0														
Aroclor-1242	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1248	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1254	UG/KG	0				0%	0	6	1,000	0	120	0														
Aroclor-1260	UG/KG	0				0%	0	6	1,000	0	240	0														
Beta-BHC	UG/KG	0				0%	0	6	3,000	0	300	0														
Delta-BHC	UG/KG	0				0%	0	6	500,000	0																
Dieldrin	UG/KG	2.4	J	TP45-4	11/9/1993	17%	1	6	1,400	0	34	0														
Endosulfan I	UG/KG	2.2	J	TP45-1	11/11/1993	67%	4	6	200,000	0																
Endosulfan II	UG/KG	0				0%	0	6	200,000	0																
Endosulfan sulfate	UG/KG	0				0%	0	6	200,000	0																
Endrin	UG/KG	0				0%	0	6	89,000	0	1,900	0														
Endrin aldehyde	UG/KG	0				0%	0	6																		
Endrin ketone	UG/KG	0				0%	0	6																		
Gamma-BHC/Lindane	UG/KG	0				0%	0	6	9,200	0	570	0														
Gamma-Chlordane	UG/KG	0				0%	0	6																		
Heptachlor	UG/KG	0				0%	0	6	15,000	0	130	0														
Heptachlor epoxide	UG/KG	0				0%	0	6			70	0														
Methoxychlor	UG/KG	0				0%	0	6			32,000	0														
Toxaphene	UG/KG	0				0%	0	6			490	0														
Inorganics																										
Aluminum	MG/KG	22,800		TP45-3	11/11/1993	100%	21	21			7,700	21														
Antimony	MG/KG	5.1	J	S45-TP-3-03	3/15/2010	38%	8	21			3.1	1														
Arsenic	MG/KG	8.7		S45-TP-1-02	3/12/2010	100%	21	21	16	0	0.68	21														
Barium	MG/KG	248		TP45-3	11/11/1993	100%	21	21	400	0	1,500	0														
Beryllium	MG/KG	1.1	J	TP45-3	11/11/1993	100%	21	21	590	0	16	0														
Cadmium	MG/KG	13.4		S45-TP-1-02	3/12/2010	95%	18	19	9.3	5	7.1	9														
Calcium	MG/KG	101,000		S45-TP-2-03	3/12/2010	100%	21	21																		
Chromium	MG/KG	39.2		S45-TP-1-03	3/12/2010	100%	21	21	1,500	0																
Cobalt	MG/KG	16.9		TP45-3	11/11/1993	100%	21	21			2.3	21														
Copper	MG/KG	7,310		S45-TP-1-02	3/12/2010	100%	21	21	270	13	310	13														
Cyanide	MG/KG	0.7		TP45-1	11/11/1993	33%	2	6	27	0	2.3	0														
Iron	MG/KG	60,900		S45-TP-1-02	3/12/2010	100%	21	21			5,500	21														
Lead	MG/KG	153	J	S45-TP-3-03	3/15/2010	100%	21	21	1,000	0	400	0														
Magnesium	MG/KG	12,500		S45-TP-4-04	3/12/2010	100%	21	21																		
Manganese	MG/KG	1,380		TP45-1	11/11/1993	100%	21	21	10,000	0	180	21														
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	3/12/2010 3/12/2010	100%	21	21	2.8	16	1.1	18														
Nickel	MG/KG	54		S45-TP-1-02	3/12/2010	100%	21	21	310	0	150	0														
Potassium	MG/KG	3,510	J	S45-TP-3-04	3/15/2010	100%	21	21																		
Selenium	MG/KG	0.56	J	S45-TP-4-03	3/12/2010	5%	1	21	1,500	0	39	0														
Silver	MG/KG	53.7		S45-TP-1-02	3/12/2010	90%	19	21	1,500	0	39	1														
Sodium	MG/KG	213		S45-TP-2-03	3/12/2010	100%	21	21																		
Thallium	MG/KG	0.25	J	S45-TP-2-05	3/12/2010	10%	2	21			0.078	2														
Vanadium	MG/KG	38		TP45-3	11/11/1993	100%	21	21			39	0														
Zinc	MG/KG	1,470		S45-TP-2-04	3/12/2010	100%	21	21	10,000	0	2,300	0														

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-01		S45-ODG-SS-02		S45-ODG-SS-02		S45-ODG-SS-03		S45-ODG-SS-04		S45-ODG-SS-05		S45-ODG-SS-06	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10001-1.5-2.0		45-FS-SB-10002-1.5-2.0		45-FS-SB-10011-1.5-2.0		45-FS-SB-10003-1.5-2.0		45-FS-SB-10004-1.0-1.5		45-FS-SB-10005-1.5-2.0		45-FS-SB-10006-1.5-2.0	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1-1.5		1.5-2		1.5-2	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018	
QC Type													SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Wet Chemistry																										
Perchlorate	UG/KG	41		S45-ODG-SS-06	5/30/2018	75%	9	12			5,500	0	0.11	J	0.046	U	0.047	U	0.044	U	0.95		0.26	J	41	

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														S45-ODG-SS-06		S45-ODG-SS-07		S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-TP-1-02		S45-TP-1-03	
Matrix														SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID														45-FS-SB-10012-1.5-2.0		45-FS-SB-10007-1.5-2.0		45-FS-SB-10008-1.5-2.0		45-FS-SB-10009-1.5-2.0		45-FS-SB-10010-1.5-2.0		S45-TP-1-02		S45-TP-1-03	
Sample Depth Interval (FT)														1.5-2		1.5-2		1.5-2		1.5-2		1.5-2		2.5-2.5		5-5	
Sample Date														5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010	
QC Type														DU		SA		SA		SA		SA		SA		SA	
Study ID														2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest	
Sample Round																											
Filtered														Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above		Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																											
1,1,1-Trichloroethane	UG/KG	0				0%	0	6	500,000	0	810,000	0															
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	6			600	0															
1,1,2-Trichloroethane	UG/KG	0				0%	0	6			150	0															
1,1-Dichloroethane	UG/KG	0				0%	0	6	240,000	0	3,600	0															
1,1-Dichloroethene	UG/KG	0				0%	0	6	500,000	0	23,000	0															
1,2-Dichloroethane	UG/KG	0				0%	0	6	30,000	0	460	0															
1,2-Dichloroethene (total)	UG/KG	0				0%	0	6	500,000	0																	
1,2-Dichloropropane	UG/KG	0				0%	0	6			1,600	0															
Acetone	UG/KG	0				0%	0	6	500,000	0	6,100,000	0															
Benzene	UG/KG	0				0%	0	6	44,000	0	1,200	0															
Bromodichloromethane	UG/KG	0				0%	0	6			290	0															
Bromoform	UG/KG	0				0%	0	6			19,000	0															
Carbon disulfide	UG/KG	0				0%	0	6			77,000	0															
Carbon tetrachloride	UG/KG	0				0%	0	6	22,000	0	650	0															
Chlorobenzene	UG/KG	0				0%	0	6	500,000	0	28,000	0															
Chlorodibromomethane	UG/KG	0				0%	0	6			8,300	0															
Chloroethane	UG/KG	0				0%	0	6			1,400,000	0															
Chloroform	UG/KG	0				0%	0	6	350,000	0	320	0															
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	6																			
Ethyl benzene	UG/KG	0				0%	0	6	390,000	0	5,800	0															
Methyl bromide	UG/KG	0				0%	0	6			680	0															
Methyl butyl ketone	UG/KG	0				0%	0	6																			
Methyl chloride	UG/KG	0				0%	0	6			11,000	0															
Methyl ethyl ketone	UG/KG	0				0%	0	6	500,000	0	2,700,000	0															
Methyl isobutyl ketone	UG/KG	0				0%	0	6			3,300,000	0															
Methylene chloride	UG/KG	0				0%	0	6	500,000	0	35,000	0															
Styrene	UG/KG	0				0%	0	6			600,000	0															
Tetrachloroethene	UG/KG	19		TP45-3	11/11/1993	100%	6	6	150,000	0	8,100	0															
Toluene	UG/KG	0				0%	0	6	500,000	0	490,000	0															
Total Xylenes	UG/KG	0				0%	0	6	500,000	0	58,000	0															
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	6																			
Trichloroethene	UG/KG	0				0%	0	6	200,000	0	410	0															
Vinyl chloride	UG/KG	0				0%	0	6	13,000	0	59	0															
Herbicides																											
2,4,5-T	UG/KG	0				0%	0	6			63,000	0															
2,4,5-TP/Silvex	UG/KG	0				0%	0	6	500,000	0	51,000	0															
2,4-D	UG/KG	0				0%	0	6			70,000	0															
2,4-DB	UG/KG	0				0%	0	6			190,000	0															
Dalapon	UG/KG	0				0%	0	6			190,000	0															
Dicamba	UG/KG	0				0%	0	6			190,000	0															
Dichloroprop	UG/KG	0				0%	0	6																			
Dinoseb	UG/KG	0				0%	0	6			6,300	0															
MCPA	UG/KG	0				0%	0	6			3,200	0															
MCPP	UG/KG	0				0%	0	6			6,300	0															
Explosives																											
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			220,000	0															
1,3-Dinitrobenzene	UG/KG	0				0%	0	6			630	0															
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	11/11/1993	100%	6	6			3,600	0															
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			1,700	0															
2,6-Dinitrotoluene	UG/KG	0				0%	0	6			360	0															
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	11/11/1993	100%	6	6			15,000	0															
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	6			15,000	0															
HMX	UG/KG	470	J	TP45-2	11/11/1993	100%	6	6			390,000	0															
RDX	UG/KG	4,300		TP45-4	11/9/1993	100%	6	6			6,100	0															
Tetryl	UG/KG	180	J	TP45-5	11/9/1993	17%	1	6			16,000	0															

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-06		S45-ODG-SS-07		S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-TP-1-02	S45-TP-1-03
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	SOIL
Sample ID													45-FS-SB-10012-1.5-2.0		45-FS-SB-10007-1.5-2.0		45-FS-SB-10008-1.5-2.0		45-FS-SB-10009-1.5-2.0		45-FS-SB-10010-1.5-2.0		S45-TP-1-02	S45-TP-1-03
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1.5-2		2.5-2.5	5-5
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		3/12/2010	3/12/2010
QC Type													DU		SA		SA		SA		SA		SA	SA
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest	OD Initial Invest
Sample Round																								
Filtered													Total		Total		Total		Total		Total		Total	Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)													
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Semivolatile Organic Compounds																								
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	6			5,800	0												
1,2-Dichlorobenzene	UG/KG	0				0%	0	6	500,000	0	180,000	0												
1,3-Dichlorobenzene	UG/KG	0				0%	0	6	280,000	0														
1,4-Dichlorobenzene	UG/KG	0				0%	0	6	130,000	0	2,600	0												
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	6																
2,4,5-Trichlorophenol	UG/KG	0				0%	0	6			630,000	0												
2,4,6-Trichlorophenol	UG/KG	0				0%	0	6			6,300	0												
2,4-Dichlorophenol	UG/KG	0				0%	0	6			19,000	0												
2,4-Dimethylphenol	UG/KG	0				0%	0	6			130,000	0												
2,4-Dinitrophenol	UG/KG	0				0%	0	6			13,000	0												
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	11/11/1993	100%	6	6			1,700	1												
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	11/11/1993	17%	1	6			360	1												
2-Chloronaphthalene	UG/KG	0				0%	0	6			480,000	0												
2-Chlorophenol	UG/KG	0				0%	0	6			39,000	0												
2-Methylnaphthalene	UG/KG	0				0%	0	6			24,000	0												
2-Methylphenol	UG/KG	0				0%	0	6	500,000	0	320,000	0												
2-Nitroaniline	UG/KG	0				0%	0	6			63,000	0												
2-Nitrophenol	UG/KG	0				0%	0	6																
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	6			1,200	0												
3-Nitroaniline	UG/KG	0				0%	0	6																
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	6			510	0												
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	6																
4-Chloro-3-methylphenol	UG/KG	0				0%	0	6			630,000	0												
4-Chloroaniline	UG/KG	0				0%	0	6			2,700	0												
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	6																
4-Methylphenol	UG/KG	0				0%	0	6	500,000	0	630,000	0												
4-Nitroaniline	UG/KG	0				0%	0	6			25,000	0												
4-Nitrophenol	UG/KG	0				0%	0	6																
Acenaphthene	UG/KG	0				0%	0	6	500,000	0	360,000	0												
Acenaphthylene	UG/KG	19	J	TP45-1	11/11/1993	33%	2	6	500,000	0														
Anthracene	UG/KG	17	J	TP45-1	11/11/1993	17%	1	6	500,000	0	1,800,000	0												
Benzo(a)anthracene	UG/KG	36	J	TP45-4	11/9/1993	83%	5	6	5,600	0	1,100	0												
Benzo(a)pyrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	1,000	0	110	0												
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	11/9/1993	83%	5	6	5,600	0	1,100	0												
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	11/11/1993	83%	5	6	500,000	0														
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	11/9/1993	83%	5	6	56,000	0	11,000	0												
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	6			19,000	0												
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	6			230	0												
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	11/11/1993	33%	2	6			39,000	0												
Butylbenzylphthalate	UG/KG	0				0%	0	6																
Carbazole	UG/KG	0				0%	0	6																
Chrysene	UG/KG	51	J	TP45-4	11/9/1993	83%	5	6	56,000	0	110,000	0												
Dibenz(a,h)anthracene	UG/KG	0				0%	0	6	560	0	110	0												
Dibenzofuran	UG/KG	0				0%	0	6	350,000	0	7,300	0												
Diethyl phthalate	UG/KG	35	J	TP45-4	11/9/1993	17%	1	6			5,100,000	0												
Dimethylphthalate	UG/KG	0				0%	0	6																
Di-n-butylphthalate	UG/KG	6,800		TP45-2	11/11/1993	100%	6	6			630,000	0												
Di-n-octylphthalate	UG/KG	0				0%	0	6			63,000	0												
Fluoranthene	UG/KG	68	J	TP45-4	11/9/1993	83%	5	6	500,000	0	240,000	0												
Fluorene	UG/KG	0				0%	0	6	500,000	0	240,000	0												
Hexachlorobenzene	UG/KG	62	J	TP45-1	11/11/1993	83%	5	6	6,000	0	210	0												
Hexachlorobutadiene	UG/KG	0				0%	0	6			1,200	0												
Hexachlorocyclopentadiene	UG/KG	0				0%	0	6			180	0												
Hexachloroethane	UG/KG	1,100		TP45-3	11/11/1993	83%	5	6			1,800	0												
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	11/11/1993	50%	3	6	5,600	0	1,100	0												
Isophorone	UG/KG	0				0%	0	6			570,000	0												
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	67%	4	6	500,000	0	3,800	0												
Nitrobenzene	UG/KG	0				0%	0	6			5,100	0												
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	6			78	0												
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	11/11/1993	67%	4	6			110,000	0												
Pentachlorophenol	UG/KG	0				0%	0	6	6,700	0	1,000	0												
Phenanthrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	500,000	0														
Phenol	UG/KG	0				0%	0	6	500,000	0	1,900,000	0												
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	100%	6	6	500,000	0	180,000	0												

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-06		S45-ODG-SS-07		S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-TP-1-02		S45-TP-1-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10012-1.5-2.0		45-FS-SB-10007-1.5-2.0		45-FS-SB-10008-1.5-2.0		45-FS-SB-10009-1.5-2.0		45-FS-SB-10010-1.5-2.0		S45-TP-1-02		S45-TP-1-03	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1.5-2		2.5-2.5		5-5	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010	
QC Type													DU		SA		SA		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																										
4,4'-DDD	UG/KG	0				0%	0	6	92,000	0	190	0														
4,4'-DDE	UG/KG	3.2	J	TP45-4	11/9/1993	33%	2	6	62,000	0	2,000	0														
4,4'-DDT	UG/KG	2.9	J	TP45-3	11/11/1993	33%	2	6	47,000	0	1,900	0														
Aldrin	UG/KG	0				0%	0	6	680	0	39	0														
Alpha-BHC	UG/KG	0				0%	0	6	3,400	0	86	0														
Alpha-Chlordane	UG/KG	0				0%	0	6	24,000	0																
Aroclor-1016	UG/KG	0				0%	0	6	1,000	0	410	0														
Aroclor-1221	UG/KG	0				0%	0	6	1,000	0	200	0														
Aroclor-1232	UG/KG	0				0%	0	6	1,000	0	170	0														
Aroclor-1242	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1248	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1254	UG/KG	0				0%	0	6	1,000	0	120	0														
Aroclor-1260	UG/KG	0				0%	0	6	1,000	0	240	0														
Beta-BHC	UG/KG	0				0%	0	6	3,000	0	300	0														
Delta-BHC	UG/KG	0				0%	0	6	500,000	0																
Dieldrin	UG/KG	2.4	J	TP45-4	11/9/1993	17%	1	6	1,400	0	34	0														
Endosulfan I	UG/KG	2.2	J	TP45-1	11/11/1993	67%	4	6	200,000	0																
Endosulfan II	UG/KG	0				0%	0	6	200,000	0																
Endosulfan sulfate	UG/KG	0				0%	0	6	200,000	0																
Endrin	UG/KG	0				0%	0	6	89,000	0	1,900	0														
Endrin aldehyde	UG/KG	0				0%	0	6																		
Endrin ketone	UG/KG	0				0%	0	6																		
Gamma-BHC/Lindane	UG/KG	0				0%	0	6	9,200	0	570	0														
Gamma-Chlordane	UG/KG	0				0%	0	6																		
Heptachlor	UG/KG	0				0%	0	6	15,000	0	130	0														
Heptachlor epoxide	UG/KG	0				0%	0	6			70	0														
Methoxychlor	UG/KG	0				0%	0	6			32,000	0														
Toxaphene	UG/KG	0				0%	0	6			490	0														
Inorganics																										
Aluminum	MG/KG	22,800		TP45-3	11/11/1993	100%	21	21			7,700	21											14,400		17,800	
Antimony	MG/KG	5.1	J	S45-TP-3-03	3/15/2010	38%	8	21			3.1	1											0.63	J	0.2	UJ
Arsenic	MG/KG	8.7		S45-TP-1-02	3/12/2010	100%	21	21	16	0	0.68	21											8.7		7.9	
Barium	MG/KG	248		TP45-3	11/11/1993	100%	21	21	400	0	1,500	0											101		171	
Beryllium	MG/KG	1.1	J	TP45-3	11/11/1993	100%	21	21	590	0	16	0											0.62		0.78	
Cadmium	MG/KG	13.4		S45-TP-1-02	3/12/2010	95%	18	19	9.3	5	7.1	9											13.4		8.7	
Calcium	MG/KG	101,000		S45-TP-2-03	3/12/2010	100%	21	21															62,400		25,700	
Chromium	MG/KG	39.2		S45-TP-1-03	3/12/2010	100%	21	21	1,500	0													35		39.2	
Cobalt	MG/KG	16.9		TP45-3	11/11/1993	100%	21	21			2.3	21											12.9		13.6	
Copper	MG/KG	7,310		S45-TP-1-02	3/12/2010	100%	21	21	270	13	310	13											7,310		882	
Cyanide	MG/KG	0.7		TP45-1	11/11/1993	33%	2	6	27	0	2.3	0														
Iron	MG/KG	60,900		S45-TP-1-02	3/12/2010	100%	21	21			5,500	21											60,900		37,600	
Lead	MG/KG	153	J	S45-TP-3-03	3/15/2010	100%	21	21	1,000	0	400	0											22.3		63.8	
Magnesium	MG/KG	12,500		S45-TP-4-04	3/12/2010	100%	21	21															9,200		7,030	
Manganese	MG/KG	1,380		TP45-1	11/11/1993	100%	21	21	10,000	0	180	21											574		635	
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	3/12/2010 3/12/2010	100%	21	21	2.8	16	1.1	18											4.3		5.2	
Nickel	MG/KG	54		S45-TP-1-02	3/12/2010	100%	21	21	310	0	150	0											54		43.5	
Potassium	MG/KG	3,510	J	S45-TP-3-04	3/15/2010	100%	21	21															2,180	J	2,700	J
Selenium	MG/KG	0.56	J	S45-TP-4-03	3/12/2010	5%	1	21	1,500	0	39	0											0.59	U	0.43	U
Silver	MG/KG	53.7		S45-TP-1-02	3/12/2010	90%	19	21	1,500	0	39	1											53.7		7.3	
Sodium	MG/KG	213		S45-TP-2-03	3/12/2010	100%	21	21															151		122	
Thallium	MG/KG	0.25	J	S45-TP-2-05	3/12/2010	10%	2	21			0.078	2											0.25	U	0.18	U
Vanadium	MG/KG	38		TP45-3	11/11/1993	100%	21	21			39	0											22.3		29.8	
Zinc	MG/KG	1,470		S45-TP-2-04	3/12/2010	100%	21	21	10,000	0	2,300	0											150		335	

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-ODG-SS-06		S45-ODG-SS-07		S45-ODG-SS-08		S45-ODG-SS-09		S45-ODG-SS-10		S45-TP-1-02		S45-TP-1-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													45-FS-SB-10012-1.5-2.0		45-FS-SB-10007-1.5-2.0		45-FS-SB-10008-1.5-2.0		45-FS-SB-10009-1.5-2.0		45-FS-SB-10010-1.5-2.0		S45-TP-1-02		S45-TP-1-03	
Sample Depth Interval (FT)													1.5-2		1.5-2		1.5-2		1.5-2		1.5-2		2.5-2.5		5-5	
Sample Date													5/30/2018		5/30/2018		5/30/2018		5/30/2018		5/30/2018		3/12/2010		3/12/2010	
QC Type													DU		SA		SA		SA		SA		SA		SA	
Study ID													2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		2018 Perchlorates		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Wet Chemistry																										
Perchlorate	UG/KG	41		S45-ODG-SS-06	5/30/2018	75%	9	12			5,500	0	29		0.48	J	0.44	J	0.54	J	0.4	J				

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.

E (or ER) = Estimated result.

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

D = Results from dilution of sample.

R = Rejected, data validation rejected the results.

J-DL = Elevated sample detection limit due to difficult sample matrix.

U = non-detect, i.e. not detected at or above this value.

JN = Tentatively identified compound, estimated concentration.

U-DL = Elevated sample detection limit due to difficult sample matrix.

UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.

U-ND = Analyte not detected in sample, but no detection or reporting limit provided.

J+ = The result is an estimated quantity, but the result may be biased high.

J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.

J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Sample Depth Interval (FT)													7.5-7.5		2.5-2.5		5-5		7.5-7.5		10-10		2.5-2.5		5-5	
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/15/2010		3/15/2010	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																										
1,1,1-Trichloroethane	UG/KG	0				0%	0	6	500,000	0	810,000	0														
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	6			600	0														
1,1,2-Trichloroethane	UG/KG	0				0%	0	6			150	0														
1,1-Dichloroethane	UG/KG	0				0%	0	6	240,000	0	3,600	0														
1,1-Dichloroethene	UG/KG	0				0%	0	6	500,000	0	23,000	0														
1,2-Dichloroethane	UG/KG	0				0%	0	6	30,000	0	460	0														
1,2-Dichloroethene (total)	UG/KG	0				0%	0	6	500,000	0																
1,2-Dichloropropane	UG/KG	0				0%	0	6			1,600	0														
Acetone	UG/KG	0				0%	0	6	500,000	0	6,100,000	0														
Benzene	UG/KG	0				0%	0	6	44,000	0	1,200	0														
Bromodichloromethane	UG/KG	0				0%	0	6			290	0														
Bromoform	UG/KG	0				0%	0	6			19,000	0														
Carbon disulfide	UG/KG	0				0%	0	6			77,000	0														
Carbon tetrachloride	UG/KG	0				0%	0	6	22,000	0	650	0														
Chlorobenzene	UG/KG	0				0%	0	6	500,000	0	28,000	0														
Chlorodibromomethane	UG/KG	0				0%	0	6			8,300	0														
Chloroethane	UG/KG	0				0%	0	6			1,400,000	0														
Chloroform	UG/KG	0				0%	0	6	350,000	0	320	0														
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	6																		
Ethyl benzene	UG/KG	0				0%	0	6	390,000	0	5,800	0														
Methyl bromide	UG/KG	0				0%	0	6			680	0														
Methyl butyl ketone	UG/KG	0				0%	0	6																		
Methyl chloride	UG/KG	0				0%	0	6			11,000	0														
Methyl ethyl ketone	UG/KG	0				0%	0	6	500,000	0	2,700,000	0														
Methyl isobutyl ketone	UG/KG	0				0%	0	6			3,300,000	0														
Methylene chloride	UG/KG	0				0%	0	6	500,000	0	35,000	0														
Styrene	UG/KG	0				0%	0	6			600,000	0														
Tetrachloroethene	UG/KG	19		TP45-3	11/11/1993	100%	6	6	150,000	0	8,100	0														
Toluene	UG/KG	0				0%	0	6	500,000	0	490,000	0														
Total Xylenes	UG/KG	0				0%	0	6	500,000	0	58,000	0														
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	6																		
Trichloroethene	UG/KG	0				0%	0	6	200,000	0	410	0														
Vinyl chloride	UG/KG	0				0%	0	6	13,000	0	59	0														
Herbicides																										
2,4,5-T	UG/KG	0				0%	0	6			63,000	0														
2,4,5-TP/Silvex	UG/KG	0				0%	0	6	500,000	0	51,000	0														
2,4-D	UG/KG	0				0%	0	6			70,000	0														
2,4-DB	UG/KG	0				0%	0	6			190,000	0														
Dalapon	UG/KG	0				0%	0	6			190,000	0														
Dicamba	UG/KG	0				0%	0	6			190,000	0														
Dichloroprop	UG/KG	0				0%	0	6																		
Dinoseb	UG/KG	0				0%	0	6			6,300	0														
MCPA	UG/KG	0				0%	0	6			3,200	0														
MCPP	UG/KG	0				0%	0	6			6,300	0														
Explosives																										
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			220,000	0														
1,3-Dinitrobenzene	UG/KG	0				0%	0	6			630	0														
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	11/11/1993	100%	6	6			3,600	0														
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			1,700	0														
2,6-Dinitrotoluene	UG/KG	0				0%	0	6			360	0														
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	11/11/1993	100%	6	6			15,000	0														
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	6			15,000	0														
HMX	UG/KG	470	J	TP45-2	11/11/1993	100%	6	6			390,000	0														
RDX	UG/KG	4,300		TP45-4	11/9/1993	100%	6	6			6,100	0														
Tetryl	UG/KG	180	J	TP45-5	11/9/1993	17%	1	6			16,000	0														

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Sample Depth Interval (FT)													7.5-7.5		2.5-2.5		5-5		7.5-7.5		10-10		2.5-2.5		5-5	
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/15/2010		3/15/2010	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Semivolatile Organic Compounds																										
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	6			5,800	0														
1,2-Dichlorobenzene	UG/KG	0				0%	0	6	500,000	0	180,000	0														
1,3-Dichlorobenzene	UG/KG	0				0%	0	6	280,000	0																
1,4-Dichlorobenzene	UG/KG	0				0%	0	6	130,000	0	2,600	0														
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	6																		
2,4,5-Trichlorophenol	UG/KG	0				0%	0	6			630,000	0														
2,4,6-Trichlorophenol	UG/KG	0				0%	0	6			6,300	0														
2,4-Dichlorophenol	UG/KG	0				0%	0	6			19,000	0														
2,4-Dimethylphenol	UG/KG	0				0%	0	6			130,000	0														
2,4-Dinitrophenol	UG/KG	0				0%	0	6			13,000	0														
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	11/11/1993	100%	6	6			1,700	1														
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	11/11/1993	17%	1	6			360	1														
2-Chloronaphthalene	UG/KG	0				0%	0	6			480,000	0														
2-Chlorophenol	UG/KG	0				0%	0	6			39,000	0														
2-Methylnaphthalene	UG/KG	0				0%	0	6			24,000	0														
2-Methylphenol	UG/KG	0				0%	0	6	500,000	0	320,000	0														
2-Nitroaniline	UG/KG	0				0%	0	6			63,000	0														
2-Nitrophenol	UG/KG	0				0%	0	6																		
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	6			1,200	0														
3-Nitroaniline	UG/KG	0				0%	0	6																		
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	6			510	0														
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	6																		
4-Chloro-3-methylphenol	UG/KG	0				0%	0	6			630,000	0														
4-Chloroaniline	UG/KG	0				0%	0	6			2,700	0														
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	6																		
4-Methylphenol	UG/KG	0				0%	0	6	500,000	0	630,000	0														
4-Nitroaniline	UG/KG	0				0%	0	6			25,000	0														
4-Nitrophenol	UG/KG	0				0%	0	6																		
Acenaphthene	UG/KG	0				0%	0	6	500,000	0	360,000	0														
Acenaphthylene	UG/KG	19	J	TP45-1	11/11/1993	33%	2	6	500,000	0																
Anthracene	UG/KG	17	J	TP45-1	11/11/1993	17%	1	6	500,000	0	1,800,000	0														
Benzo(a)anthracene	UG/KG	36	J	TP45-4	11/9/1993	83%	5	6	5,600	0	1,100	0														
Benzo(a)pyrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	1,000	0	110	0														
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	11/9/1993	83%	5	6	5,600	0	1,100	0														
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	11/11/1993	83%	5	6	500,000	0																
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	11/9/1993	83%	5	6	56,000	0	11,000	0														
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	6			19,000	0														
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	6			230	0														
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	11/11/1993	33%	2	6			39,000	0														
Butylbenzylphthalate	UG/KG	0				0%	0	6																		
Carbazole	UG/KG	0				0%	0	6																		
Chrysene	UG/KG	51	J	TP45-4	11/9/1993	83%	5	6	56,000	0	110,000	0														
Dibenz(a,h)anthracene	UG/KG	0				0%	0	6	560	0	110	0														
Dibenzofuran	UG/KG	0				0%	0	6	350,000	0	7,300	0														
Diethyl phthalate	UG/KG	35	J	TP45-4	11/9/1993	17%	1	6			5,100,000	0														
Dimethylphthalate	UG/KG	0				0%	0	6																		
Di-n-butylphthalate	UG/KG	6,800		TP45-2	11/11/1993	100%	6	6			630,000	0														
Di-n-octylphthalate	UG/KG	0				0%	0	6			63,000	0														
Fluoranthene	UG/KG	68	J	TP45-4	11/9/1993	83%	5	6	500,000	0	240,000	0														
Fluorene	UG/KG	0				0%	0	6	500,000	0	240,000	0														
Hexachlorobenzene	UG/KG	62	J	TP45-1	11/11/1993	83%	5	6	6,000	0	210	0														
Hexachlorobutadiene	UG/KG	0				0%	0	6			1,200	0														
Hexachlorocyclopentadiene	UG/KG	0				0%	0	6			180	0														
Hexachloroethane	UG/KG	1,100		TP45-3	11/11/1993	83%	5	6			1,800	0														
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	11/11/1993	50%	3	6	5,600	0	1,100	0														
Isophorone	UG/KG	0				0%	0	6			570,000	0														
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	67%	4	6	500,000	0	3,800	0														
Nitrobenzene	UG/KG	0				0%	0	6			5,100	0														
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	6			78	0														
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	11/11/1993	67%	4	6			110,000	0														
Pentachlorophenol	UG/KG	0				0%	0	6	6,700	0	1,000	0														
Phenanthrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	500,000	0																
Phenol	UG/KG	0				0%	0	6	500,000	0	1,900,000	0														
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	100%	6	6	500,000	0	180,000	0														

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Sample Depth Interval (FT)													7.5-7.5		2.5-2.5		5-5		7.5-7.5		10-10		2.5-2.5		5-5	
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/15/2010		3/15/2010	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																										
4,4'-DDD	UG/KG	0				0%	0	6	92,000	0	190	0														
4,4'-DDE	UG/KG	3.2	J	TP45-4	11/9/1993	33%	2	6	62,000	0	2,000	0														
4,4'-DDT	UG/KG	2.9	J	TP45-3	11/11/1993	33%	2	6	47,000	0	1,900	0														
Aldrin	UG/KG	0				0%	0	6	680	0	39	0														
Alpha-BHC	UG/KG	0				0%	0	6	3,400	0	86	0														
Alpha-Chlordane	UG/KG	0				0%	0	6	24,000	0																
Aroclor-1016	UG/KG	0				0%	0	6	1,000	0	410	0														
Aroclor-1221	UG/KG	0				0%	0	6	1,000	0	200	0														
Aroclor-1232	UG/KG	0				0%	0	6	1,000	0	170	0														
Aroclor-1242	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1248	UG/KG	0				0%	0	6	1,000	0	230	0														
Aroclor-1254	UG/KG	0				0%	0	6	1,000	0	120	0														
Aroclor-1260	UG/KG	0				0%	0	6	1,000	0	240	0														
Beta-BHC	UG/KG	0				0%	0	6	3,000	0	300	0														
Delta-BHC	UG/KG	0				0%	0	6	500,000	0																
Dieldrin	UG/KG	2.4	J	TP45-4	11/9/1993	17%	1	6	1,400	0	34	0														
Endosulfan I	UG/KG	2.2	J	TP45-1	11/11/1993	67%	4	6	200,000	0																
Endosulfan II	UG/KG	0				0%	0	6	200,000	0																
Endosulfan sulfate	UG/KG	0				0%	0	6	200,000	0																
Endrin	UG/KG	0				0%	0	6	89,000	0	1,900	0														
Endrin aldehyde	UG/KG	0				0%	0	6																		
Endrin ketone	UG/KG	0				0%	0	6																		
Gamma-BHC/Lindane	UG/KG	0				0%	0	6	9,200	0	570	0														
Gamma-Chlordane	UG/KG	0				0%	0	6																		
Heptachlor	UG/KG	0				0%	0	6	15,000	0	130	0														
Heptachlor epoxide	UG/KG	0				0%	0	6			70	0														
Methoxychlor	UG/KG	0				0%	0	6			32,000	0														
Toxaphene	UG/KG	0				0%	0	6			490	0														
Inorganics																										
Aluminum	MG/KG	22,800		TP45-3	11/11/1993	100%	21	21			7,700	21	13,000		16,400		12,500		16,500		12,500		16,500	J	21,700	J
Antimony	MG/KG	5.1	J	S45-TP-3-03	3/15/2010	38%	8	21			3.1	1	0.13	UJ	0.2	UJ	1.5	J	0.29	J	0.38	J	0.2	UJ	5.1	J
Arsenic	MG/KG	8.7		S45-TP-1-02	3/12/2010	100%	21	21	16	0	0.68	21	4.2		5.5		4.2		4.8		5.8		4.7	J	4.6	J
Barium	MG/KG	248		TP45-3	11/11/1993	100%	21	21	400	0	1,500	0	71.2		126		190		227		191		158	J	173	J
Beryllium	MG/KG	1.1	J	TP45-3	11/11/1993	100%	21	21	590	0	16	0	0.63		0.79		0.55		0.73		0.6		0.75	J	0.7	J
Cadmium	MG/KG	13.4		S45-TP-1-02	3/12/2010	95%	18	19	9.3	5	7.1	9	0.04	J	3.5		4.6		7.6		6.1		7.9	J	6.9	J
Calcium	MG/KG	101,000		S45-TP-2-03	3/12/2010	100%	21	21					53,200		28,900		101,000		29,500		30,900		23,000	J	34,100	J
Chromium	MG/KG	39.2		S45-TP-1-03	3/12/2010	100%	21	21	1,500	0			23.5		26.2		21.3		26.7		19.7		28.1	J	26.7	J
Cobalt	MG/KG	16.9		TP45-3	11/11/1993	100%	21	21			2.3	21	13.3		12.5		10		11.3		9.6		12.1	J	9.2	J
Copper	MG/KG	7,310		S45-TP-1-02	3/12/2010	100%	21	21	270	13	310	13	44.4		132		165		2,490		172		378	J	716	J
Cyanide	MG/KG	0.7		TP45-1	11/11/1993	33%	2	6	27	0	2.3	0														
Iron	MG/KG	60,900		S45-TP-1-02	3/12/2010	100%	21	21			5,500	21	22,100		27,800		20,300		25,600		23,000		26,900	J	23,400	J
Lead	MG/KG	153	J	S45-TP-3-03	3/15/2010	100%	21	21	1,000	0	400	0	15.9		33.4		62.8		91		83.6		58.3	J	153	J
Magnesium	MG/KG	12,500		S45-TP-4-04	3/12/2010	100%	21	21					10,800		7,010		7,450		7,380		6,020		7,310	J	7,810	J
Manganese	MG/KG	1,380		TP45-1	11/11/1993	100%	21	21	10,000	0	180	21	409		616		727		407		389		580	J	566	J
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	3/12/2010 3/12/2010	100%	21	21	2.8	16	1.1	18	0.02	J	1.1		6		9.1		7.6		2.6	J	8	J
Nickel	MG/KG	54		S45-TP-1-02	3/12/2010	100%	21	21	310	0	150	0	45.4		37.1		31		38.2		30		40.8	J	39	J
Potassium	MG/KG	3,510	J	S45-TP-3-04	3/15/2010	100%	21	21					2,240	J	2,140	J	1,780	J	2,400	J	1,780	J	2,310	J	3,220	J
Selenium	MG/KG	0.56	J	S45-TP-4-03	3/12/2010	5%	1	21	1,500	0	39	0	0.28	U	0.43	U	0.32	U	0.4	U	0.23	U	0.44	UJ	0.22	UJ
Silver	MG/KG	53.7		S45-TP-1-02	3/12/2010	90%	19	21	1,500	0	39	1	0.14	J	0.72	J	0.31	J	0.63	J	0.78	J	2.5	J	1.5	U
Sodium	MG/KG	213		S45-TP-2-03	3/12/2010	100%	21	21					120		199		213		189		199		101	J	149	J
Thallium	MG/KG	0.25	J	S45-TP-2-05	3/12/2010	10%	2	21			0.078	2	0.12	U	0.18	U	0.14	U	0.17	U	0.25	J	0.18	UJ	0.09	UJ
Vanadium	MG/KG	38		TP45-3	11/11/1993	100%	21	21			39	0	21.3		26.5		20.8		26.9		20.6		27.6	J	29	J
Zinc	MG/KG	1,470		S45-TP-2-04	3/12/2010	100%	21	21	10,000	0	2,300	0	84.4		198		463		1,470		535		315	J	585	J

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-1-04		S45-TP-2-02		S45-TP-2-03		S45-TP-2-04		S45-TP-2-05		S45-TP-3-02		S45-TP-3-03	
Sample Depth Interval (FT)													7.5-7.5		2.5-2.5		5-5		7.5-7.5		10-10		2.5-2.5		5-5	
Sample Date													3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/15/2010		3/15/2010	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Wet Chemistry																										
Perchlorate	UG/KG	41		S45-ODG-SS-06	5/30/2018	75%	9	12			5,500	0														
Footnote:																										
1) All historical data collected prior to 2013 are reported as provided by others.																										
2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.																										
3) NLE = no limit established.																										
4) ND = not detected in any background sample, no background concentration available.																										
5) **Bold** = chemical dectection																										
6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.																										
7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.																										

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1) https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05	TP45-1
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	SOIL
Sample ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05	TP45-1
Sample Depth Interval (FT)													7.5-7.5		10-10		2.5-2.5		5-5		7.5-7.5		10-10	3-3
Sample Date													3/15/2010		3/15/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010	11/11/1993
QC Type													SA		SA		SA		SA		SA		SA	SA
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest	ESI
Sample Round																								
Filtered													Total		Total		Total		Total		Total		Total	Total
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)													
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																									
1,1,1-Trichloroethane	UG/KG	0				0%	0	6	500,000	0	810,000	0												11	U
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	6			600	0												11	U
1,1,2-Trichloroethane	UG/KG	0				0%	0	6			150	0												11	U
1,1-Dichloroethane	UG/KG	0				0%	0	6	240,000	0	3,600	0												11	U
1,1-Dichloroethene	UG/KG	0				0%	0	6	500,000	0	23,000	0												11	U
1,2-Dichloroethane	UG/KG	0				0%	0	6	30,000	0	460	0												11	U
1,2-Dichloroethene (total)	UG/KG	0				0%	0	6	500,000	0														11	U
1,2-Dichloropropane	UG/KG	0				0%	0	6			1,600	0												11	U
Acetone	UG/KG	0				0%	0	6	500,000	0	6,100,000	0												11	U
Benzene	UG/KG	0				0%	0	6	44,000	0	1,200	0												11	U
Bromodichloromethane	UG/KG	0				0%	0	6			290	0												11	U
Bromoform	UG/KG	0				0%	0	6			19,000	0												11	U
Carbon disulfide	UG/KG	0				0%	0	6			77,000	0												11	U
Carbon tetrachloride	UG/KG	0				0%	0	6	22,000	0	650	0												11	U
Chlorobenzene	UG/KG	0				0%	0	6	500,000	0	28,000	0												11	U
Chlorodibromomethane	UG/KG	0				0%	0	6			8,300	0												11	U
Chloroethane	UG/KG	0				0%	0	6			1,400,000	0												11	U
Chloroform	UG/KG	0				0%	0	6	350,000	0	320	0												11	U
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	6																11	U
Ethyl benzene	UG/KG	0				0%	0	6	390,000	0	5,800	0												11	U
Methyl bromide	UG/KG	0				0%	0	6			680	0												11	U
Methyl butyl ketone	UG/KG	0				0%	0	6																11	U
Methyl chloride	UG/KG	0				0%	0	6			11,000	0												11	U
Methyl ethyl ketone	UG/KG	0				0%	0	6	500,000	0	2,700,000	0												11	U
Methyl isobutyl ketone	UG/KG	0				0%	0	6			3,300,000	0												11	U
Methylene chloride	UG/KG	0				0%	0	6	500,000	0	35,000	0												11	U
Styrene	UG/KG	0				0%	0	6			600,000	0												11	U
Tetrachloroethene	UG/KG	19		TP45-3	11/11/1993	100%	6	6	150,000	0	8,100	0												4	J
Toluene	UG/KG	0				0%	0	6	500,000	0	490,000	0												11	U
Total Xylenes	UG/KG	0				0%	0	6	500,000	0	58,000	0												11	U
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	6																11	U
Trichloroethene	UG/KG	0				0%	0	6	200,000	0	410	0												11	U
Vinyl chloride	UG/KG	0				0%	0	6	13,000	0	59	0												11	U
Herbicides																									
2,4,5-T	UG/KG	0				0%	0	6			63,000	0												5.6	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	6	500,000	0	51,000	0												5.6	U
2,4-D	UG/KG	0				0%	0	6			70,000	0												56	U
2,4-DB	UG/KG	0				0%	0	6			190,000	0												56	U
Dalapon	UG/KG	0				0%	0	6			190,000	0												140	U
Dicamba	UG/KG	0				0%	0	6			190,000	0												5.6	U
Dichloroprop	UG/KG	0				0%	0	6																56	U
Dinoseb	UG/KG	0				0%	0	6			6,300	0												28	U
MCPA	UG/KG	0				0%	0	6			3,200	0												5,600	U
MCPP	UG/KG	0				0%	0	6			6,300	0												5,600	U
Explosives																									
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			220,000	0												150	J
1,3-Dinitrobenzene	UG/KG	0				0%	0	6			630	0												130	UJ
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	11/11/1993	100%	6	6			3,600	0												330	J
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			1,700	0												130	UJ
2,6-Dinitrotoluene	UG/KG	0				0%	0	6			360	0												130	UJ
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	11/11/1993	100%	6	6			15,000	0												430	J
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	6			15,000	0												130	UJ
HMX	UG/KG	470	J	TP45-2	11/11/1993	100%	6	6			390,000	0												250	J
RDX	UG/KG	4,300		TP45-4	11/9/1993	100%	6	6			6,100	0												2,500	J
Tetryl	UG/KG	180	J	TP45-5	11/9/1993	17%	1	6			16,000	0												130	UJ

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Sample Depth Interval (FT)													7.5-7.5		10-10		2.5-2.5		5-5		7.5-7.5		10-10		3-3	
Sample Date													3/15/2010		3/15/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		11/11/1993	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Semivolatile Organic Compounds																										
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	6			5,800	0													370	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	6	500,000	0	180,000	0													370	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	6	280,000	0															370	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	6	130,000	0	2,600	0													370	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	6																	370	U
2,4,5-Trichlorophenol	UG/KG	0				0%	0	6			630,000	0													890	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	6			6,300	0													370	U
2,4-Dichlorophenol	UG/KG	0				0%	0	6			19,000	0													370	U
2,4-Dimethylphenol	UG/KG	0				0%	0	6			130,000	0													370	U
2,4-Dinitrophenol	UG/KG	0				0%	0	6			13,000	0													890	U
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	11/11/1993	100%	6	6			1,700	1													100	J
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	11/11/1993	17%	1	6			360	1													370	U
2-Chloronaphthalene	UG/KG	0				0%	0	6			480,000	0													370	U
2-Chlorophenol	UG/KG	0				0%	0	6			39,000	0													370	U
2-Methylnaphthalene	UG/KG	0				0%	0	6			24,000	0													370	U
2-Methylphenol	UG/KG	0				0%	0	6	500,000	0	320,000	0													370	U
2-Nitroaniline	UG/KG	0				0%	0	6			63,000	0													890	U
2-Nitrophenol	UG/KG	0				0%	0	6																	370	U
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	6			1,200	0													370	U
3-Nitroaniline	UG/KG	0				0%	0	6																	890	U
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	6			510	0													890	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	6																	370	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	6			630,000	0													370	U
4-Chloroaniline	UG/KG	0				0%	0	6			2,700	0													370	U
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	6																	370	U
4-Methylphenol	UG/KG	0				0%	0	6	500,000	0	630,000	0													370	U
4-Nitroaniline	UG/KG	0				0%	0	6			25,000	0													890	U
4-Nitrophenol	UG/KG	0				0%	0	6																	890	U
Acenaphthene	UG/KG	0				0%	0	6	500,000	0	360,000	0													370	U
Acenaphthylene	UG/KG	19	J	TP45-1	11/11/1993	33%	2	6	500,000	0															19	J
Anthracene	UG/KG	17	J	TP45-1	11/11/1993	17%	1	6	500,000	0	1,800,000	0													17	J
Benzo(a)anthracene	UG/KG	36	J	TP45-4	11/9/1993	83%	5	6	5,600	0	1,100	0													32	J
Benzo(a)pyrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	1,000	0	110	0													46	J
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	11/9/1993	83%	5	6	5,600	0	1,100	0													38	J
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	11/11/1993	83%	5	6	500,000	0															66	J
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	11/9/1993	83%	5	6	56,000	0	11,000	0													28	J
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	6			19,000	0													370	U
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	6			230	0													370	U
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	11/11/1993	33%	2	6			39,000	0													65	J
Butylbenzylphthalate	UG/KG	0				0%	0	6																	370	U
Carbazole	UG/KG	0				0%	0	6																	370	U
Chrysene	UG/KG	51	J	TP45-4	11/9/1993	83%	5	6	56,000	0	110,000	0													46	J
Dibenz(a,h)anthracene	UG/KG	0				0%	0	6	560	0	110	0													370	U
Dibenzofuran	UG/KG	0				0%	0	6	350,000	0	7,300	0													370	U
Diethyl phthalate	UG/KG	35	J	TP45-4	11/9/1993	17%	1	6			5,100,000	0													370	U
Dimethylphthalate	UG/KG	0				0%	0	6																	370	U
Di-n-butylphthalate	UG/KG	6,800		TP45-2	11/11/1993	100%	6	6			630,000	0													35	J
Di-n-octylphthalate	UG/KG	0				0%	0	6			63,000	0													370	U
Fluoranthene	UG/KG	68	J	TP45-4	11/9/1993	83%	5	6	500,000	0	240,000	0													59	J
Fluorene	UG/KG	0				0%	0	6	500,000	0	240,000	0													370	U
Hexachlorobenzene	UG/KG	62	J	TP45-1	11/11/1993	83%	5	6	6,000	0	210	0													62	J
Hexachlorobutadiene	UG/KG	0				0%	0	6			1,200	0													370	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	6			180	0													370	U
Hexachloroethane	UG/KG	1,100		TP45-3	11/11/1993	83%	5	6			1,800	0													72	J
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	11/11/1993	50%	3	6	5,600	0	1,100	0													37	J
Isophorone	UG/KG	0				0%	0	6			570,000	0													370	U
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	67%	4	6	500,000	0	3,800	0													30	J
Nitrobenzene	UG/KG	0				0%	0	6			5,100	0													370	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	6			78	0													370	U
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	11/11/1993	67%	4	6			110,000	0													370	U
Pentachlorophenol	UG/KG	0				0%	0	6	6,700	0	1,000	0													890	U
Phenanthrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	500,000	0															46	J
Phenol	UG/KG	0				0%	0	6	500,000	0	1,900,000	0													370	U
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	100%	6	6	500,000	0	180,000	0													110	J

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Sample Depth Interval (FT)													7.5-7.5		10-10		2.5-2.5		5-5		7.5-7.5		10-10		3-3	
Sample Date													3/15/2010		3/15/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		11/11/1993	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																										
4,4'-DDD	UG/KG	0				0%	0	6	92,000	0	190	0													3.7	U
4,4'-DDE	UG/KG	3.2	J	TP45-4	11/9/1993	33%	2	6	62,000	0	2,000	0													3.7	U
4,4'-DDT	UG/KG	2.9	J	TP45-3	11/11/1993	33%	2	6	47,000	0	1,900	0													3.7	U
Aldrin	UG/KG	0				0%	0	6	680	0	39	0													1.9	U
Alpha-BHC	UG/KG	0				0%	0	6	3,400	0	86	0													1.9	U
Alpha-Chlordane	UG/KG	0				0%	0	6	24,000	0															1.9	U
Aroclor-1016	UG/KG	0				0%	0	6	1,000	0	410	0													37	U
Aroclor-1221	UG/KG	0				0%	0	6	1,000	0	200	0													74	U
Aroclor-1232	UG/KG	0				0%	0	6	1,000	0	170	0													37	U
Aroclor-1242	UG/KG	0				0%	0	6	1,000	0	230	0													37	U
Aroclor-1248	UG/KG	0				0%	0	6	1,000	0	230	0													37	U
Aroclor-1254	UG/KG	0				0%	0	6	1,000	0	120	0													37	U
Aroclor-1260	UG/KG	0				0%	0	6	1,000	0	240	0													37	U
Beta-BHC	UG/KG	0				0%	0	6	3,000	0	300	0													1.9	U
Delta-BHC	UG/KG	0				0%	0	6	500,000	0															1.9	U
Dieldrin	UG/KG	2.4	J	TP45-4	11/9/1993	17%	1	6	1,400	0	34	0													3.7	U
Endosulfan I	UG/KG	2.2	J	TP45-1	11/11/1993	67%	4	6	200,000	0															1.9	J
Endosulfan II	UG/KG	0				0%	0	6	200,000	0															3.7	U
Endosulfan sulfate	UG/KG	0				0%	0	6	200,000	0															3.7	U
Endrin	UG/KG	0				0%	0	6	89,000	0	1,900	0													3.7	U
Endrin aldehyde	UG/KG	0				0%	0	6																	3.7	U
Endrin ketone	UG/KG	0				0%	0	6																	3.7	U
Gamma-BHC/Lindane	UG/KG	0				0%	0	6	9,200	0	570	0													1.9	U
Gamma-Chlordane	UG/KG	0				0%	0	6																	1.9	U
Heptachlor	UG/KG	0				0%	0	6	15,000	0	130	0													1.9	U
Heptachlor epoxide	UG/KG	0				0%	0	6			70	0													1.9	U
Methoxychlor	UG/KG	0				0%	0	6			32,000	0													19	U
Toxaphene	UG/KG	0				0%	0	6			490	0													190	U
Inorganics																										
Aluminum	MG/KG	22,800		TP45-3	11/11/1993	100%	21	21			7,700	21	17,400	J	14,400	J	15,000		12,700		9,690		10,800		20,100	
Antimony	MG/KG	5.1	J	S45-TP-3-03	3/15/2010	38%	8	21			3.1	1	0.38	J	0.69	U	0.58	J	0.19	UJ	0.16	J	0.14	UJ	9.7	UJ
Arsenic	MG/KG	8.7		S45-TP-1-02	3/12/2010	100%	21	21	16	0	0.68	21	4.6	J	3.9	J	5.7		5		3.3		5.4		6.8	
Barium	MG/KG	248		TP45-3	11/11/1993	100%	21	21	400	0	1,500	0	154	J	126	J	153		151		108		76.1		208	
Beryllium	MG/KG	1.1	J	TP45-3	11/11/1993	100%	21	21	590	0	16	0	0.74	J	0.62	J	0.7		0.58		0.42	J	0.54		0.9	J
Cadmium	MG/KG	13.4		S45-TP-1-02	3/12/2010	95%	18	19	9.3	5	7.1	9	6.1	J	2.8	J	8.1		4.5		1.8		0.01	U	10.4	J
Calcium	MG/KG	101,000		S45-TP-2-03	3/12/2010	100%	21	21					28,800	J	37,700	J	30,900		41,800		40,400		53,900		42,700	
Chromium	MG/KG	39.2		S45-TP-1-03	3/12/2010	100%	21	21	1,500	0			26	J	22.8	J	25		22.8		14.4		18.8		31.3	
Cobalt	MG/KG	16.9		TP45-3	11/11/1993	100%	21	21			2.3	21	9.4	J	10	J	11.3		10.4		6.4		11		13.2	
Copper	MG/KG	7,310		S45-TP-1-02	3/12/2010	100%	21	21	270	13	310	13	311	J	266	J	416		240		115		24.7		722	
Cyanide	MG/KG	0.7		TP45-1	11/11/1993	33%	2	6	27	0	2.3	0													0.7	
Iron	MG/KG	60,900		S45-TP-1-02	3/12/2010	100%	21	21			5,500	21	24,300	J	21,500	J	24,800		25,300		15,500		19,000		35,700	
Lead	MG/KG	153	J	S45-TP-3-03	3/15/2010	100%	21	21	1,000	0	400	0	45.7	J	42.7	J	57.4		50.9		30.3		11.2		54.1	
Magnesium	MG/KG	12,500		S45-TP-4-04	3/12/2010	100%	21	21					9,350	J	8,470	J	12,100		10,300		12,500		8,380		7,910	
Manganese	MG/KG	1,380		TP45-1	11/11/1993	100%	21	21	10,000	0	180	21	502	J	420	J	577		466		380		379		1,380	
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	3/12/2010 3/12/2010	100%	21	21	2.8	16	1.1	18	3.2	J	3.2	J	4.4		9.1		6.7		0.04		3.1	J
Nickel	MG/KG	54		S45-TP-1-02	3/12/2010	100%	21	21	310	0	150	0	33.9	J	34.8	J	35.8		35.5		20		34.3		41.8	
Potassium	MG/KG	3,510	J	S45-TP-3-04	3/15/2010	100%	21	21					3,510	J	2,590	J	2,010	J	1,890	J	1,870	J	1,790	J	3,040	
Selenium	MG/KG	0.56	J	S45-TP-4-03	3/12/2010	5%	1	21	1,500	0	39	0	0.21	UJ	0.19	UJ	0.41	U	0.56	J	0.22	U	0.3	U	0.23	UJ
Silver	MG/KG	53.7		S45-TP-1-02	3/12/2010	90%	19	21	1,500	0	39	1	2.9	J	1.3	U	3.6		1.4	J	0.38	J	0.12	J	3.2	J
Sodium	MG/KG	213		S45-TP-2-03	3/12/2010	100%	21	21					101	J	137	J	195		196		166		188		141	J
Thallium	MG/KG	0.25	J	S45-TP-2-05	3/12/2010	10%	2	21			0.078	2	0.09	UJ	0.08	UJ	0.17	U	0.18	U	0.09	U	0.15	J	0.25	U
Vanadium	MG/KG	38		TP45-3	11/11/1993	100%	21	21			39	0	28.3	J	23	J	25.7		21.7		17.5		18.5		32.4	
Zinc	MG/KG	1,470		S45-TP-2-04	3/12/2010	100%	21	21	10,000	0	2,300	0	294	J	241	J	304		371		336		80.1		345	

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													S45-TP-3-04		S45-TP-3-05		S45-TP-4-02		S45-TP-4-03		S45-TP-4-04		S45-TP-4-05		TP45-1	
Sample Depth Interval (FT)													7.5-7.5		10-10		2.5-2.5		5-5		7.5-7.5		10-10		3-3	
Sample Date													3/15/2010		3/15/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		11/11/1993	
QC Type													SA		SA		SA		SA		SA		SA		SA	
Study ID													OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		OD Initial Invest		ESI	
Sample Round																										
Filtered													Total		Total		Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)															
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Wet Chemistry																										
Perchlorate	UG/KG	41		S45-ODG-SS-06	5/30/2018	75%	9	12			5,500	0														

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.
https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)
- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													TP45-1		TP45-2		TP45-3		TP45-4		TP45-5	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													TP45-11		TP45-2		TP45-3		TP45-4		TP45-5	
Sample Depth Interval (FT)													3-3		3-3		3-3		3-3		3-3	
Sample Date													11/11/1993		11/11/1993		11/11/1993		11/9/1993		11/9/1993	
QC Type													DU		SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI		ESI	
Sample Round																						
Filtered													Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)											
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																						
1,1,1-Trichloroethane	UG/KG	0				0%	0	6	500,000	0	810,000	0	11	U	12	U	11	U	11	U	11	U
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	6			600	0	11	U	12	U	11	U	11	U	11	U
1,1,2-Trichloroethane	UG/KG	0				0%	0	6			150	0	11	U	12	U	11	U	11	U	11	U
1,1-Dichloroethane	UG/KG	0				0%	0	6	240,000	0	3,600	0	11	U	12	U	11	U	11	U	11	U
1,1-Dichloroethene	UG/KG	0				0%	0	6	500,000	0	23,000	0	11	U	12	U	11	U	11	U	11	U
1,2-Dichloroethane	UG/KG	0				0%	0	6	30,000	0	460	0	11	U	12	U	11	U	11	U	11	U
1,2-Dichloroethene (total)	UG/KG	0				0%	0	6	500,000	0			11	U	12	U	11	U	11	U	11	U
1,2-Dichloropropane	UG/KG	0				0%	0	6			1,600	0	11	U	12	U	11	U	11	U	11	U
Acetone	UG/KG	0				0%	0	6	500,000	0	6,100,000	0	11	U	12	U	31	U	11	U	11	U
Benzene	UG/KG	0				0%	0	6	44,000	0	1,200	0	11	U	12	U	11	U	11	U	11	U
Bromodichloromethane	UG/KG	0				0%	0	6			290	0	11	U	12	U	11	U	11	U	11	U
Bromoform	UG/KG	0				0%	0	6			19,000	0	11	U	12	U	11	U	11	U	11	U
Carbon disulfide	UG/KG	0				0%	0	6			77,000	0	11	U	12	U	11	U	11	U	11	U
Carbon tetrachloride	UG/KG	0				0%	0	6	22,000	0	650	0	11	U	12	U	11	U	11	U	11	U
Chlorobenzene	UG/KG	0				0%	0	6	500,000	0	28,000	0	11	U	12	U	11	U	11	U	11	U
Chlorodibromomethane	UG/KG	0				0%	0	6			8,300	0	11	U	12	U	11	U	11	U	11	U
Chloroethane	UG/KG	0				0%	0	6			1,400,000	0	11	U	12	U	11	U	11	U	11	U
Chloroform	UG/KG	0				0%	0	6	350,000	0	320	0	11	U	12	U	11	U	11	U	11	U
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	6					11	U	12	U	11	U	11	U	11	U
Ethyl benzene	UG/KG	0				0%	0	6	390,000	0	5,800	0	11	U	12	U	11	U	11	U	11	U
Methyl bromide	UG/KG	0				0%	0	6			680	0	11	U	12	U	11	U	11	U	11	U
Methyl butyl ketone	UG/KG	0				0%	0	6					11	U	12	U	11	U	11	U	11	U
Methyl chloride	UG/KG	0				0%	0	6			11,000	0	11	U	12	U	11	U	11	U	11	U
Methyl ethyl ketone	UG/KG	0				0%	0	6	500,000	0	2,700,000	0	11	U	12	U	11	U	11	U	11	U
Methyl isobutyl ketone	UG/KG	0				0%	0	6			3,300,000	0	11	U	12	U	11	U	11	U	11	U
Methylene chloride	UG/KG	0				0%	0	6	500,000	0	35,000	0	11	U	12	U	11	U	11	U	11	U
Styrene	UG/KG	0				0%	0	6			600,000	0	11	U	12	U	11	U	11	U	11	U
Tetrachloroethene	UG/KG	19		TP45-3	11/11/1993	100%	6	6	150,000	0	8,100	0	6	J	8	J	19		2	J	3	J
Toluene	UG/KG	0				0%	0	6	500,000	0	490,000	0	11	U	12	U	11	U	11	U	11	U
Total Xylenes	UG/KG	0				0%	0	6	500,000	0	58,000	0	11	U	12	U	11	U	11	U	11	U
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	6					11	U	12	U	11	U	11	U	11	U
Trichloroethene	UG/KG	0				0%	0	6	200,000	0	410	0	11	U	12	U	11	U	11	U	11	U
Vinyl chloride	UG/KG	0				0%	0	6	13,000	0	59	0	11	U	12	U	11	U	11	U	11	U
Herbicides																						
2,4,5-T	UG/KG	0				0%	0	6			63,000	0	5.5	U	5.8	U	6	U	6.9	U	5.6	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	6	500,000	0	51,000	0	5.5	U	5.8	U	6	U	6.9	U	5.6	U
2,4-D	UG/KG	0				0%	0	6			70,000	0	55	U	58	U	60	U	69	U	56	U
2,4-DB	UG/KG	0				0%	0	6			190,000	0	55	U	58	U	60	U	69	U	56	U
Dalapon	UG/KG	0				0%	0	6			190,000	0	140	U	140	U	150	U	170	U	140	U
Dicamba	UG/KG	0				0%	0	6			190,000	0	5.5	U	5.8	U	6	U	6.9	U	5.6	U
Dichloroprop	UG/KG	0				0%	0	6					55	U	58	U	60	U	69	U	56	U
Dinoseb	UG/KG	0				0%	0	6			6,300	0	28	U	29	U	30	U	35	U	28	U
MCPA	UG/KG	0				0%	0	6			3,200	0	5,500	U	5,800	U	6,000	U	6,900	U	5,600	U
MCPP	UG/KG	0				0%	0	6			6,300	0	5,500	U	5,800	U	6,000	U	6,900	U	5,600	U
Explosives																						
1,3,5-Trinitrobenzene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			220,000	0	170	J	190	J	130	UJ	180		140	
1,3-Dinitrobenzene	UG/KG	0				0%	0	6			630	0	130	UJ	130	UJ	130	UJ	130	U	130	U
2,4,6-Trinitrotoluene	UG/KG	600	J	TP45-2	11/11/1993	100%	6	6			3,600	0	340	J	600	J	400	J	330		280	
2,4-Dinitrotoluene	UG/KG	190	J	TP45-2	11/11/1993	83%	5	6			1,700	0	140	J	190	J	120	J	110	J	90	J
2,6-Dinitrotoluene	UG/KG	0				0%	0	6			360	0	130	UJ	130	UJ	130	UJ	130	U	130	U
2-amino-4,6-Dinitrotoluene	UG/KG	680	J	TP45-2	11/11/1993	100%	6	6			15,000	0	430	J	680	J	530	J	480		350	
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	6			15,000	0	130	UJ	130	UJ	130	UJ	130	U	130	U
HMX	UG/KG	470	J	TP45-2	11/11/1993	100%	6	6			390,000	0	430	J	470	J	240	J	350		200	
RDX	UG/KG	4,300		TP45-4	11/9/1993	100%	6	6			6,100	0	1,600	J	2,700	J	2,500	J	4,300		1,300	
Tetryl	UG/KG	180	J	TP45-5	11/9/1993	17%	1	6			16,000	0	130	UJ	130	UJ	130	UJ	130	U	180	J

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45			SEAD-45			SEAD-45			SEAD-45			SEAD-45		
Loc ID														TP45-1			TP45-2			TP45-3			TP45-4			TP45-5		
Matrix														SOIL			SOIL			SOIL			SOIL			SOIL		
Sample ID														TP45-11			TP45-2			TP45-3			TP45-4			TP45-5		
Sample Depth Interval (FT)														3-3			3-3			3-3			3-3			3-3		
Sample Date														11/11/1993			11/11/1993			11/11/1993			11/9/1993			11/9/1993		
QC Type														DU			SA			SA			SA			SA		
Study ID														ESI			ESI			ESI			ESI			ESI		
Sample Round																												
Filtered														Total			Total			Total			Total			Total		
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)																		
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above		Value	Qual		Value	Qual		Value	Qual		Value	Qual		Value	Qual		
Semivolatile Organic Compounds																												
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	6			5,800	0		360	U		1,900	U		400	U		460	U		370	U	
1,2-Dichlorobenzene	UG/KG	0				0%	0	6	500,000	0	180,000	0		360	U		1,900	U		400	U		460	U		370	U	
1,3-Dichlorobenzene	UG/KG	0				0%	0	6	280,000	0				360	U		1,900	U		400	U		460	U		370	U	
1,4-Dichlorobenzene	UG/KG	0				0%	0	6	130,000	0	2,600	0		360	U		1,900	U		400	U		460	U		370	U	
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
2,4,5-Trichlorophenol	UG/KG	0				0%	0	6			630,000	0		880	U		4,600	U		960	U		1,100	U		900	U	
2,4,6-Trichlorophenol	UG/KG	0				0%	0	6			6,300	0		360	U		1,900	U		400	U		460	U		370	U	
2,4-Dichlorophenol	UG/KG	0				0%	0	6			19,000	0		360	U		1,900	U		400	U		460	U		370	U	
2,4-Dimethylphenol	UG/KG	0				0%	0	6			130,000	0		360	U		1,900	U		400	U		460	U		370	U	
2,4-Dinitrophenol	UG/KG	0				0%	0	6			13,000	0		880	U		4,600	U		960	U		1,100	U		900	U	
2,4-Dinitrotoluene	UG/KG	14,000		TP45-2	11/11/1993	100%	6	6			1,700	1		190	J		14,000			84	J		59	J		230	J	
2,6-Dinitrotoluene	UG/KG	700	J	TP45-2	11/11/1993	17%	1	6			360	1		360	U		700	J		400	U		460	U		370	U	
2-Chloronaphthalene	UG/KG	0				0%	0	6			480,000	0		360	U		1,900	U		400	U		460	U		370	U	
2-Chlorophenol	UG/KG	0				0%	0	6			39,000	0		360	U		1,900	U		400	U		460	U		370	U	
2-Methylnaphthalene	UG/KG	0				0%	0	6			24,000	0		360	U		1,900	U		400	U		460	U		370	U	
2-Methylphenol	UG/KG	0				0%	0	6	500,000	0	320,000	0		360	U		1,900	U		400	U		460	U		370	U	
2-Nitroaniline	UG/KG	0				0%	0	6			63,000	0		880	U		4,600	U		960	U		1,100	U		900	U	
2-Nitrophenol	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	6			1,200	0		360	U		1,900	U		400	U		460	U		370	U	
3-Nitroaniline	UG/KG	0				0%	0	6						880	U		4,600	U		960	U		1,100	U		900	U	
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	6			510	0		880	U		4,600	U		960	U		1,100	U		900	U	
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
4-Chloro-3-methylphenol	UG/KG	0				0%	0	6			630,000	0		360	U		1,900	U		400	U		460	U		370	U	
4-Chloroaniline	UG/KG	0				0%	0	6			2,700	0		360	U		1,900	U		400	U		460	U		370	U	
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
4-Methylphenol	UG/KG	0				0%	0	6	500,000	0	630,000	0		360	U		1,900	U		400	U		460	U		370	U	
4-Nitroaniline	UG/KG	0				0%	0	6			25,000	0		880	U		4,600	U		960	U		1,100	U		900	U	
4-Nitrophenol	UG/KG	0				0%	0	6						880	U		4,600	U		960	U		1,100	U		900	U	
Acenaphthene	UG/KG	0				0%	0	6	500,000	0	360,000	0		360	U		1,900	U		400	U		460	U		370	U	
Acenaphthylene	UG/KG	19	J	TP45-1	11/11/1993	33%	2	6	500,000	0				17	J		1,900	U		400	U		460	U		370	U	
Anthracene	UG/KG	17	J	TP45-1	11/11/1993	17%	1	6	500,000	0	1,800,000	0		360	U		1,900	U		400	U		460	U		370	U	
Benzo(a)anthracene	UG/KG	36	J	TP45-4	11/9/1993	83%	5	6	5,600	0	1,100	0		30	J		1,900	U		22	J		36	J		32	J	
Benzo(a)pyrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	1,000	0	110	0		41	J		1,900	U		28	J		45	J		42	J	
Benzo(b)fluoranthene	UG/KG	42	J	TP45-5	11/9/1993	83%	5	6	5,600	0	1,100	0		36	J		1,900	U		24	J		39	J		42	J	
Benzo(ghi)perylene	UG/KG	66	J	TP45-1	11/11/1993	83%	5	6	500,000	0				58	J		1,900	U		34	J		53	J		45	J	
Benzo(k)fluoranthene	UG/KG	34	J	TP45-4	11/9/1993	83%	5	6	56,000	0	11,000	0		26	J		1,900	U		21	J		34	J		23	J	
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	6			19,000	0		360	U		1,900	U		400	U		460	U		370	U	
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	6			230	0		360	U		1,900	U		400	U		460	U		370	U	
Bis(2-Ethylhexyl)phthalate	UG/KG	65	J	TP45-1	11/11/1993	33%	2	6			39,000	0		50	J		1,900	U		400	U		460	U		370	U	
Butylbenzylphthalate	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
Carbazole	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
Chrysene	UG/KG	51	J	TP45-4	11/9/1993	83%	5	6	56,000	0	110,000	0		44	J		1,900	U		37	J		51	J		47	J	
Dibenz(a,h)anthracene	UG/KG	0				0%	0	6	560	0	110	0		360	U		1,900	U		400	U		460	U		370	U	
Dibenzofuran	UG/KG	0				0%	0	6	350,000	0	7,300	0		360	U		1,900	U		400	U		460	U		370	U	
Diethyl phthalate	UG/KG	35	J	TP45-4	11/9/1993	17%	1	6			5,100,000	0		360	U		1,900	U		400	U		35	J		370	U	
Dimethylphthalate	UG/KG	0				0%	0	6						360	U		1,900	U		400	U		460	U		370	U	
Di-n-butylphthalate	UG/KG	6,800		TP45-2	11/11/1993	100%	6	6			630,000	0		170	J		6,800			27	J		75	J		230	J	
Di-n-octylphthalate	UG/KG	0				0%	0	6			63,000	0		360	U		1,900	U		400	U		460	U		370	U	
Fluoranthene	UG/KG	68	J	TP45-4	11/9/1993	83%	5	6	500,000	0	240,000	0		50	J		1,900	U		52	J		68	J		58	J	
Fluorene	UG/KG	0				0%	0	6	500,000	0	240,000	0		360	U		1,900	U		400	U		460	U		370	U	
Hexachlorobenzene	UG/KG	62	J	TP45-1	11/11/1993	83%	5	6	6,000	0	210	0		54	J		1,900	U		52	J		48	J		42	J	
Hexachlorobutadiene	UG/KG	0				0%	0	6			1,200	0		360	U		1,900	U		400	U		460	U		370	U	
Hexachlorocyclopentadiene	UG/KG	0				0%	0	6			180	0		360	U		1,900	U		400	U		460	U		370	U	
Hexachloroethane	UG/KG	1,100		TP45-3	11/11/1993	83%	5	6			1,800	0		68	J		1,900	U		1,100			41	J		36	J	
Indeno(1,2,3-cd)pyrene	UG/KG	37	J	TP45-1	11/11/1993	50%	3	6	5,600	0	1,100	0		360	U		1,900	U		400	U		29	J		26	J	
Isophorone	UG/KG	0				0%	0	6			570,000	0		360	U		1,900	U		400	U		460	U		370	U	
Naphthalene	UG/KG	30	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	67%	4	6	500,000	0	3,800	0		27	J		1,900	U		24	J		30	J		370	U	
Nitrobenzene	UG/KG	0				0%	0	6			5,100	0		360	U		1,900	U		400	U		460	U		370	U	
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	6			78	0		360	U		1,900	U		400	U		460	U		370	U	
N-Nitrosodiphenylamine	UG/KG	1,600	J	TP45-2	11/11/1993	67%	4	6			110,000	0		30	J		1,600	J		20	J		460	U		25	J	
Pentachlorophenol	UG/KG	0				0%	0	6	6,700	0	1,000	0		880	U		4,600	U		960	U		1,100	U		900	U	
Phenanthrene	UG/KG	46	J	TP45-1	11/11/1993	83%	5	6	500,000	0				38	J		1,900	U		38	J		44	J		34	J	
Phenol	UG/KG	0				0%	0	6	500,000	0	1,900,000	0		360	U		1,900	U		400	U		460	U		370	U	
Pyrene	UG/KG	110	J J	TP45-1 TP45-4	11/11/1993 11/9/1993	100%	6	6	500,000	0	180,000	0		98	J		100	J		90	J		110	J		97	J	

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													TP45-1		TP45-2		TP45-3		TP45-4		TP45-5	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													TP45-11		TP45-2		TP45-3		TP45-4		TP45-5	
Sample Depth Interval (FT)													3-3		3-3		3-3		3-3		3-3	
Sample Date													11/11/1993		11/11/1993		11/11/1993		11/9/1993		11/9/1993	
QC Type													DU		SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI		ESI	
Sample Round																						
Filtered													Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)											
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																						
4,4'-DDD	UG/KG	0				0%	0	6	92,000	0	190	0	3.6	U	3.8	U	4	U	4.6	U	3.7	U
4,4'-DDE	UG/KG	3.2	J	TP45-4	11/9/1993	33%	2	6	62,000	0	2,000	0	3.6	U	3.8	U	4	U	3.2	J	1.9	J
4,4'-DDT	UG/KG	2.9	J	TP45-3	11/11/1993	33%	2	6	47,000	0	1,900	0	2.3	J	3.8	U	2.9	J	4.6	U	3.7	U
Aldrin	UG/KG	0				0%	0	6	680	0	39	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Alpha-BHC	UG/KG	0				0%	0	6	3,400	0	86	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Alpha-Chlordane	UG/KG	0				0%	0	6	24,000	0			1.9	U	2	U	2	U	2.4	U	1.9	U
Aroclor-1016	UG/KG	0				0%	0	6	1,000	0	410	0	36	U	38	U	40	U	46	U	37	U
Aroclor-1221	UG/KG	0				0%	0	6	1,000	0	200	0	74	U	77	U	81	U	93	U	75	U
Aroclor-1232	UG/KG	0				0%	0	6	1,000	0	170	0	36	U	38	U	40	U	46	U	37	U
Aroclor-1242	UG/KG	0				0%	0	6	1,000	0	230	0	36	U	38	U	40	U	46	U	37	U
Aroclor-1248	UG/KG	0				0%	0	6	1,000	0	230	0	36	U	38	U	40	U	46	U	37	U
Aroclor-1254	UG/KG	0				0%	0	6	1,000	0	120	0	36	U	38	U	40	U	46	U	37	U
Aroclor-1260	UG/KG	0				0%	0	6	1,000	0	240	0	36	U	38	U	40	U	46	U	37	U
Beta-BHC	UG/KG	0				0%	0	6	3,000	0	300	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Delta-BHC	UG/KG	0				0%	0	6	500,000	0			1.9	U	2	U	2	U	2.4	U	1.9	U
Dieldrin	UG/KG	2.4	J	TP45-4	11/9/1993	17%	1	6	1,400	0	34	0	3.6	U	3.8	U	4	U	2.4	J	3.7	U
Endosulfan I	UG/KG	2.2	J	TP45-1	11/11/1993	67%	4	6	200,000	0			2.2	J	1.9	J	1.6	J	2.4	U	1.9	U
Endosulfan II	UG/KG	0				0%	0	6	200,000	0			3.6	U	3.8	U	4	U	4.6	U	3.7	U
Endosulfan sulfate	UG/KG	0				0%	0	6	200,000	0			3.6	U	3.8	U	4	U	4.6	U	3.7	U
Endrin	UG/KG	0				0%	0	6	89,000	0	1,900	0	3.6	U	3.8	U	4	U	4.6	U	3.7	U
Endrin aldehyde	UG/KG	0				0%	0	6					3.6	U	3.8	U	4	U	4.6	U	3.7	U
Endrin ketone	UG/KG	0				0%	0	6					3.6	U	3.8	U	4	U	4.6	U	3.7	U
Gamma-BHC/Lindane	UG/KG	0				0%	0	6	9,200	0	570	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Gamma-Chlordane	UG/KG	0				0%	0	6					1.9	U	2	U	2	U	2.4	U	1.9	U
Heptachlor	UG/KG	0				0%	0	6	15,000	0	130	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Heptachlor epoxide	UG/KG	0				0%	0	6			70	0	1.9	U	2	U	2	U	2.4	U	1.9	U
Methoxychlor	UG/KG	0				0%	0	6			32,000	0	19	U	20	U	20	U	24	U	19	U
Toxaphene	UG/KG	0				0%	0	6			490	0	190	U	200	U	200	U	240	U	190	U
Inorganics																						
Aluminum	MG/KG	22,800		TP45-3	11/11/1993	100%	21	21			7,700	21	16,500		20,800		22,800		20,600		17,300	
Antimony	MG/KG	5.1	J	S45-TP-3-03	3/15/2010	38%	8	21			3.1	1	7.6	UJ	12.1	UJ	12.4	UJ	10.2	U	9.2	U
Arsenic	MG/KG	8.7		S45-TP-1-02	3/12/2010	100%	21	21	16	0	0.68	21	6.3		7.1		8.2		6	J	5.1	J
Barium	MG/KG	248		TP45-3	11/11/1993	100%	21	21	400	0	1,500	0	177		201		248		216		174	
Beryllium	MG/KG	1.1	J	TP45-3	11/11/1993	100%	21	21	590	0	16	0	0.8		0.91	J	1.1	J	0.94	J	0.8	J
Cadmium	MG/KG	13.4		S45-TP-1-02	3/12/2010	95%	18	19	9.3	5	7.1	9	9.6	J	9.5	J	13.1	J	10.9	UR	7.4	UR
Calcium	MG/KG	101,000		S45-TP-2-03	3/12/2010	100%	21	21					31,500		26,400		32,500		36,400		32,100	
Chromium	MG/KG	39.2		S45-TP-1-03	3/12/2010	100%	21	21	1,500	0			25.7		30.1		35.5		32.1		27.6	
Cobalt	MG/KG	16.9		TP45-3	11/11/1993	100%	21	21			2.3	21	13.2		12.8		16.9		15.3		12.1	
Copper	MG/KG	7,310		S45-TP-1-02	3/12/2010	100%	21	21	270	13	310	13	555		561		791		1,240	J	449	J
Cyanide	MG/KG	0.7		TP45-1	11/11/1993	33%	2	6	27	0	2.3	0	0.54	U	0.55	U	0.55	U	0.62		0.51	U
Iron	MG/KG	60,900		S45-TP-1-02	3/12/2010	100%	21	21			5,500	21	31,900		31,500		41,300		37,600		31,600	
Lead	MG/KG	153	J	S45-TP-3-03	3/15/2010	100%	21	21	1,000	0	400	0	73.3		69.4		87.8		74.7		61.9	
Magnesium	MG/KG	12,500		S45-TP-4-04	3/12/2010	100%	21	21					7,780		7,800		9,270		8,940		7,570	
Manganese	MG/KG	1,380		TP45-1	11/11/1993	100%	21	21	10,000	0	180	21	613		605		827		726		600	
Mercury	MG/KG	9.1		S45-TP-2-04 S45-TP-4-03	3/12/2010 3/12/2010	100%	21	21	2.8	16	1.1	18	1.4	J	3.1	J	4	J	3.6		4.3	
Nickel	MG/KG	54		S45-TP-1-02	3/12/2010	100%	21	21	310	0	150	0	39.1		40.5		51		48.3		39.2	
Potassium	MG/KG	3,510	J	S45-TP-3-04	3/15/2010	100%	21	21					1,960		3,280		3,010		2,400		1,960	
Selenium	MG/KG	0.56	J	S45-TP-4-03	3/12/2010	5%	1	21	1,500	0	39	0	0.15	UJ	0.16	UJ	0.23	UJ	0.27	UJ	0.2	UJ
Silver	MG/KG	53.7		S45-TP-1-02	3/12/2010	90%	19	21	1,500	0	39	1	4.7	J	5	J	6.6	J	26.2	J	3.9	J
Sodium	MG/KG	213		S45-TP-2-03	3/12/2010	100%	21	21					105	J	116	J	135	J	136	J	122	J
Thallium	MG/KG	0.25	J	S45-TP-2-05	3/12/2010	10%	2	21			0.078	2	0.16	U	0.17	U	0.25	U	0.29	UJ	0.22	UJ
Vanadium	MG/KG	38		TP45-3	11/11/1993	100%	21	21			39	0	26.7		34.4		38		32.6		27.3	
Zinc	MG/KG	1,470		S45-TP-2-04	3/12/2010	100%	21	21	10,000	0	2,300	0	360		390		538		557	J	333	J

Table A-2
Analytical Data for Subsurface Soil Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													TP45-1		TP45-2		TP45-3		TP45-4		TP45-5	
Matrix													SOIL		SOIL		SOIL		SOIL		SOIL	
Sample ID													TP45-11		TP45-2		TP45-3		TP45-4		TP45-5	
Sample Depth Interval (FT)													3-3		3-3		3-3		3-3		3-3	
Sample Date													11/11/1993		11/11/1993		11/11/1993		11/9/1993		11/9/1993	
QC Type													DU		SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI		ESI	
Sample Round																						
Filtered													Total		Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)											
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Wet Chemistry																						
Perchlorate	UG/KG	41		S45-ODG-SS-06	5/30/2018	75%	9	12			5,500	0										

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Cell Bold values represent a results that is above the NYS SCO Commercial Use value. ####
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil ###
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL ###

10) Criteria action level source document and web address.

- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.

https://govt.westlaw.com/nycrr/Document/I4eadfca8cd1711dda432a117e6e0f345?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

- The 2018-05 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)

https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-3
Analytical Data for Ditch Soil at OD Grounds
Feasibilty Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix													DITCH SOIL		DITCH SOIL		DITCH SOIL		DITCH SOIL	
Sample ID													SD45-1		SD45-2		SD45-3		SD45-4	
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5	
Sample Date													11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type													SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI	
Sample Round																				
Filtered													Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)									
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																				
1,1,1-Trichloroethane	UG/KG	0				0%	0	4	500,000	0	810,000	0	13	U	14	U	15	U	13	U
1,1,2,2-Tetrachloroethane	UG/KG	0				0%	0	4			600	0	13	U	14	U	15	U	13	U
1,1,2-Trichloroethane	UG/KG	0				0%	0	4			150	0	13	U	14	U	15	U	13	U
1,1-Dichloroethane	UG/KG	0				0%	0	4	240,000	0	3,600	0	13	U	14	U	15	U	13	U
1,1-Dichloroethene	UG/KG	0				0%	0	4	500,000	0	23,000	0	13	U	14	U	15	U	13	U
1,2-Dichloroethane	UG/KG	0				0%	0	4	30,000	0	460	0	13	U	14	U	15	U	13	U
1,2-Dichloroethene (total)	UG/KG	0				0%	0	4	500,000	0			13	U	14	U	15	U	13	U
1,2-Dichloropropane	UG/KG	0				0%	0	4			1,600	0	13	U	14	U	15	U	13	U
Acetone	UG/KG	0				0%	0	4	500,000	0	6,100,000	0	13	U	14	U	15	U	13	U
Benzene	UG/KG	0				0%	0	4	44,000	0	1,200	0	13	U	14	U	15	U	13	U
Bromodichloromethane	UG/KG	0				0%	0	4			290	0	13	U	14	U	15	U	13	U
Bromoform	UG/KG	0				0%	0	4			19,000	0	13	U	14	U	15	U	13	U
Carbon disulfide	UG/KG	0				0%	0	4			77,000	0	13	U	14	U	15	U	13	U
Carbon tetrachloride	UG/KG	0				0%	0	4	22,000	0	650	0	13	U	14	U	15	U	13	U
Chlorobenzene	UG/KG	0				0%	0	4	500,000	0	28,000	0	13	U	14	U	15	U	13	U
Chlorodibromomethane	UG/KG	0				0%	0	4			8,300	0	13	U	14	U	15	U	13	U
Chloroethane	UG/KG	0				0%	0	4			1,400,000	0	13	U	14	U	15	U	13	U
Chloroform	UG/KG	0				0%	0	4	350,000	0	320	0	13	U	14	U	15	U	13	U
Cis-1,3-Dichloropropene	UG/KG	0				0%	0	4					13	U	14	U	15	U	13	U
Ethyl benzene	UG/KG	0				0%	0	4	390,000	0	5,800	0	13	U	14	U	15	U	13	U
Methyl bromide	UG/KG	0				0%	0	4			680	0	13	U	14	U	15	U	13	U
Methyl butyl ketone	UG/KG	0				0%	0	4					13	U	14	U	15	U	13	U
Methyl chloride	UG/KG	0				0%	0	4			11,000	0	13	U	14	U	15	U	13	U
Methyl ethyl ketone	UG/KG	0				0%	0	4	500,000	0	2,700,000	0	13	U	14	U	15	U	13	U
Methyl isobutyl ketone	UG/KG	0				0%	0	4			3,300,000	0	13	U	14	U	15	U	13	U
Methylene chloride	UG/KG	0				0%	0	4	500,000	0	35,000	0	13	U	14	U	15	U	13	U
Styrene	UG/KG	0				0%	0	4			600,000	0	13	U	14	U	15	U	13	U
Tetrachloroethene	UG/KG	0				0%	0	4	150,000	0	8,100	0	13	U	14	U	15	U	13	U
Toluene	UG/KG	0				0%	0	4	500,000	0	490,000	0	13	U	14	U	15	U	13	U
Total Xylenes	UG/KG	0				0%	0	4	500,000	0	58,000	0	13	U	14	U	15	U	13	U
Trans-1,3-Dichloropropene	UG/KG	0				0%	0	4					13	U	14	U	15	U	13	U
Trichloroethene	UG/KG	0				0%	0	4	200,000	0	410	0	13	U	14	U	15	U	13	U
Vinyl chloride	UG/KG	0				0%	0	4	13,000	0	59	0	13	U	14	U	15	U	13	U
Herbicides																				
2,4,5-T	UG/KG	0				0%	0	4			63,000	0	6.4	U	8	U	7.6	U	6.8	U
2,4,5-TP/Silvex	UG/KG	0				0%	0	4	500,000	0	51,000	0	6.4	U	8	U	7.6	U	6.8	U
2,4-D	UG/KG	0				0%	0	4			70,000	0	64	U	80	U	76	U	68	U
2,4-DB	UG/KG	0				0%	0	4			190,000	0	64	U	80	U	76	U	68	U
Dalapon	UG/KG	0				0%	0	4			190,000	0	160	U	200	U	190	U	170	U
Dicamba	UG/KG	0				0%	0	4			190,000	0	6.4	U	8	U	7.6	U	6.8	U
Dichloroprop	UG/KG	0				0%	0	4					64	U	80	U	76	U	68	U
Dinoseb	UG/KG	0				0%	0	4			6,300	0	32	U	40	U	38	U	34	U
MCPA	UG/KG	0				0%	0	4			3,200	0	6,400	U	8,000	U	7,600	U	6,800	U
MCPP	UG/KG	0				0%	0	4			6,300	0	6,400	U	8,000	U	7,600	U	6,800	U
Explosives																				
1,3,5-Trinitrobenzene	UG/KG	0				0%	0	4			220,000	0	130	U	130	U	130	U	130	U
1,3-Dinitrobenzene	UG/KG	0				0%	0	4			630	0	130	U	130	U	130	U	130	U
2,4,6-Trinitrotoluene	UG/KG	120	J	SW/SD45-2	11/1/1993	25%	1	4			3,600	0	130	U	120	J	130	U	130	U
2,4-Dinitrotoluene	UG/KG	83	J	SW/SD45-2	11/1/1993	25%	1	4			1,700	0	130	U	83	J	130	U	130	U
2,6-Dinitrotoluene	UG/KG	0				0%	0	4			360	0	130	U	130	U	130	U	130	U
2-amino-4,6-Dinitrotoluene	UG/KG	260		SW/SD45-2	11/1/1993	25%	1	4			15,000	0	130	U	260		130	U	130	U
4-amino-2,6-Dinitrotoluene	UG/KG	0				0%	0	4			15,000	0	130	U	130	U	130	U	130	U
HMX	UG/KG	0				0%	0	4			390,000	0	130	U	130	U	130	U	130	U
RDX	UG/KG	210		SW/SD45-2	11/1/1993	25%	1	4			6,100	0	130	U	210		130	U	130	U
Tetryl	UG/KG	140	J	SW/SD45-2	11/1/1993	25%	1	4			16,000	0	130	U	140	J	130	U	130	U

Table A-3
Analytical Data for Ditch Soil at OD Grounds
Feasibilty Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix													DITCH SOIL		DITCH SOIL		DITCH SOIL		DITCH SOIL	
Sample ID													SD45-1		SD45-2		SD45-3		SD45-4	
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5	
Sample Date													11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type													SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI	
Sample Round																				
Filtered													Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)									
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Semivolatile Organic Compounds																				
1,2,4-Trichlorobenzene	UG/KG	0				0%	0	4			5,800	0	420	U	530	U	500	U	440	U
1,2-Dichlorobenzene	UG/KG	0				0%	0	4	500,000	0	180,000	0	420	U	530	U	500	U	440	U
1,3-Dichlorobenzene	UG/KG	0				0%	0	4	280,000	0			420	U	530	U	500	U	440	U
1,4-Dichlorobenzene	UG/KG	0				0%	0	4	130,000	0	2,600	0	420	U	530	U	500	U	440	U
2,2'-oxybis(1-Chloropropane)	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
2,4,5-Trichlorophenol	UG/KG	0				0%	0	4			630,000	0	1,000	U	1,300	U	1,200	U	1,100	U
2,4,6-Trichlorophenol	UG/KG	0				0%	0	4			6,300	0	420	U	530	U	500	U	440	U
2,4-Dichlorophenol	UG/KG	0				0%	0	4			19,000	0	420	U	530	U	500	U	440	U
2,4-Dimethylphenol	UG/KG	0				0%	0	4			130,000	0	420	U	530	U	500	U	440	U
2,4-Dinitrophenol	UG/KG	0				0%	0	4			13,000	0	1,000	U	1,300	U	1,200	U	1,100	U
2,4-Dinitrotoluene	UG/KG	0				0%	0	4			1,700	0	420	U	530	U	500	U	440	U
2,6-Dinitrotoluene	UG/KG	0				0%	0	4			360	0	420	U	530	U	500	U	440	U
2-Chloronaphthalene	UG/KG	0				0%	0	4			480,000	0	420	U	530	U	500	U	440	U
2-Chlorophenol	UG/KG	0				0%	0	4			39,000	0	420	U	530	U	500	U	440	U
2-Methylnaphthalene	UG/KG	0				0%	0	4			24,000	0	420	U	530	U	500	U	440	U
2-Methylphenol	UG/KG	0				0%	0	4	500,000	0	320,000	0	420	U	530	U	500	U	440	U
2-Nitroaniline	UG/KG	0				0%	0	4			63,000	0	1,000	U	1,300	U	1,200	U	1,100	U
2-Nitrophenol	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
3,3'-Dichlorobenzidine	UG/KG	0				0%	0	4			1,200	0	420	U	530	U	500	U	440	U
3-Nitroaniline	UG/KG	0				0%	0	4					1,000	U	1,300	U	1,200	U	1,100	U
4,6-Dinitro-2-methylphenol	UG/KG	0				0%	0	4			510	0	1,000	U	1,300	U	1,200	U	1,100	U
4-Bromophenyl phenyl ether	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
4-Chloro-3-methylphenol	UG/KG	0				0%	0	4			630,000	0	420	U	530	U	500	U	440	U
4-Chloroaniline	UG/KG	0				0%	0	4			2,700	0	420	U	530	U	500	U	440	U
4-Chlorophenyl phenyl ether	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
4-Methylphenol	UG/KG	0				0%	0	4	500,000	0	630,000	0	420	U	530	U	500	U	440	U
4-Nitroaniline	UG/KG	0				0%	0	4			25,000	0	1,000	U	1,300	U	1,200	U	1,100	U
4-Nitrophenol	UG/KG	0				0%	0	4					1,000	U	1,300	U	1,200	U	1,100	U
Acenaphthene	UG/KG	0				0%	0	4	500,000	0	360,000	0	420	U	530	U	500	U	440	U
Acenaphthylene	UG/KG	0				0%	0	4	500,000	0			420	U	530	U	500	U	440	U
Anthracene	UG/KG	0				0%	0	4	500,000	0	1,800,000	0	420	U	530	U	500	U	440	U
Benzo(a)anthracene	UG/KG	32	J	SW/SD45-2	11/1/1993	50%	2	4	5,600	0	1,100	0	420	U	32	J	23	J	440	U
Benzo(a)pyrene	UG/KG	37	J	SW/SD45-2	11/1/1993	50%	2	4	1,000	0	110	0	420	U	37	J	28	J	440	U
Benzo(b)fluoranthene	UG/KG	37	J	SW/SD45-2	11/1/1993	50%	2	4	5,600	0	1,100	0	420	U	37	J	28	J	440	U
Benzo(ghi)perylene	UG/KG	48	J	SW/SD45-2	11/1/1993	25%	1	4	500,000	0			420	U	48	J	500	U	440	U
Benzo(k)fluoranthene	UG/KG	28	J	SW/SD45-2	11/1/1993	50%	2	4	56,000	0	11,000	0	420	U	28	J	26	J	440	U
Bis(2-Chloroethoxy)methane	UG/KG	0				0%	0	4			19,000	0	420	U	530	U	500	U	440	U
Bis(2-Chloroethyl)ether	UG/KG	0				0%	0	4			230	0	420	U	530	U	500	U	440	U
Bis(2-Ethylhexyl)phthalate	UG/KG	0				0%	0	4			39,000	0	420	U	530	U	500	U	440	U
Butylbenzylphthalate	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
Carbazole	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
Chrysene	UG/KG	50	J	SW/SD45-2	11/1/1993	75%	3	4	56,000	0	110,000	0	420	U	50	J	36	J	20	J
Dibenz(a,h)anthracene	UG/KG	0				0%	0	4	560	0	110	0	420	U	530	U	500	U	440	U
Dibenzofuran	UG/KG	0				0%	0	4	350,000	0	7,300	0	420	U	530	U	500	U	440	U
Diethyl phthalate	UG/KG	0				0%	0	4			5,100,000	0	420	U	530	U	500	U	440	U
Dimethylphthalate	UG/KG	0				0%	0	4					420	U	530	U	500	U	440	U
Di-n-butylphthalate	UG/KG	25	J	SW/SD45-2	11/1/1993	25%	1	4			630,000	0	420	U	25	J	500	U	440	U
Di-n-octylphthalate	UG/KG	0				0%	0	4			63,000	0	420	U	530	U	500	U	440	U
Fluoranthene	UG/KG	60	J	SW/SD45-2	11/1/1993	75%	3	4	500,000	0	240,000	0	420	U	60	J	47	J	31	J
Fluorene	UG/KG	0				0%	0	4	500,000	0	240,000	0	420	U	530	U	500	U	440	U
Hexachlorobenzene	UG/KG	40	J	SW/SD45-2	11/1/1993	50%	2	4	6,000	0	210	0	420	U	40	J	500	U	30	J
Hexachlorobutadiene	UG/KG	0				0%	0	4			1,200	0	420	U	530	U	500	U	440	U
Hexachlorocyclopentadiene	UG/KG	0				0%	0	4			180	0	420	U	530	U	500	U	440	U
Hexachloroethane	UG/KG	0				0%	0	4			1,800	0	420	U	530	U	500	U	440	U
Indeno(1,2,3-cd)pyrene	UG/KG	32	J	SW/SD45-2	11/1/1993	25%	1	4	5,600	0	1,100	0	420	U	32	J	500	U	440	U
Isophorone	UG/KG	0				0%	0	4			570,000	0	420	U	530	U	500	U	440	U
Naphthalene	UG/KG	24	J	SW/SD45-4	11/1/1993	25%	1	4	500,000	0	3,800	0	420	U	530	U	500	U	24	J
Nitrobenzene	UG/KG	0				0%	0	4			5,100	0	420	U	530	U	500	U	440	U
N-Nitroso-di-n-propylamine	UG/KG	0				0%	0	4			78	0	420	U	530	U	500	U	440	U
N-Nitrosodiphenylamine	UG/KG	0				0%	0	4			110,000	0	420	U	530	U	500	U	440	U
Pentachlorophenol	UG/KG	0				0%	0	4	6,700	0	1,000	0	1,000	U	1,300	U	1,200	U	1,100	U
Phenanthrene	UG/KG	34	J	SW/SD45-2	11/1/1993	75%	3	4	500,000	0			420	U	34	J	24	J	25	J
Phenol	UG/KG	0				0%	0	4	500,000	0	1,900,000	0	420	U	530	U	500	U	440	U
Pyrene	UG/KG	110	J	SW/SD45-2	11/1/1993	75%	3	4	500,000	0	180,000	0	420	U	110	J	59	J	61	J

Table A-3
Analytical Data for Ditch Soil at OD Grounds
Feasibilty Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix													DITCH SOIL		DITCH SOIL		DITCH SOIL		DITCH SOIL	
Sample ID													SD45-1		SD45-2		SD45-3		SD45-4	
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5	
Sample Date													11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type													SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI	
Sample Round																				
Filtered													Total		Total		Total		Total	
Criteria									NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)									
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Pesticides & PCBs																				
4,4'-DDD	UG/KG	0				0%	0	4	92,000	0	190	0	4.2	U	5.3	U	5	U	4.5	U
4,4'-DDE	UG/KG	12	J	SW/SD45-4	11/1/1993	50%	2	4	62,000	0	2,000	0	4.2	U	4.3	J	5	U	12	J
4,4'-DDT	UG/KG	0				0%	0	4	47,000	0	1,900	0	4.2	U	5.3	U	5	U	4.5	U
Aldrin	UG/KG	2.2	J	SW/SD45-4	11/1/1993	25%	1	4	680	0	39	0	2.2	U	2.7	U	2.6	U	2.2	J
Alpha-BHC	UG/KG	0				0%	0	4	3,400	0	86	0	2.2	U	2.7	U	2.6	U	2.3	U
Alpha-Chlordane	UG/KG	5.7	J	SW/SD45-4	11/1/1993	25%	1	4	24,000	0			2.2	U	2.7	U	2.6	U	5.7	J
Aroclor-1016	UG/KG	0				0%	0	4	1,000	0	410	0	42	U	53	U	50	U	45	U
Aroclor-1221	UG/KG	0				0%	0	4	1,000	0	200	0	85	U	110	U	100	U	91	U
Aroclor-1232	UG/KG	0				0%	0	4	1,000	0	170	0	42	U	53	U	50	U	45	U
Aroclor-1242	UG/KG	0				0%	0	4	1,000	0	230	0	42	U	53	U	50	U	45	U
Aroclor-1248	UG/KG	0				0%	0	4	1,000	0	230	0	42	U	53	U	50	U	45	U
Aroclor-1254	UG/KG	580	J	SW/SD45-4	11/1/1993	50%	2	4	1,000	0	120	1	42	U	74		50	U	580	J
Aroclor-1260	UG/KG	0				0%	0	4	1,000	0	240	0	42	U	53	U	50	U	45	U
Beta-BHC	UG/KG	0				0%	0	4	3,000	0	300	0	2.2	U	2.7	U	2.6	U	2.3	U
Delta-BHC	UG/KG	0				0%	0	4	500,000	0			2.2	U	2.7	U	2.6	U	2.3	U
Dieldrin	UG/KG	7.4	J	SW/SD45-4	11/1/1993	25%	1	4	1,400	0	34	0	4.2	U	5.3	U	5	U	7.4	J
Endosulfan I	UG/KG	2.7	J	SW/SD45-2	11/1/1993	50%	2	4	200,000	0			2.2	U	2.7	J	1.3	J	2.3	U
Endosulfan II	UG/KG	0				0%	0	4	200,000	0			4.2	U	5.3	U	5	U	4.5	U
Endosulfan sulfate	UG/KG	0				0%	0	4	200,000	0			4.2	U	5.3	U	5	U	4.5	U
Endrin	UG/KG	0				0%	0	4	89,000	0	1,900	0	4.2	U	5.3	U	5	U	4.5	U
Endrin aldehyde	UG/KG	3.2	J	SW/SD45-4	11/1/1993	25%	1	4					4.2	U	5.3	U	5	U	3.2	J
Endrin ketone	UG/KG	0				0%	0	4					4.2	U	5.3	U	5	U	4.5	U
Gamma-BHC/Lindane	UG/KG	0				0%	0	4	9,200	0	570	0	2.2	U	2.7	U	2.6	U	2.3	U
Gamma-Chlordane	UG/KG	0				0%	0	4					2.2	U	2.7	U	2.6	U	2.3	U
Heptachlor	UG/KG	0				0%	0	4	15,000	0	130	0	2.2	U	2.7	U	2.6	U	2.3	U
Heptachlor epoxide	UG/KG	0				0%	0	4			70	0	2.2	U	2.7	U	2.6	U	2.3	U
Methoxychlor	UG/KG	0				0%	0	4			32,000	0	22	U	27	U	26	U	23	U
Toxaphene	UG/KG	0				0%	0	4			490	0	220	U	270	U	260	U	230	U
Inorganics																				
Aluminum	MG/KG	35,000		SW/SD45-2	11/1/1993	100%	4	4			7,700	4	14,400		35,000		22,300		21,100	
Antimony	MG/KG	0				0%	0	4			3.1	0	10.1	U	13.4	U	11.7	U	7.2	UJ
Arsenic	MG/KG	16.1		SW/SD45-4	11/1/1993	100%	4	4	16	1	0.68	4	6.9		4.2		7.3		16.1	
Barium	MG/KG	308		SW/SD45-2	11/1/1993	100%	4	4	400	0	1,500	0	85.4		308		187		176	
Beryllium	MG/KG	1.4		SW/SD45-2	11/1/1993	100%	4	4	590	0	16	0	0.62	J	1.4		0.94	J	0.83	
Cadmium	MG/KG	25.6	J	SW/SD45-4	11/1/1993	100%	4	4	9.3	2	7.1	2	0.76	J	14.9		5.6		25.6	J
Calcium	MG/KG	84,400		SW/SD45-1	11/1/1993	100%	4	4					84,400		21,700		25,100		25,100	
Chromium	MG/KG	48.4		SW/SD45-2	11/1/1993	100%	4	4	1,500	0			22.5		48.4		31.4		31.8	
Cobalt	MG/KG	19.7		SW/SD45-2	11/1/1993	100%	4	4			2.3	4	11.2		19.7		12.9		13.2	
Copper	MG/KG	814		SW/SD45-2	11/1/1993	100%	4	4	270	2	310	2	63.9		814		323		241	
Cyanide	MG/KG	0				0%	0	4	27	0	2.3	0	0.61	U	0.68	U	0.74	U	0.68	U
Iron	MG/KG	50,500		SW/SD45-2	11/1/1993	100%	4	4			5,500	4	25,600		50,500		32,600		33,200	
Lead	MG/KG	101		SW/SD45-2	11/1/1993	100%	4	4	1,000	0	400	0	19.8		101		52.8		72.9	
Magnesium	MG/KG	10,200		SW/SD45-2	11/1/1993	100%	4	4					9,720		10,200		7,630		7,510	
Manganese	MG/KG	935		SW/SD45-4	11/1/1993	100%	4	4	10,000	0	180	4	458		692		616		935	
Mercury	MG/KG	5.3		SW/SD45-2	11/1/1993	100%	4	4	2.8	2	1.1	3	0.38		5.3		4.4		2.2	J
Nickel	MG/KG	67.7		SW/SD45-2	11/1/1993	100%	4	4	310	0	150	0	40.1		67.7		41.6		44.6	
Potassium	MG/KG	4,680		SW/SD45-2	11/1/1993	100%	4	4					2,580		4,680		3,360		2,840	
Selenium	MG/KG	0				0%	0	4	1,500	0	39	0	0.19	U	0.35	U	0.24	U	0.28	UJ
Silver	MG/KG	5.8		SW/SD45-2	11/1/1993	75%	3	4	1,500	0	39	0	1.3	U	5.8		3.1		2.5	J
Sodium	MG/KG	377	J	SW/SD45-2	11/1/1993	100%	4	4					208	J	377	J	146	J	130	J
Thallium	MG/KG	0				0%	0	4			0.078	0	0.21	U	0.38	U	0.26	U	0.31	U
Vanadium	MG/KG	53.7		SW/SD45-2	11/1/1993	100%	4	4			39	1	23.9		53.7		37.2		32.9	
Zinc	MG/KG	755		SW/SD45-2	11/1/1993	100%	4	4	10,000	0	2,300	0	104		755		312		329	

Table A-3
Analytical Data for Ditch Soil at OD Grounds
Feasibilty Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix													DITCH SOIL		DITCH SOIL		DITCH SOIL		DITCH SOIL	
Sample ID													SD45-1		SD45-2		SD45-3		SD45-4	
Sample Depth Interval (FT)													0-0.5		0-0.5		0-0.5		0-0.5	
Sample Date													11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type													SA		SA		SA		SA	
Study ID													ESI		ESI		ESI		ESI	
Sample Round																				
Filtered													Total		Total		Total		Total	
Criteria										NYS COMMERCIAL USE		2018-05 RSL Residential Soil (HQ=0.1)								
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Footnote:																				
1) All historical data collected prior to 2013 are reported as provided by others.																				
2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.																				
3) NLE = no limit established.																				
4) ND = not detected in any background sample, no background concentration available.																				
5) **Bold** = chemical dectection																				
6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.																				
7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data																				
[blank] = detect, i.e. detected chemical result value.		E (or ER) = Estimated result.																		
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.		D = Results from dilution of sample.																		
R = Rejected, data validation rejected the results.		J-DL = Elevated sample detection limit due to difficult sample matrix.																		
U = non-detect, i.e. not detected at or above this value.		JN = Tentatively identified compound, estimated concentration.																		
U-DL = Elevated sample detection limit due to difficult sample matrix.		UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.																		
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.		J+ = The result is an estimated quantity, but the result may be biased high.																		
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.		J- = The result is an estimated quantity, but the result may be biased low.																		
8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.																				
9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria																				
- Cell Bold values represent a results that is above the NYS SCO Commercial Use value.		#####																		
- Bold & Shade values represent a results that is above the USEPA 2018-05 RSL Residential Soil (HQ=0.1).		###																		
- Cell Shade values represent a result that is above both the NYS SCO Commercial Use and USEPA RSL		###																		
10) Criteria action level source document and web address.																				
- The NYS SCO Commercial Use values were obtained from the NYSDEC Soil Cleanup Objectives.																				
http://www.dec.ny.gov/regs/15507.html																				
- The 2017-06 USEPA RSL Residential Soil (HQ=0.1) refers to the EPA's Regional Screening Levels (HQ=0.1)																				
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables																				

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													MW1		MW1R		MW2		MW2R		MW3		MW3R		MW4		MW45-1		MW45-2	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GW	
Sample ID													MW1		45FS20001		MW2		45FS20002		MW3		45FS20003		MW4		45FS20004		MW45-2		45FS20005	
Sample Date													2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/3/1994		6/4/2018	
QC Type													SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
Study ID													ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates	
Sample Round																																
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																																
1,1,1-Trichloroethane	UG/L	0				0%	0	8	5	0	800	0	10	U			10	U			10	U			10	U			10	U		
1,1,2,2-Tetrachloroethane	UG/L	0				0%	0	8	5	0	0.076	0	10	U			10	U			10	U			10	U			10	U		
1,1,2-Trichloroethane	UG/L	0				0%	0	8	1	0	0.041	0	10	U			10	U			10	U			10	U			10	U		
1,1-Dichloroethane	UG/L	0				0%	0	8	5	0	2.8	0	10	U			10	U			10	U			10	U			10	U		
1,1-Dichloroethene	UG/L	0				0%	0	8	5	0	28	0	10	U			10	U			10	U			10	U			10	U		
1,2-Dichloroethane	UG/L	0				0%	0	8	0.6	0	0.17	0	10	U			10	U			10	U			10	U			10	U		
1,2-Dichloroethene (total)	UG/L	0				0%	0	8					10	U			10	U			10	U			10	U			10	U		
1,2-Dichloropropane	UG/L	0				0%	0	8	1	0	0.82	0	10	U			10	U			10	U			10	U			10	U		
Acetone	UG/L	0				0%	0	8			1,400	0	10	U			10	U			10	U			10	U			10	U		
Benzene	UG/L	0				0%	0	8	1	0	0.46	0	10	U			10	U			10	U			10	U			10	U		
Bromodichloromethane	UG/L	0				0%	0	8			0.13	0	10	U			10	U			10	U			10	U			10	U		
Bromoform	UG/L	0				0%	0	8			3.3	0	10	U			10	U			10	U			10	U			10	U		
Carbon disulfide	UG/L	0				0%	0	8	60	0	81	0	10	U			10	U			10	U			10	U			10	U		
Carbon tetrachloride	UG/L	0				0%	0	8	5	0	0.46	0	10	U			10	U			10	U			10	U			10	U		
Chlorobenzene	UG/L	0				0%	0	8	5	0	7.8	0	10	U			10	U			10	U			10	U			10	U		
Chlorodibromomethane	UG/L	0				0%	0	8			0.87	0	10	U			10	U			10	U			10	U			10	U		
Chloroethane	UG/L	0				0%	0	8	5	0	2,100	0	10	U			10	U			10	U			10	U			10	U		
Chloroform	UG/L	0				0%	0	8	7	0	0.22	0	10	U			10	U			10	U			10	U			10	U		
Cis-1,3-Dichloropropene	UG/L	0				0%	0	8					10	U			10	U			10	U			10	U			10	U		
Ethyl benzene	UG/L	0				0%	0	8	5	0	1.5	0	10	U			10	U			10	U			10	U			10	U		
Methyl bromide	UG/L	0				0%	0	8	5	0	0.75	0	10	U			10	U			10	U			10	U			10	U		
Methyl butyl ketone	UG/L	0				0%	0	8					10	U			10	U			10	U			10	U			10	U		
Methyl chloride	UG/L	0				0%	0	8	5	0	19	0	10	U			10	U			10	U			10	U			10	U		
Methyl ethyl ketone	UG/L	0				0%	0	8			560	0	10	U			10	U			10	U			10	U			10	U		
Methyl isobutyl ketone	UG/L	0				0%	0	8			630	0	10	U			10	U			10	U			10	U			10	U		
Methylene chloride	UG/L	0				0%	0	8	5	0	11	0	10	U			10	U			10	U			10	U			10	U		
Styrene	UG/L	0				0%	0	8	5	0	120	0	10	U			10	U			10	U			10	U			10	U		
Tetrachloroethene	UG/L	1	J	MW1	2/1/1994	13%	1	8	5	0	4.1	0	1	J			10	U			10	U			10	U			10	U		
Toluene	UG/L	0				0%	0	8	5	0	110	0	10	U			10	U			10	U			10	U			10	U		
Total Xylenes	UG/L	0				0%	0	8			19	0	10	U			10	U			10	U			10	U			10	U		
Trans-1,3-Dichloropropene	UG/L	0				0%	0	8					10	U			10	U			10	U			10	U			10	U		
Trichloroethene	UG/L	0				0%	0	8	5	0	0.28	0	10	U			10	U			10	U			10	U			10	U		
Vinyl chloride	UG/L	0				0%	0	8	2	0	0.019	0	10	U			10	U			10	U			10	U			10	U		
Herbicides																																
2,4,5-T	UG/L	0				0%	0	8	35	0	16	0	0.11	U			0.12	U			0.11	U			0.12	U			0.11	U		
2,4,5-TP/Silvex	UG/L	0				0%	0	8	0.26	0	11	0	0.11	U			0.12	U			0.11	U			0.12	U			0.11	U		
2,4-D	UG/L	0				0%	0	8	50	0	17	0	1.1	U			1.2	U			1.1	U			1.2	U			1.1	U		
2,4-DB	UG/L	0				0%	0	8			45	0	1.1	U			1.2	U			1.1	U			1.2	U			1.1	U		
Dalapon	UG/L	0				0%	0	8	50	0	60	0	2.5	U			2.7	U			2.4	U			2.7	U			2.5	U		
Dicamba	UG/L	0				0%	0	8	0.44	0	57	0	0.11	U			0.12	U			0.11	U			0.12	U			0.11	U		
Dichloroprop	UG/L	0				0%	0	8					1.1	U			1.2	U			1.1	U			1.2	U			1.1	U		
Dinoseb	UG/L	0				0%	0	8			1.5	0	0.53	U			0.58	U			0.52	U			0.59	U			0.54	U		
MCPA	UG/L	0				0%	0	8	0.44	0	0.75	0	110	U			120	U			110	U			120	U			110	U		
MCPP	UG/L	0				0%	0	8			1.6	0	110	U			120	U			110	U			120	U			110	U		
Explosives																																
1,3,5-Trinitrobenzene	UG/L	0				0%	0	8	5	0	59	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
1,3-Dinitrobenzene	UG/L	0.067	J	MW5	2/2/1994	13%	1	8	5	0	0.2	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
2,4,6-Trinitrotoluene	UG/L	0				0%	0	8	5	0	0.98	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
2,4-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.24	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
2,6-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.049	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
2-amino-4,6-Dinitrotoluene	UG/L	0				0%	0	8			3.9	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
4-amino-2,6-Dinitrotoluene	UG/L	0				0%	0	8			3.9	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
HMX	UG/L	0.5		MW1	2/1/1994	13%	1	8			100	0	0.5				0.13	U			0.13	U			0.13	U			0.13	UJ		
RDX	UG/L	0				0%	0	8			0.7	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
Tetryl	UG/L	0				0%	0	8			3.9	0	0.13	U			0.13	U			0.13	U			0.13	U			0.13	UJ		
Semivolatile Organic Compounds																																
1,2,4-Trichlorobenzene	UG/L	0				0%	0	8			0.4	0	10	U			11	U			10	U			10	U			11	U		
1,2-Dichlorobenzene	UG/L	0				0%	0	8			30	0	10	U			11	U			10	U			10	U			11	U		
1,3-Dichlorobenzene	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
1,4-Dichlorobenzene	UG/L	0				0%	0	8			0.48	0	10	U			11	U			10	U			10	U			11	U		
2,2'-oxybis(1-Chloropropane)	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
2,4,5-Trichlorophenol	UG/L	0				0%	0	8			120	0	25	U			28	U			25	U			26	U			27	U		
2,4,6-Trichlorophenol	UG/L	0				0%	0	8			1.2	0	10	U			11	U			10	U			10	U			11	U		
2,4-Dichlorophenol	UG/L	0				0%	0	8	1	0	4.6	0	10	U			11	U			10	U			10	U			11	U		
2,4-Dimethylphenol	UG/L	0				0%	0	8	1	0	36	0	10	U			11	U			10	U			10	U			11	U		
2,4-Dinitrophenol	UG/L	0				0%	0	8	1	0	3.9	0	25	U			28	U			25	U			26	U			27	U		
2,4-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.24	0	10	U			11	U			10	U			10	U			11	U		
2,6-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.049	0	10	U			11	U			10	U			10	U			11	U		
2-Chloronaphthalene	UG/L	0				0%	0	8			75	0	10	U			11	U			10	U			10	U			11	U		
2-Chlorophenol	UG/L	0				0%	0	8			9.1	0	10	U			11	U			10	U			10	U			11	U		

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													MW1		MW1R		MW2		MW2R		MW3		MW3R		MW4		MW45-1		MW45-2	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GW	
Sample ID													MW1		45FS20001		MW2		45FS20002		MW3		45FS20003		MW4		45FS20004		MW45-2		45FS20005	
Sample Date													2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/3/1994		6/4/2018	
QC Type													SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
Study ID													ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates	
Sample Round																																
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
2-Methylnaphthalene	UG/L	0				0%	0	8			3.6	0	10	U			11	U			10	U			10	U			11	U		
2-Methylphenol	UG/L	0				0%	0	8			93	0	10	U			11	U			10	U			10	U			11	U		
2-Nitroaniline	UG/L	0				0%	0	8	5	0	19	0	25	U			28	U			25	U			26	U			27	U		
2-Nitrophenol	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
3,3'-Dichlorobenzidine	UG/L	0				0%	0	8	5	0	0.13	0	10	U			11	U			10	U			10	U			11	U		
3-Nitroaniline	UG/L	0				0%	0	8	5	0			25	U			28	U			25	U			26	U			27	U		
4,6-Dinitro-2-methylphenol	UG/L	0				0%	0	8			0.15	0	25	U			28	U			25	U			26	U			27	U		
4-Bromophenyl phenyl ether	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
4-Chloro-3-methylphenol	UG/L	0				0%	0	8			140	0	10	U			11	U			10	U			10	U			11	U		
4-Chloroaniline	UG/L	0				0%	0	8	5	0	0.37	0	10	U			11	U			10	U			10	U			11	U		
4-Chlorophenyl phenyl ether	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
4-Methylphenol	UG/L	0				0%	0	8			190	0	10	U			11	U			10	U			10	U			11	U		
4-Nitroaniline	UG/L	0				0%	0	8	5	0	3.8	0	25	U			28	U			25	U			26	U			27	U		
4-Nitrophenol	UG/L	0				0%	0	8					25	U			28	U			25	U			26	U			27	U		
Acenaphthene	UG/L	0				0%	0	8			53	0	10	U			11	U			10	U			10	U			11	U		
Acenaphthylene	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Anthracene	UG/L	0				0%	0	8			180	0	10	U			11	U			10	U			10	U			11	U		
Benzo(a)anthracene	UG/L	0				0%	0	8			0.03	0	10	U			11	U			10	U			10	U			11	U		
Benzo(a)pyrene	UG/L	0				0%	0	8	0		0.025	0	10	U			11	U			10	U			10	U			11	U		
Benzo(b)fluoranthene	UG/L	0				0%	0	8			0.25	0	10	U			11	U			10	U			10	U			11	U		
Benzo(ghi)perylene	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Benzo(k)fluoranthene	UG/L	0				0%	0	8			2.5	0	10	U			11	U			10	U			10	U			11	U		
Bis(2-Chloroethoxy)methane	UG/L	0				0%	0	8	5	0	5.9	0	10	U			11	U			10	U			10	U			11	U		
Bis(2-Chloroethyl)ether	UG/L	0				0%	0	8	1	0	0.014	0	10	U			11	U			10	U			10	U			11	U		
Bis(2-Ethylhexyl)phthalate	UG/L	33		MW1	2/1/1994	50%	4	8	5	4	5.6	4	33				11	U			12				11				23			
Butylbenzylphthalate	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Carbazole	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Chrysene	UG/L	0				0%	0	8			25	0	10	U			11	U			10	U			10	U			11	U		
Dibenz(a,h)anthracene	UG/L	0				0%	0	8			0.025	0	10	U			11	U			10	U			10	U			11	U		
Dibenzofuran	UG/L	0				0%	0	8			0.79	0	10	U			11	U			10	U			10	U			11	U		
Diethyl phthalate	UG/L	0				0%	0	8			1,500	0	10	U			11	U			10	U			10	U			11	U		
Dimethylphthalate	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Di-n-butylphthalate	UG/L	0				0%	0	8	50	0	90	0	10	U			11	U			10	U			10	U			11	U		
Di-n-octylphthalate	UG/L	0				0%	0	8			20	0	10	U			11	U			10	U			10	U			11	U		
Fluoranthene	UG/L	0				0%	0	8			80	0	10	U			11	U			10	U			10	U			11	U		
Fluorene	UG/L	0				0%	0	8			29	0	10	U			11	U			10	U			10	U			11	U		
Hexachlorobenzene	UG/L	0				0%	0	8	0.04	0	0.0098	0	10	U			11	U			10	U			10	U			11	U		
Hexachlorobutadiene	UG/L	0				0%	0	8	0.5	0	0.14	0	10	U			11	U			10	U			10	U			11	U		
Hexachlorocyclopentadiene	UG/L	0				0%	0	8	5	0	0.041	0	10	U			11	U			10	U			10	U			11	U		
Hexachloroethane	UG/L	0				0%	0	8	5	0	0.33	0	10	U			11	U			10	U			10	U			11	U		
Indeno(1,2,3-cd)pyrene	UG/L	0				0%	0	8			0.25	0	10	U			11	U			10	U			10	U			11	U		
Isophorone	UG/L	0				0%	0	8			78	0	10	U			11	U			10	U			10	U			11	U		
Naphthalene	UG/L	0				0%	0	8			0.17	0	10	U			11	U			10	U			10	U			11	U		
Nitrobenzene	UG/L	0				0%	0	8	0.4	0	0.14	0	10	U			11	U			10	U			10	U			11	U		
N-Nitroso-di-n-propylamine	UG/L	0				0%	0	8			0.011	0	10	U			11	U			10	U			10	U			11	U		
N-Nitrosodiphenylamine	UG/L	0				0%	0	8			12	0	10	U			11	U			10	U			10	U			11	U		
Pentachlorophenol	UG/L	0				0%	0	8	1	0	0.041	0	25	U			28	U			25	U			26	U			27	U		
Phenanthrene	UG/L	0				0%	0	8					10	U			11	U			10	U			10	U			11	U		
Phenol	UG/L	0				0%	0	8	1	0	580	0	10	U			11	U			10	U			10	U			11	U		
Pyrene	UG/L	0				0%	0	8			12	0	10	U			11	U			10	U			10	U			11	U		
Pesticides & PCBs																																
4,4'-DDD	UG/L	0				0%	0	8	0.3	0	0.0063	0	0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
4,4'-DDE	UG/L	0				0%	0	8	0.2	0	0.046	0	0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
4,4'-DDT	UG/L	0				0%	0	8	0.2	0	0.23	0	0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Aldrin	UG/L	0				0%	0	8	0		0.00092	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Alpha-BHC	UG/L	0				0%	0	8	0.01	0	0.0072	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Alpha-Chlordane	UG/L	0				0%	0	8					0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Aroclor-1016	UG/L	0				0%	0	8			0.14	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Aroclor-1221	UG/L	0				0%	0	8			0.0047	0	2.7	U			2.3	U			2.1	U			2.4	U			2.2	U		
Aroclor-1232	UG/L	0				0%	0	8			0.0047	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Aroclor-1242	UG/L	0				0%	0	8			0.0078	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Aroclor-1248	UG/L	0				0%	0	8			0.0078	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Aroclor-1254	UG/L	0				0%	0	8			0.0078	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Aroclor-1260	UG/L	0				0%	0	8			0.0078	0	1.4	U			1.1	U			1	U			1.2	U			1.1	U		
Beta-BHC	UG/L	0				0%	0	8	0.04	0	0.025	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Delta-BHC	UG/L	0				0%	0	8	0.04	0			0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Dieldrin	UG/L	0				0%	0	8	0.004	0	0.0018	0	0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Endosulfan I	UG/L	0				0%	0	8					0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Endosulfan II	UG/L	0				0%	0	8					0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Endosulfan sulfate	UG/L	0				0%	0	8					0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Endrin	UG/L	0				0%	0	8	0		0.23	0	0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Endrin aldehyde	UG/L	0				0%	0	8	5	0			0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Endrin ketone	UG/L	0				0%	0	8	5	0			0.14	U			0.11	U			0.1	U			0.12	U			0.11	U		
Gamma-BHC/Lindane	UG/L	0				0%	0	8	0.05	0	0.042	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Gamma-Chlordane	UG/L	0				0%	0	8					0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Heptachlor	UG/L	0				0%	0	8	0.04	0	0.0014	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Heptachlor epoxide	UG/L	0				0%	0	8	0.03	0	0.0014	0	0.068	U			0.057	U			0.052	U			0.059	U			0.056	U		
Methoxychlor	UG/L	0				0%	0	8	35	0	3.7	0	0.68	U			0.57	U			0.52	U			0.59	U			0.56	U		
Toxaphene	UG/L	0				0%	0	8	0.06	0	0.071	0	6.8	U			5.7	U			5.2	U			5.9	U			5.6	U		

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID													MW1		MW1R		MW2		MW2R		MW3		MW3R		MW4		MW45-1		MW45-2		MW45-2	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GW	
Sample ID													MW1		45FS20001		MW2		45FS20002		MW3		45FS20003		MW4		45FS20004		MW45-2		45FS20005	
Sample Date													2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/1/1994		6/4/2018		2/2/1994		6/4/2018		2/3/1994		6/4/2018	
QC Type													SA		SA		SA		SA		SA		SA		SA		SA		SA		SA	
Study ID													ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates		ESI		2018 Perchlorates	
Sample Round																																
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																																
Aluminum	UG/L	63,300		MW45-4	1/26/1994	75%	9	12			2,000	3	124	J			828				83.5	J			17,700				42	U		
Antimony	UG/L	52.1	J	MW3	2/1/1994	58%	7	12	3	7	0.78	7	24.5	J			23.1	J			52.1	J			49.6	J			26.8	J		
Arsenic	UG/L	9.5	J	MW45-4	1/26/1994	25%	3	12	25	0	0.052	3	1.4	U			1.4	U			1.4	U			1.7	J			1.4	U		
Barium	UG/L	751		MW45-4	1/26/1994	100%	12	12	1,000	0	380	1	56.5	J			50.8	J			25.5	J			195	J			27.2	J		
Beryllium	UG/L	5		MW45-4	1/26/1994	25%	3	12			2.5	1	0.4	U			0.4	U			0.4	U			0.87	J			0.4	U		
Cadmium	UG/L	3.8	J	MW4	2/2/1994	33%	4	12	5	0	0.92	4	2.2	J			2.1	U			2.1	U			3.7	J			2.9	J		
Calcium	UG/L	660,000		MW45-4	1/26/1994	100%	12	12					118,000				94,600				91,700				152,000				232,000			
Chromium	UG/L	106		MW45-4	1/26/1994	42%	5	12	50	1			2.6	U			4.1	J			2.6	U			28.9				2.6	U		
Cobalt	UG/L	94.4		MW45-4	1/26/1994	33%	4	12			0.6	4	4.4	U			5.3	J			4.4	U			11.2				4.4	U		
Copper	UG/L	123		MW45-4	1/26/1994	58%	7	12	200	0	80	1	3.1	U			7.2	J			3.9	J			79.2				3.1	U		
Cyanide	UG/L	0				0%	0	11			0.15	0	5	U			5	U			5	U			5	U			5	U		
Iron	UG/L	113,000		MW45-4	1/26/1994	83%	10	12	500	5	1,400	3	207				940				109				27,500				48.5	J		
Iron+Manganese	UG/L	117,640		MW45-4	1/26/1994	100%	12	12					211.4	J			963.7				111.9	J			27,884				1,449	J		
Lead	UG/L	75.6		MW45-4	1/26/1994	67%	8	12	25	1	15	2	0.71	J			0.66	J			0.73	J			13.7				0.71	J		
Magnesium	UG/L	77,900		MW45-3	2/3/1994	100%	12	12					26,400				15,700				15,600				31,600				57,600			
Manganese	UG/L	4,640		MW45-4	1/26/1994	100%	12	12	300	4	43	5	4.4	J			23.7				2.9	J			284				7,469			
Mercury	UG/L	1.8		MW4	2/2/1994	25%	3	12	0.7	1	0.063	3	0.04	U			0.04	U			0.04	U			1.8				0.04	U		
Nickel	UG/L	209		MW45-4	1/26/1994	42%	5	12	100	1	39	2	4	U			4	U			4	U			43.2				10.2	J		
Potassium	UG/L	18,700		MW45-3	2/3/1994	75%	9	12					910	U			1,050	J			904	U			6,540				9,660			
Selenium	UG/L	2.5	J	MW45-2	2/3/1994	42%	5	12	10	0	10	0	0.99	J			0.7	U			0.7	U			1.9	J			2.5	J		
Silver	UG/L	4.6	J	MW4	2/2/1994	17%	2	12	50	0	9.4	0	4.2	U			4.2	U			4.2	U			4.6	J			4.2	U		
Sodium	UG/L	40,000		MW45-2	2/3/1994	100%	12	12	20,000	1			10,000				13,100				3,400	J			15,800				40,000			
Thallium	UG/L	3.4	J	MW45-4	4/9/1999	8%	1	12			0.02	1	1.2	U			1.2	U			1.2	U			1.2	U			1.2	U		
Vanadium	UG/L	93.1		MW45-4	1/26/1994	25%	3	12			8.6	3	3.7	U			3.7	U			3.7	U			14.7				3.7	U		
Zinc	UG/L	321		MW45-4	1/26/1994	100%	12	12			600	0	15.3	J			23				14	J			164				31.6			
Wet Chemistry																																
Perchlorate	UG/L	4.1		MW45-3	6/4/2018	100%	8	8			1.4	3			1.4				0.18				0.085				1				4.1	

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected; however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that

- Bold values represent a results that is above the NYS GA Standard value. ####
- Cell Bold values represent a results that is above the USEPA 2018-05 RSL Tap Water (HQ=0.1). ####
- Cell Shade values represent a result that is above both the NYS AWQS GA Standard and USEPA 2018-05 RSL ####

10) Criteria action level source document and web address.

- The NYS GA Standard values were obtained from NYS Ambient Water Quality Standard Updated May 2018.
  https://www.dec.ny.gov/chemical/23853.html
- The 2017-06 USEPA RSL Tap Water (HQ=0.1) refers to the USEPA's Regional Screening Levels (HQ=0.1)
  https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		OB Grounds		OB Grounds	
Loc ID													MW45-2		MW45-3		MW45-4		MW45-4		MW45-4		MW45-4		MW45-4R		MW5		MW23-3		MW23-4R	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GROUNDWATER		GROUNDWATER	
Sample ID													45FS20006		MW45-3		45FS20007		MW45-4		OB108		122000		122247		122248		45FS20008		MW5		45FS20009		45FS200010	
Sample Date													6/4/2018		2/3/1994		6/4/2018		1/26/1994		6/18/1997		4/9/1999		12/7/1999		12/7/1999		6/4/2018		2/2/1994		6/4/2018		6/4/2018	
QC Type													DU		SA		SA		SA		SA		SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		ESI		2018 Perchlorates		ESI		OB_Quarterly		RI PHASE 1 STEP 1		RI PHASE 1 STEP 1-PLUT RESAMP		RI PHASE 1 STEP 1		2018 Perchlorates		ESI		2018 Perchlorates		2018 Perchlorates	
Sample Round																					0		1		2		2									
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																																				
1,1,1-Trichloroethane	UG/L	0				0%	0	8	5	0	800	0			10	U			10	U											10	U				
1,1,2,2-Tetrachloroethane	UG/L	0				0%	0	8	5	0	0.076	0			10	U			10	U											10	U				
1,1,2-Trichloroethane	UG/L	0				0%	0	8	1	0	0.041	0			10	U			10	U											10	U				
1,1-Dichloroethane	UG/L	0				0%	0	8	5	0	2.8	0			10	U			10	U											10	U				
1,1-Dichloroethene	UG/L	0				0%	0	8	5	0	28	0			10	U			10	U											10	U				
1,2-Dichloroethane	UG/L	0				0%	0	8	0.6	0	0.17	0			10	U			10	U											10	U				
1,2-Dichloroethene (total)	UG/L	0				0%	0	8							10	U			10	U											10	U				
1,2-Dichloropropane	UG/L	0				0%	0	8	1	0	0.82	0			10	U			10	U											10	U				
Acetone	UG/L	0				0%	0	8			1,400	0			10	U			10	U											10	U				
Benzene	UG/L	0				0%	0	8	1	0	0.46	0			10	U			10	U											10	U				
Bromodichloromethane	UG/L	0				0%	0	8			0.13	0			10	U			10	U											10	U				
Bromoform	UG/L	0				0%	0	8			3.3	0			10	U			10	U											10	U				
Carbon disulfide	UG/L	0				0%	0	8	60	0	81	0			10	U			10	U											10	U				
Carbon tetrachloride	UG/L	0				0%	0	8	5	0	0.46	0			10	U			10	U											10	U				
Chlorobenzene	UG/L	0				0%	0	8	5	0	7.8	0			10	U			10	U											10	U				
Chlorodibromomethane	UG/L	0				0%	0	8			0.87	0			10	U			10	U											10	U				
Chloroethane	UG/L	0				0%	0	8	5	0	2,100	0			10	U			10	U											10	U				
Chloroform	UG/L	0				0%	0	8	7	0	0.22	0			10	U			10	U											10	U				
Cis-1,3-Dichloropropene	UG/L	0				0%	0	8							10	U			10	U											10	U				
Ethyl benzene	UG/L	0				0%	0	8	5	0	1.5	0			10	U			10	U											10	U				
Methyl bromide	UG/L	0				0%	0	8	5	0	0.75	0			10	U			10	U											10	U				
Methyl butyl ketone	UG/L	0				0%	0	8							10	U			10	U											10	U				
Methyl chloride	UG/L	0				0%	0	8	5	0	19	0			10	U			10	U											10	U				
Methyl ethyl ketone	UG/L	0				0%	0	8			560	0			10	U			10	U											10	U				
Methyl isobutyl ketone	UG/L	0				0%	0	8			630	0			10	U			10	U											10	U				
Methylene chloride	UG/L	0				0%	0	8	5	0	11	0			10	U			10	U											10	U				
Styrene	UG/L	0				0%	0	8	5	0	120	0			10	U			10	U											10	U				
Tetrachloroethene	UG/L	1	J	MW1	2/1/1994	13%	1	8	5	0	4.1	0			10	U			10	U											10	U				
Toluene	UG/L	0				0%	0	8	5	0	110	0			10	U			10	U											10	U				
Total Xylenes	UG/L	0				0%	0	8			19	0			10	U			10	U											10	U				
Trans-1,3-Dichloropropene	UG/L	0				0%	0	8							10	U			10	U											10	U				
Trichloroethene	UG/L	0				0%	0	8	5	0	0.28	0			10	U			10	U											10	U				
Vinyl chloride	UG/L	0				0%	0	8	2	0	0.019	0			10	U			10	U											10	U				
Herbicides																																				
2,4,5-T	UG/L	0				0%	0	8	35	0	16	0			0.11	U			0.11	U											0.11	U				
2,4,5-TP/Silvex	UG/L	0				0%	0	8	0.26	0	11	0			0.11	U			0.11	U											0.11	U				
2,4-D	UG/L	0				0%	0	8	50	0	17	0			1.1	U			1.1	U											1.1	U				
2,4-DB	UG/L	0				0%	0	8			45	0			1.1	U			1.1	U											1.1	U				
Dalapon	UG/L	0				0%	0	8	50	0	60	0			2.5	U			2.5	U											2.5	U				
Dicamba	UG/L	0				0%	0	8	0.44	0	57	0			0.11	U			0.11	U											0.11	U				
Dichloroprop	UG/L	0				0%	0	8							1.1	U			1.1	U											1.1	U				
Dinoseb	UG/L	0				0%	0	8			1.5	0			0.53	U			0.54	U											0.55	U				
MCPA	UG/L	0				0%	0	8	0.44	0	0.75	0			110	U			110	U											110	U				
MCPP	UG/L	0				0%	0	8			1.6	0			110	U			110	U											110	U				
Explosives																																				
1,3,5-Trinitrobenzene	UG/L	0				0%	0	8	5	0	59	0			0.13	U			0.13	U											0.13	U				
1,3-Dinitrobenzene	UG/L	0.067	J	MW5	2/2/1994	13%	1	8	5	0	0.2	0			0.13	U			0.13	U											0.067	J				
2,4,6-Trinitrotoluene	UG/L	0				0%	0	8	5	0	0.98	0			0.13	U			0.13	U											0.13	U				
2,4-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.24	0			0.13	U			0.13	U											0.13	U				
2,6-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.049	0			0.13	U			0.13	U											0.13	U				
2-amino-4,6-Dinitrotoluene	UG/L	0				0%	0	8			3.9	0			0.13	U			0.13	U											0.13	U				
4-amino-2,6-Dinitrotoluene	UG/L	0				0%	0	8			3.9	0			0.13	U			0.13	U											0.13	U				
HMX	UG/L	0.5		MW1	2/1/1994	13%	1	8			100	0			0.13	U			0.13	U											0.13	U				
RDX	UG/L	0				0%	0	8			0.7	0			0.13	U			0.13	U											0.13	U				
Tetryl	UG/L	0				0%	0	8			3.9	0			0.13	U			0.13	U											0.13	U				
Semivolatile Organic Compounds																																				
1,2,4-Trichlorobenzene	UG/L	0				0%	0	8			0.4	0			11	U			11	U											10	U				
1,2-Dichlorobenzene	UG/L	0				0%	0	8			30	0			11	U			11	U											10	U				
1,3-Dichlorobenzene	UG/L	0				0%	0	8							11	U			11	U											10	U				
1,4-Dichlorobenzene	UG/L	0				0%	0	8			0.48	0			11	U			11	U											10	U				
2,2'-oxybis(1-Chloropropane)	UG/L	0				0%	0	8							11	U			11	U											10	U				
2,4,5-Trichlorophenol	UG/L	0				0%	0	8			120	0			27	U			27	U											26	U				
2,4,6-Trichlorophenol	UG/L	0				0%	0	8			1.2	0			11	U			11	U											10	U				
2,4-Dichlorophenol	UG/L	0				0%	0	8	1	0	4.6	0			11	U			11	U											10	U				
2,4-Dimethylphenol	UG/L	0				0%	0	8	1	0	36	0			11	U			11	U											10	U				
2,4-Dinitrophenol	UG/L	0				0%	0	8	1	0	3.9	0			27	U			27	U											26	U				
2,4-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.24	0			11	U			11	U											10	U				
2,6-Dinitrotoluene	UG/L	0				0%	0	8	5	0	0.049	0			11	U			11	U											10	U				
2-Chloronaphthalene	UG/L	0				0%	0	8			75	0			11	U			11	U											10	U				
2-Chlorophenol	UG/L	0				0%	0	8			9.1	0			11	U			11	U											10	U				

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		OB Grounds		OB Grounds	
Loc ID													MW45-2		MW45-3		MW45-3		MW45-4		MW45-4		MW45-4		MW45-4		MW45-4R		MW5		MW23-3		MW23-4R	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GW		GROUNDWATER		GROUNDWATER	
Sample ID													45FS20006		MW45-3		45FS20007		MW45-4		OB108		122000		122247		122248		45FS20008		MW5		45FS20009		45FS200010	
Sample Date													6/4/2018		2/3/1994		6/4/2018		1/26/1994		6/18/1997		4/9/1999		12/7/1999		12/7/1999		6/4/2018		2/2/1994		6/4/2018		6/4/2018	
QC Type													DU		SA		SA		SA		SA		SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		ESI		2018 Perchlorates		ESI		OB_Quarterly		RI PHASE 1 STEP 1		RI PHASE 1 STEP 1-PLUT RESAMP		RI PHASE 1 STEP 1		2018 Perchlorates		ESI		2018 Perchlorates		2018 Perchlorates	
Sample Round																					0		1		2		2									
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
2-Methylnaphthalene	UG/L	0				0%	0	8			3.6	0			11	U			11	U											10	U				
2-Methylphenol	UG/L	0				0%	0	8			93	0			11	U			11	U											10	U				
2-Nitroaniline	UG/L	0				0%	0	8	5	0	19	0			27	U			27	U											26	U				
2-Nitrophenol	UG/L	0				0%	0	8							11	U			11	U											10	U				
3,3'-Dichlorobenzidine	UG/L	0				0%	0	8	5	0	0.13	0			11	U			11	U											10	U				
3-Nitroaniline	UG/L	0				0%	0	8	5	0					27	U			27	U											26	U				
4,6-Dinitro-2-methylphenol	UG/L	0				0%	0	8			0.15	0			27	U			27	U											26	U				
4-Bromophenyl phenyl ether	UG/L	0				0%	0	8							11	U			11	U											10	U				
4-Chloro-3-methylphenol	UG/L	0				0%	0	8			140	0			11	U			11	U											10	U				
4-Chloroaniline	UG/L	0				0%	0	8	5	0	0.37	0			11	U			11	U											10	U				
4-Chlorophenyl phenyl ether	UG/L	0				0%	0	8							11	U			11	U											10	U				
4-Methylphenol	UG/L	0				0%	0	8			190	0			11	U			11	U											10	U				
4-Nitroaniline	UG/L	0				0%	0	8	5	0	3.8	0			27	U			27	U											26	U				
4-Nitrophenol	UG/L	0				0%	0	8							27	U			27	U											26	U				
Acenaphthene	UG/L	0				0%	0	8			53	0			11	U			11	U											10	U				
Acenaphthylene	UG/L	0				0%	0	8							11	U			11	U											10	U				
Anthracene	UG/L	0				0%	0	8			180	0			11	U			11	U											10	U				
Benzo(a)anthracene	UG/L	0				0%	0	8			0.03	0			11	U			11	U											10	U				
Benzo(a)pyrene	UG/L	0				0%	0	8	0		0.025	0			11	U			11	U											10	U				
Benzo(b)fluoranthene	UG/L	0				0%	0	8			0.25	0			11	U			11	U											10	U				
Benzo(ghi)perylene	UG/L	0				0%	0	8							11	U			11	U											10	U				
Benzo(k)fluoranthene	UG/L	0				0%	0	8			2.5	0			11	U			11	U											10	U				
Bis(2-Chloroethoxy)methane	UG/L	0				0%	0	8	5	0	5.9	0			11	U			11	U											10	U				
Bis(2-Chloroethyl)ether	UG/L	0				0%	0	8	1	0	0.014	0			11	U			11	U											10	U				
Bis(2-Ethylhexyl)phthalate	UG/L	33		MW1	2/1/1994	50%	4	8	5	4	5.6	4			11	U			11	U											10	U				
Butylbenzylphthalate	UG/L	0				0%	0	8							11	U			11	U											10	U				
Carbazole	UG/L	0				0%	0	8							11	U			11	U											10	U				
Chrysene	UG/L	0				0%	0	8			25	0			11	U			11	U											10	U				
Dibenz(a,h)anthracene	UG/L	0				0%	0	8			0.025	0			11	U			11	U											10	U				
Dibenzofuran	UG/L	0				0%	0	8			0.79	0			11	U			11	U											10	U				
Diethyl phthalate	UG/L	0				0%	0	8			1,500	0			11	U			11	U											10	U				
Dimethylphthalate	UG/L	0				0%	0	8							11	U			11	U											10	U				
Di-n-butylphthalate	UG/L	0				0%	0	8	50	0	90	0			11	U			11	U											10	U				
Di-n-octylphthalate	UG/L	0				0%	0	8			20	0			11	U			11	U											10	U				
Fluoranthene	UG/L	0				0%	0	8			80	0			11	U			11	U											10	U				
Fluorene	UG/L	0				0%	0	8			29	0			11	U			11	U											10	U				
Hexachlorobenzene	UG/L	0				0%	0	8	0.04	0	0.0098	0			11	U			11	U											10	U				
Hexachlorobutadiene	UG/L	0				0%	0	8	0.5	0	0.14	0			11	U			11	U											10	U				
Hexachlorocyclopentadiene	UG/L	0				0%	0	8	5	0	0.041	0			11	U			11	U											10	U				
Hexachloroethane	UG/L	0				0%	0	8	5	0	0.33	0			11	U			11	U											10	U				
Indeno(1,2,3-cd)pyrene	UG/L	0				0%	0	8			0.25	0			11	U			11	U											10	U				
Isophorone	UG/L	0				0%	0	8			78	0			11	U			11	U											10	U				
Naphthalene	UG/L	0				0%	0	8			0.17	0			11	U			11	U											10	U				
Nitrobenzene	UG/L	0				0%	0	8	0.4	0	0.14	0			11	U			11	U											10	U				
N-Nitroso-di-n-propylamine	UG/L	0				0%	0	8			0.011	0			11	U			11	U											10	U				
N-Nitrosodiphenylamine	UG/L	0				0%	0	8			12	0			11	U			11	U											10	U				
Pentachlorophenol	UG/L	0				0%	0	8	1	0	0.041	0			27	U			27	U											26	U				
Phenanthrene	UG/L	0				0%	0	8							11	U			11	U											10	U				
Phenol	UG/L	0				0%	0	8	1	0	580	0			11	U			11	U											10	U				
Pyrene	UG/L	0				0%	0	8			12	0			11	U			11	U											10	U				
Pesticides & PCBs																																				
4,4'-DDD	UG/L	0				0%	0	8	0.3	0	0.0063	0			0.12	U			0.11	UJ											0.11	U				
4,4'-DDE	UG/L	0				0%	0	8	0.2	0	0.046	0			0.12	U			0.11	UJ											0.11	U				
4,4'-DDT	UG/L	0				0%	0	8	0.2	0	0.23	0			0.12	U			0.11	UJ											0.11	U				
Aldrin	UG/L	0				0%	0	8	0		0.00092	0			0.059	U			0.056	UJ											0.054	U				
Alpha-BHC	UG/L	0				0%	0	8	0.01	0	0.0072	0			0.059	U			0.056	UJ											0.054	U				
Alpha-Chlordane	UG/L	0				0%	0	8							0.059	U			0.056	UJ											0.054	U				
Aroclor-1016	UG/L	0				0%	0	8			0.14	0			1.2	U			1.1	UJ											1.1	U				
Aroclor-1221	UG/L	0				0%	0	8			0.0047	0			2.4	U			2.2	UJ											2.2	U				
Aroclor-1232	UG/L	0				0%	0	8			0.0047	0			1.2	U			1.1	UJ											1.1	U				
Aroclor-1242	UG/L	0				0%	0	8			0.0078	0			1.2	U			1.1	UJ											1.1	U				
Aroclor-1248	UG/L	0				0%	0	8			0.0078	0			1.2	U			1.1	UJ											1.1	U				
Aroclor-1254	UG/L	0				0%	0	8			0.0078	0			1.2	U			1.1	UJ											1.1	U				
Aroclor-1260	UG/L	0				0%	0	8			0.0078	0			1.2	U			1.1	UJ											1.1	U				
Beta-BHC	UG/L	0				0%	0	8	0.04	0	0.025	0			0.059	U			0.056	UJ											0.054	U				
Delta-BHC	UG/L	0				0%	0	8	0.04	0					0.059	U			0.056	UJ											0.054	U				
Dieldrin	UG/L	0				0%	0	8	0.004	0	0.0018	0			0.12	U			0.11	UJ											0.11	U				
Endosulfan I	UG/L	0				0%	0	8							0.059	U			0.056	UJ											0.054	U				
Endosulfan II	UG/L	0				0%	0	8							0.12	U			0.11	UJ											0.11	U				
Endosulfan sulfate	UG/L	0				0%	0	8							0.12	U			0.11	UJ											0.11	U				
Endrin	UG/L	0				0%	0	8	0		0.23	0			0.12	U			0.11	UJ											0.11	U				
Endrin aldehyde	UG/L	0				0%	0	8	5	0					0.12	U			0.11	UJ											0.11	U				
Endrin ketone	UG/L	0				0%	0	8	5	0					0.12	U			0.11	UJ											0.11	U				
Gamma-BHC/Lindane	UG/L	0				0%	0	8	0.05	0	0.042	0			0.059	U			0.056	UJ											0.054	U				
Gamma-Chlordane	UG/L	0				0%	0	8							0.059	U			0.056	UJ											0.054	U				
Heptachlor	UG/L	0				0%	0	8	0.04	0	0.0014	0			0.059	U			0.056	UJ											0.054	U				
Heptachlor epoxide	UG/L	0				0%	0	8	0.03	0	0.0014	0			0.059	U			0.056	UJ											0.054	U				
Methoxychlor	UG/L	0				0%	0	8	35	0	3.7	0			0.59	U			0.56	UJ											0.54	U				
Toxaphene	UG/L	0				0%	0	8	0.06	0	0.071	0			5.9	U			5.6	UJ											5.4	U				

Table A-4
Analytical Data for Groundwater Samples at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

Area													SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		OB Grounds		OB Grounds	
Loc ID													MW45-2		MW45-3		MW45-3		MW45-4		MW45-4		MW45-4		MW45-4		MW45-4R		MW5		MW23-3		MW23-4R	
Matrix													GW		GW		GW		GW		GW		GW		GW		GW		GROUNDWATER		GROUNDWATER	
Sample ID													45FS20006		MW45-3		45FS20007		MW45-4		OB108		122000		122247		122248		45FS20008		MW5		45FS20009		45FS200010	
Sample Date													6/4/2018		2/3/1994		6/4/2018		1/26/1994		6/18/1997		4/9/1999		12/7/1999		12/7/1999		6/4/2018		2/2/1994		6/4/2018		6/4/2018	
QC Type													DU		SA		SA		SA		SA		SA		SA		DU		SA		SA		SA		SA	
Study ID													2018 Perchlorates		ESI		2018 Perchlorates		ESI		OB_Quarterly		RI PHASE 1 STEP 1		RI PHASE 1 STEP 1-PLUT RESAMP		RI PHASE 1 STEP 1		2018 Perchlorates		ESI		2018 Perchlorates		2018 Perchlorates	
Sample Round																					0		1		2		2									
Filtered													Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
Parameter	Unit	Maximum Value	Qualifier	Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above NYS GA Standard	Criteria Level	Number of Detects Above EPA RSL for Tap Water	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Inorganics																																				
Aluminum	UG/L	63,300		MW45-4	1/26/1994	75%	9	12			2,000	3			**7,510**				**63,300**		36.8		215		14.3	U	14.3	U			821					
Antimony	UG/L	52.1	J	MW3	2/1/1994	58%	7	12	3	7	0.78	7			**36.7**	**J**			21.6	UJ	2.8	U	2.2	U	2.7	U	2.7	U			**28.1**	**J**				
Arsenic	UG/L	9.5	J	MW45-4	1/26/1994	25%	3	12	25	0	0.052	3			**1.8**	**J**			**9.5**	**J**	3.6	U	1.8	U	1.9	U	1.9	U			1.4	U				
Barium	UG/L	751		MW45-4	1/26/1994	100%	12	12	1,000	0	380	1			62.1	J			**751**		23.4		24.4	J	28.2	J	28.4	J			82.8	J				
Beryllium	UG/L	5		MW45-4	1/26/1994	25%	3	12			2.5	1			0.52	J			**5**		2	U	0.1	U	0.2	U	0.2	U			0.4	U				
Cadmium	UG/L	3.8	J	MW4	2/2/1994	33%	4	12	5	0	0.92	4			**3.2**	**J**			2.1	U	4	U	0.3	U	0.3	U	0.3	U			2.1	U				
Calcium	UG/L	660,000		MW45-4	1/26/1994	100%	12	12							211,000				660,000		112,000		144,000		177,000		181,000				123,000					
Chromium	UG/L	106		MW45-4	1/26/1994	42%	5	12	50	1					16.1				**106**		1.3	U	0.7	U	0.9	U	0.9	U			2.6	J				
Cobalt	UG/L	94.4		MW45-4	1/26/1994	33%	4	12			0.6	4			**14.8**	**J**			**94.4**		1.4	U	1.5	U	2	U	2	U			4.4	U				
Copper	UG/L	123		MW45-4	1/26/1994	58%	7	12	200	0	80	1			11.9	J			**123**		1.5		1	U	1.9	J	1.7	U			3.1	U				
Cyanide	UG/L	0				0%	0	11			0.15	0			5	U			5	U			5	UJ	10	UJ	10	UJ			5	U				
Iron	UG/L	113,000		MW45-4	1/26/1994	83%	10	12	500	5	1,400	3			**14,100**				**113,000**		62.8		256		25.4	U	25.4	U			**1,220**					
Iron+Manganese	UG/L	117,640		MW45-4	1/26/1994	100%	12	12							14,725				117,640		67.8	J	263.1	J	13.8	J	13.7	J			1,275					
Lead	UG/L	75.6		MW45-4	1/26/1994	67%	8	12	25	1	15	2			9.5				**75.6**		2	U	0.9	U	1	U	1	U			1.1	J				
Magnesium	UG/L	77,900		MW45-3	2/3/1994	100%	12	12							77,900				73,500		24,200		31,400		36,500		37,400				27,700					
Manganese	UG/L	4,640		MW45-4	1/26/1994	100%	12	12	300	4	43	5			**625**				**4,640**		5	J	7.1	U	1.1	U	1	U			**55**					
Mercury	UG/L	1.8		MW4	2/2/1994	25%	3	12	0.7	1	0.063	3			**0.08**	**J**			**0.20**		0.2	U	0.1	UJ	0.1	UJ	0.1	UJ			0.04	U				
Nickel	UG/L	209		MW45-4	1/26/1994	42%	5	12	100	1	39	2			30.7	J			**209**		2.2		1.4	U	1.7	U	1.7	U			4	U				
Potassium	UG/L	18,700		MW45-3	2/3/1994	75%	9	12							18,700				13,900		2,180		2,460	J	2,660	J	2,870	J			907	U				
Selenium	UG/L	2.5	J	MW45-2	2/3/1994	42%	5	12	10	0	10	0			1.9	J			0.70	U	3.1	U	1.8	U	2.4	UJ	2.4	UJ			1.5	J				
Silver	UG/L	4.6	J	MW4	2/2/1994	17%	2	12	50	0	9.4	0			4.2	U			4.2	U	0.98		0.9	U	1.9	UJ	1.9	UJ			4.2	U				
Sodium	UG/L	40,000		MW45-2	2/3/1994	100%	12	12	20,000	1					18,600				17,300		10,600		11,400		14,000		13,900				16,100					
Thallium	UG/L	3.4	J	MW45-4	4/9/1999	8%	1	12			0.02	1			1.2	U			1.2	U	4	U	**3.4**	**J**	2.7	U	2.7	U			1.2	U				
Vanadium	UG/L	93.1		MW45-4	1/26/1994	25%	3	12			8.6	3			**11.7**	**J**			**93.1**		1.2	U	1.6	U	1.5	U	1.5	U			3.7	U				
Zinc	UG/L	321		MW45-4	1/26/1994	100%	12	12			600	0			81.1				321		6.8		5.8	J	5.1	J	5.3	J			24.5					
Wet Chemistry																																				
Perchlorate	UG/L	4.1		MW45-3	6/4/2018	100%	8	8			1.4	3	**1.9**				**4.1**												0.67				0.01	U	0.17	

Footnote:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data

(blank) = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected: however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that

- Bold values represent a results that is above the NYS GA Standard value. ####
- Cell Bold values represent a results that is above the USEPA 2018-05 RSL Tap Water (HQ=0.1). ###
- Cell Shade values represent a result that is above both the NYS AWQS GA Standard and USEPA 2018-05 RSL ###

10) Criteria action level source document and web address.

- The NYS GA Standard values were obtained from NYS Ambient Water Quality Standard Updated May 2018.
  https://www.dec.ny.gov/chemical/23853.html
- The 2017-06 USEPA RSL Tap Water (HQ=0.1) refers to the USEPA's Regional Screening Levels (HQ=0.1)
  https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table A-5.1
Analytical Data For Surface Water Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID														SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix														SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER	
Sample ID														SW45-1		SW45-2		SW45-3		SW45-4	
Sample Depth Interval (FT)														0-0.1		0-0.1		0-0.1		0-0.1	
Sample Date														11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type														SA		SA		SA		SA	
Study ID														ESI		ESI		ESI		ESI	
Criteria								2018-04 NYS AWQS CLASS D (HUMAN HEALTH)		2018-04 NYS AWQS CLASS D (AQUATIC)		2018-05 RSL Tap Water (HQ=0.1)									
Parameter	Unit	Maximum Detected Value		Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above Standard-1	Criteria Level	Number of Detects Above Standard-2	Action Level	Number of Detects Above Standard-3	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																					
1,1,1-Trichloroethane	UG/L	0				0%	0	4					800	0	10	U	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	UG/L	0				0%	0	4					0.076	0	10	U	10	U	10	U	10	U
1,1,2-Trichloroethane	UG/L	0				0%	0	4					0.041	0	10	U	10	U	10	U	10	U
1,1-Dichloroethane	UG/L	0				0%	0	4					2.8	0	10	U	10	U	10	U	10	U
1,1-Dichloroethene	UG/L	0				0%	0	4					28	0	10	U	10	U	10	U	10	U
1,2-Dichloroethane	UG/L	0				0%	0	4					0.17	0	10	U	10	U	10	U	10	U
1,2-Dichloroethene (total)	UG/L	0				0%	0	4							10	U	10	U	10	U	10	U
1,2-Dichloropropane	UG/L	0				0%	0	4					0.82	0	10	U	10	U	10	U	10	U
Acetone	UG/L	0				0%	0	4					1,400	0	10	U	10	U	10	U	10	U
Benzene	UG/L	0				0%	0	4	10	0			0.46	0	10	U	10	U	10	U	10	U
Bromodichloromethane	UG/L	0				0%	0	4					0.13	0	10	U	10	U	10	U	10	U
Bromoform	UG/L	0				0%	0	4					3.3	0	10	U	10	U	10	U	10	U
Carbon disulfide	UG/L	0				0%	0	4					81	0	10	U	10	U	10	U	10	U
Carbon tetrachloride	UG/L	0				0%	0	4					0.46	0	10	U	10	U	10	U	10	U
Chlorobenzene	UG/L	0				0%	0	4	400	0			7.8	0	10	U	10	U	10	U	10	U
Chlorodibromomethane	UG/L	0				0%	0	4					0.87	0	10	U	10	U	10	U	10	U
Chloroethane	UG/L	0				0%	0	4					2,100	0	10	U	10	U	10	U	10	U
Chloroform	UG/L	0				0%	0	4					0.22	0	10	U	10	U	10	U	10	U
Cis-1,3-Dichloropropene	UG/L	0				0%	0	4							10	U	10	U	10	U	10	U
Ethyl benzene	UG/L	0				0%	0	4					1.5	0	10	U	10	U	10	U	10	U
Methyl bromide	UG/L	0				0%	0	4					0.75	0	10	U	10	U	10	U	10	U
Methyl butyl ketone	UG/L	0				0%	0	4							10	U	10	U	10	U	10	U
Methyl chloride	UG/L	0				0%	0	4					19	0	10	U	10	U	10	U	10	U
Methyl ethyl ketone	UG/L	0				0%	0	4					560	0	10	U	10	U	10	U	10	U
Methyl isobutyl ketone	UG/L	0				0%	0	4					630	0	10	U	10	U	10	U	10	U
Methylene chloride	UG/L	0				0%	0	4	200	0			11	0	10	U	10	U	10	U	10	U
Styrene	UG/L	0				0%	0	4					120	0	10	U	10	U	10	U	10	U
Tetrachloroethene	UG/L	0				0%	0	4					4.1	0	10	U	10	U	10	U	10	U
Toluene	UG/L	0				0%	0	4	6,000	0			110	0	10	U	10	U	10	U	10	U
Total Xylenes	UG/L	0				0%	0	4					19	0	10	U	10	U	10	U	10	U
Trans-1,3-Dichloropropene	UG/L	0				0%	0	4							10	U	10	U	10	U	10	U
Trichloroethene	UG/L	0				0%	0	4	40	0			0.28	0	10	U	10	U	10	U	10	U
Vinyl chloride	UG/L	0				0%	0	4					0.019	0	10	U	10	U	10	U	10	U
Herbicides																					
2,4,5-T	UG/L	0				0%	0	4					16	0	0.12	U	0.12	U	0.11	U	0.11	U
2,4,5-TP/Silvex	UG/L	0				0%	0	4					11	0	0.12	U	0.12	U	0.11	U	0.11	U
2,4-D	UG/L	0				0%	0	4					17	0	1.2	U	1.2	U	1.1	U	1.1	U
2,4-DB	UG/L	0				0%	0	4					45	0	1.2	U	1.2	U	1.1	U	1.1	U
Dalapon	UG/L	0				0%	0	4					60	0	2.6	U	2.6	U	2.5	U	2.4	U
Dicamba	UG/L	0				0%	0	4					57	0	0.12	U	0.12	U	0.11	U	0.11	U
Dichloroprop	UG/L	0				0%	0	4							1.2	U	1.2	U	1.1	U	1.1	U
Dinoseb	UG/L	0				0%	0	4					1.5	0	0.56	U	0.56	U	0.54	U	0.52	U
MCPA	UG/L	0				0%	0	4					0.75	0	120	U	120	U	110	U	110	U
MCPP	UG/L	0				0%	0	4					1.6	0	120	U	120	U	110	U	110	U
Explosives																					
1,3,5-Trinitrobenzene	UG/L	0				0%	0	4					59	0	0.13	U	0.13	U	0.13	U	0.13	U
1,3-Dinitrobenzene	UG/L	0				0%	0	4					0.2	0	0.13	U	0.13	U	0.13	U	0.13	U
2,4,6-Trinitrotoluene	UG/L	0				0%	0	4					0.98	0	0.13	U	0.13	U	0.13	U	0.13	U
2,4-Dinitrotoluene	UG/L	0				0%	0	4					0.24	0	0.13	U	0.13	U	0.13	U	0.13	U
2,6-Dinitrotoluene	UG/L	0				0%	0	4					0.049	0	0.13	U	0.13	U	0.13	U	0.13	U
2-amino-4,6-Dinitrotoluene	UG/L	0				0%	0	4					3.9	0	0.13	U	0.13	U	0.13	U	0.13	U
4-amino-2,6-Dinitrotoluene	UG/L	0				0%	0	4					3.9	0	0.13	U	0.13	U	0.13	U	0.13	U
HMX	UG/L	0.49		SW/SD45-3	11/1/1993	50%	2	4					100	0	0.13	U	0.45		0.49		0.13	U
RDX	UG/L	2		SW/SD45-2	11/1/1993	50%	2	4					0.7	1	0.24	J	2		0.13	U	0.13	U
Tetryl	UG/L	0				0%	0	4					3.9	0	0.13	U	0.13	U	0.13	U	0.13	U
Semivolatile Organic Compounds																					
1,2,4-Trichlorobenzene	UG/L	0				0%	0	4					0.4	0	10	U	11	U	11	U	10	U
1,2-Dichlorobenzene	UG/L	0				0%	0	4					30	0	10	U	11	U	11	U	10	U
1,3-Dichlorobenzene	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
1,4-Dichlorobenzene	UG/L	0				0%	0	4					0.48	0	10	U	11	U	11	U	10	U

Table A-5.1
Analytical Data For Surface Water Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area															SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID															SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix															SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER	
Sample ID															SW45-1		SW45-2		SW45-3		SW45-4	
Sample Depth Interval (FT)															0-0.1		0-0.1		0-0.1		0-0.1	
Sample Date															11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type															SA		SA		SA		SA	
Study ID															ESI		ESI		ESI		ESI	
Criteria								2018-04 NYS AWQS CLASS D (HUMAN HEALTH)		2018-04 NYS AWQS CLASS D (AQUATIC)		2018-05 RSL Tap Water (HQ=0.1)										
Parameter	Unit	Maximum Detected Value		Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above Standard-1	Criteria Level	Number of Detects Above Standard-2	Action Level	Number of Detects Above Standard-3	Value	Qual	Value	Qual	Value	Qual	Value	Qual
2,2'-oxybis(1-Chloropropane)	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
2,4,5-Trichlorophenol	UG/L	0				0%	0	4					120	0	26	U	27	U	26	U	25	U
2,4,6-Trichlorophenol	UG/L	0				0%	0	4					1.2	0	10	U	11	U	11	U	10	U
2,4-Dichlorophenol	UG/L	0				0%	0	4	1	0			4.6	0	10	U	11	U	11	U	10	U
2,4-Dimethylphenol	UG/L	0				0%	0	4	1,000	0			36	0	10	U	11	U	11	U	10	U
2,4-Dinitrophenol	UG/L	0				0%	0	4	400	0			3.9	0	26	U	27	U	26	U	25	U
2,4-Dinitrotoluene	UG/L	0				0%	0	4					0.24	0	10	U	11	U	11	U	10	U
2,6-Dinitrotoluene	UG/L	0				0%	0	4					0.049	0	10	U	11	U	11	U	10	U
2-Chloronaphthalene	UG/L	0				0%	0	4					75	0	10	U	11	U	11	U	10	U
2-Chlorophenol	UG/L	0				0%	0	4					9.1	0	10	U	11	U	11	U	10	U
2-Methylnaphthalene	UG/L	0				0%	0	4					3.6	0	10	U	11	U	11	U	10	U
2-Methylphenol	UG/L	0				0%	0	4					93	0	10	U	11	U	11	U	10	U
2-Nitroaniline	UG/L	0				0%	0	4					19	0	26	U	27	U	26	U	25	U
2-Nitrophenol	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
3,3'-Dichlorobenzidine	UG/L	0				0%	0	4					0.13	0	10	U	11	U	11	U	10	U
3-Nitroaniline	UG/L	0				0%	0	4							26	U	27	U	26	U	25	U
4,6-Dinitro-2-methylphenol	UG/L	0				0%	0	4					0.15	0	26	U	27	U	26	U	25	U
4-Bromophenyl phenyl ether	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
4-Chloro-3-methylphenol	UG/L	0				0%	0	4					140	0	10	U	11	U	11	U	10	U
4-Chloroaniline	UG/L	0				0%	0	4					0.37	0	10	U	11	U	11	U	10	U
4-Chlorophenyl phenyl ether	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
4-Methylphenol	UG/L	0				0%	0	4					190	0	10	U	11	U	11	U	10	U
4-Nitroaniline	UG/L	0				0%	0	4					3.8	0	26	U	27	U	26	U	25	U
4-Nitrophenol	UG/L	0				0%	0	4							26	U	27	U	26	U	25	U
Acenaphthene	UG/L	0				0%	0	4					53	0	10	U	11	U	11	U	10	U
Acenaphthylene	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Anthracene	UG/L	0				0%	0	4					180	0	10	U	11	U	11	U	10	U
Benzo(a)anthracene	UG/L	0				0%	0	4					0.03	0	10	U	11	U	11	U	10	U
Benzo(a)pyrene	UG/L	0				0%	0	4					0.025	0	10	U	11	U	11	U	10	U
Benzo(b)fluoranthene	UG/L	0				0%	0	4					0.25	0	10	U	11	U	11	U	10	U
Benzo(ghi)perylene	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Benzo(k)fluoranthene	UG/L	0				0%	0	4					2.5	0	10	U	11	U	11	U	10	U
Bis(2-Chloroethoxy)methane	UG/L	0				0%	0	4					5.9	0	10	U	11	U	11	U	10	U
Bis(2-Chloroethyl)ether	UG/L	0				0%	0	4					0.014	0	10	U	11	U	11	U	10	U
Bis(2-Ethylhexyl)phthalate	UG/L	0				0%	0	4					5.6	0	10	U	11	U	11	U	10	U
Butylbenzylphthalate	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Carbazole	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Chrysene	UG/L	0				0%	0	4					25	0	10	U	11	U	11	U	10	U
Dibenz(a,h)anthracene	UG/L	0				0%	0	4					0.025	0	10	U	11	U	11	U	10	U
Dibenzofuran	UG/L	0				0%	0	4					0.79	0	10	U	11	U	11	U	10	U
Diethyl phthalate	UG/L	0				0%	0	4					1,500	0	10	U	11	U	11	U	10	U
Dimethylphthalate	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Di-n-butylphthalate	UG/L	0				0%	0	4					90	0	10	U	11	U	11	U	10	U
Di-n-octylphthalate	UG/L	0				0%	0	4					20	0	10	U	11	U	11	U	10	U
Fluoranthene	UG/L	0				0%	0	4					80	0	10	U	11	U	11	U	10	U
Fluorene	UG/L	0				0%	0	4					29	0	10	U	11	U	11	U	10	U
Hexachlorobenzene	UG/L	0				0%	0	4	0.00003	0			0.0098	0	10	U	11	U	11	U	10	U
Hexachlorobutadiene	UG/L	0				0%	0	4	0.01	0	10	0	0.14	0	10	U	11	U	11	U	10	U
Hexachlorocyclopentadiene	UG/L	0				0%	0	4			4.5	0	0.041	0	10	U	11	U	11	U	10	U
Hexachloroethane	UG/L	0				0%	0	4	0.6	0			0.33	0	10	U	11	U	11	U	10	U
Indeno(1,2,3-cd)pyrene	UG/L	0				0%	0	4					0.25	0	10	U	11	U	11	U	10	U
Isophorone	UG/L	0				0%	0	4					78	0	10	U	11	U	11	U	10	U
Naphthalene	UG/L	0				0%	0	4					0.17	0	10	U	11	U	11	U	10	U
Nitrobenzene	UG/L	0				0%	0	4					0.14	0	10	U	11	U	11	U	10	U
N-Nitroso-di-n-propylamine	UG/L	0				0%	0	4					0.011	0	10	U	11	U	11	U	10	U
N-Nitrosodiphenylamine	UG/L	0				0%	0	4					12	0	10	U	11	U	11	U	10	U
Pentachlorophenol	UG/L	0				0%	0	4	1	0			0.041	0	26	U	27	U	26	U	25	U
Phenanthrene	UG/L	0				0%	0	4							10	U	11	U	11	U	10	U
Phenol	UG/L	0				0%	0	4	5	0			580	0	10	U	11	U	11	U	10	U
Pyrene	UG/L	0				0%	0	4					12	0	10	U	11	U	11	U	10	U
Pesticides & PCBs																						
4,4'-DDD	UG/L	0				0%	0	4	0.00008	0	0.000011	0	0.0063	0	0.1	U	0.1	U	0.12	U	0.12	U
4,4'-DDE	UG/L	0				0%	0	4	0.000007	0	0.000011	0	0.046	0	0.1	U	0.1	U	0.12	U	0.12	U
4,4'-DDT	UG/L	0				0%	0	4	0.00001	0	0.000011	0	0.23	0	0.1	U	0.1	U	0.12	U	0.12	U
Aldrin	UG/L	0				0%	0	4	5	0			0.00092	0	0.052	U	0.052	U	0.058	U	0.058	U
Alpha-BHC	UG/L	0				0%	0	4	0.002	0			0.0072	0	0.052	U	0.052	U	0.058	U	0.058	U
Alpha-Chlordane	UG/L	0				0%	0	4							0.052	U	0.052	U	0.058	U	0.058	U
Aroclor-1016	UG/L	0				0%	0	4					0.14	0	1	U	1	U	1.2	U	1.2	U
Aroclor-1221	UG/L	0				0%	0	4					0.0047	0	2.1	U	2.1	U	2.3	U	2.3	U
Aroclor-1232	UG/L	0				0%	0	4					0.0047	0	1	U	1	U	1.2	U	1.2	U
Aroclor-1242	UG/L	0				0%	0	4					0.0078	0	1	U	1	U	1.2	U	1.2	U
Aroclor-1248	UG/L	0				0%	0	4					0.0078	0	1	U	1	U	1.2	U	1.2	U
Aroclor-1254	UG/L	0				0%	0	4					0.0078	0	1	U	1	U	1.2	U	1.2	U
Aroclor-1260	UG/L	0				0%	0	4					0.0078	0	1	U	1	U	1.2	U	1.2	U

Table A-5.1
Analytical Data For Surface Water Samples at OD Grounds
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area															SEAD-45		SEAD-45		SEAD-45		SEAD-45	
Loc ID															SW/SD45-1		SW/SD45-2		SW/SD45-3		SW/SD45-4	
Matrix															SURFACE WATER		SURFACE WATER		SURFACE WATER		SURFACE WATER	
Sample ID															SW45-1		SW45-2		SW45-3		SW45-4	
Sample Depth Interval (FT)															0-0.1		0-0.1		0-0.1		0-0.1	
Sample Date															11/1/1993		11/1/1993		11/1/1993		11/1/1993	
QC Type															SA		SA		SA		SA	
Study ID															ESI		ESI		ESI		ESI	
Criteria									2018-04 NYS AWQS CLASS D (HUMAN HEALTH)		2018-04 NYS AWQS CLASS D (AQUATIC)		2018-05 RSL Tap Water (HQ=0.1)									
Parameter	Unit	Maximum Detected Value		Location ID of Max Detect	Sample Date	Frequency of Detects	Number of Detects	Number of Analyses	Criteria Level	Number of Detects Above Standard-1	Criteria Level	Number of Detects Above Standard-2	Action Level	Number of Detects Above Standard-3	Value	Qual	Value	Qual	Value	Qual	Value	Qual
Beta-BHC	UG/L	0				0%	0	4	0.007	0			0.025	0	0.052	U	0.052	U	0.058	U	0.058	U
Delta-BHC	UG/L	0				0%	0	4	0.008	0					0.052	U	0.052	U	0.058	U	0.058	U
Dieldrin	UG/L	0				0%	0	4	0.0000006	0	0.24	0	0.0018	0	0.1	U	0.1	U	0.12	U	0.12	U
Endosulfan I	UG/L	0				0%	0	4							0.052	U	0.052	U	0.058	U	0.058	U
Endosulfan II	UG/L	0				0%	0	4							0.1	U	0.1	U	0.12	U	0.12	U
Endosulfan sulfate	UG/L	0				0%	0	4							0.1	U	0.1	U	0.12	U	0.12	U
Endrin	UG/L	0				0%	0	4	0.002	0	0.086	0	0.23	0	0.1	U	0.1	U	0.12	U	0.12	U
Endrin aldehyde	UG/L	0				0%	0	4							0.1	U	0.1	U	0.12	U	0.12	U
Endrin ketone	UG/L	0				0%	0	4							0.1	U	0.1	U	0.12	U	0.12	U
Gamma-BHC/Lindane	UG/L	0				0%	0	4	0.008	0	0.95	0	0.042	0	0.052	U	0.052	U	0.058	U	0.058	U
Gamma-Chlordane	UG/L	0				0%	0	4							0.052	U	0.052	U	0.058	U	0.058	U
Heptachlor	UG/L	0				0%	0	4	0.0002	0			0.0014	0	0.052	U	0.052	U	0.058	U	0.058	U
Heptachlor epoxide	UG/L	0				0%	0	4	0.0003	0			0.0014	0	0.052	U	0.052	U	0.058	U	0.058	U
Methoxychlor	UG/L	0				0%	0	4					3.7	0	0.52	U	0.52	U	0.58	U	0.58	U
Toxaphene	UG/L	0				0%	0	4	0.000006	0	1.6	0	0.071	0	5.2	U	5.2	U	5.8	U	5.8	U
Inorganics																						
Aluminum	UG/L	37,500		SW/SD45-4	11/1/1993	100%	4	4					2,000	3	29,000		4,370		968		37,500	
Antimony	UG/L	0				0%	0	4					0.78	0	52.6	U	52.4	U	52.8	U	52.5	U
Arsenic	UG/L	2.3	J	SW/SD45-4	11/1/1993	25%	1	4			340	0	0.052	1	1.2	U	1.2	U	1.2	U	2.3	J
Barium	UG/L	439		SW/SD45-4	11/1/1993	100%	4	4					380	1	204		82.5	J	33.5	J	439	
Beryllium	UG/L	1.5	J	SW/SD45-4	11/1/1993	50%	2	4					2.5	0	1.3	J	0.3	U	0.3	U	1.5	J
Cadmium	UG/L	11.2		SW/SD45-4	11/1/1993	25%	1	4					0.92	1	3.3	U	3.3	U	3.3	U	11.2	
Calcium	UG/L	194,000		SW/SD45-1	11/1/1993	100%	4	4							194,000		38,500		33,800		105,000	
Chromium	UG/L	50.8		SW/SD45-4	11/1/1993	75%	3	4			16	2			45.4		3.4	J	2.5	U	50.8	
Cobalt	UG/L	18.2	J	SW/SD45-4	11/1/1993	50%	2	4					0.6	2	18.2	J	4.9	U	4.9	U	14.2	J
Copper	UG/L	612		SW/SD45-4	11/1/1993	100%	4	4					80	3	612		116		24.8	J	612	
Cyanide	UG/L	47.7		SW/SD45-4	11/1/1993	25%	1	4					0.15	1	8.3	U	8.3	U	8.3	U	47.7	
Iron	UG/L	60,400	J	SW/SD45-4	11/1/1993	100%	4	4					1,400	3	47,700	J	5,920	J	1,270	J	60,400	J
Lead	UG/L	68.7		SW/SD45-4	11/1/1993	100%	4	4					15	2	37.2		10.9		1.9	J	68.7	
Magnesium	UG/L	24,300		SW/SD45-1	11/1/1993	100%	4	4							24,300		4,680	J	3,280	J	19,300	
Manganese	UG/L	1,250		SW/SD45-4	11/1/1993	100%	4	4					43	3	841		56.1		21.1		1,250	
Mercury	UG/L	3		SW/SD45-4	11/1/1993	100%	4	4	0.0007	4	1.4	1	0.063	4	0.32		0.2		0.13	J	3	
Nickel	UG/L	74.2		SW/SD45-4	11/1/1993	100%	4	4					39	2	73.7		8.1	J	4.2	J	74.2	
Potassium	UG/L	9,670		SW/SD45-4	11/1/1993	100%	4	4							6,650		5,020		1,530	J	9,670	
Selenium	UG/L	0				0%	0	4					10	0	5.5	U	1.1	U	1.1	U	5.5	U
Silver	UG/L	0				0%	0	4					9.4	0	6.7	UJ	6.6	UJ	6.7	UJ	6.7	UJ
Sodium	UG/L	4,340	J	SW/SD45-4	11/1/1993	100%	4	4							2,810	J	899	J	1,080	J	4,340	J
Thallium	UG/L	0				0%	0	4			20	0	0.02	0	1.2	U	1.2	U	1.2	U	1.2	U
Vanadium	UG/L	54.9		SW/SD45-4	11/1/1993	75%	3	4			190	0	8.6	2	41.9	J	6.1	J	3.3	U	54.9	
Zinc	UG/L	883		SW/SD45-4	11/1/1993	100%	4	4					600	1	226		98.9		23.3		883	

Footnotes:

1) All historical data collected prior to 2013 are reported as provided by others.

2) Number of Analyses is the number of detected and non-detected results excluding rejected results. Sample duplicate pairs have not been averaged.

3) NLE = no limit established.

4) ND = not detected in any background sample, no background concentration available.

5) **Bold** = chemical dectection

6) SS = Site Specific action level, see "Specific Chemical Class (or Parameter)" footnote for details.

7) Chemical result qualifiers are assigned by the laboratory and are evaluated and modified (if necessary) during the data validation.

[blank] = detect, i.e. detected chemical result value.	E (or ER) = Estimated result.
B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.	D = Results from dilution of sample.
R = Rejected, data validation rejected the results.	J-DL = Elevated sample detection limit due to difficult sample matrix.
U = non-detect, i.e. not detected at or above this value.	JN = Tentatively identified compound, estimated concentration.
U-DL = Elevated sample detection limit due to difficult sample matrix.	UJ=The compound was not detected; however, the results is estimated because of discrepancies in meeting certain analyte-specific QC criteria.
U-ND = Analyte not detected in sample, but no detection or reporting limit provided.	J+ = The result is an estimated quantity, but the result may be biased high.
J = estimated detected value due to a concetration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control.	J- = The result is an estimated quantity, but the result may be biased low.

8) Specific Chemical Classes (or Parameters) comments or notes regarding how data is displayed, compared to Action Levels, or represented in this table.

9) Chemical results greater than or equal to the action level (depending on criteria) are highlighted based on the Criteria that are present.

- Bold values represent a results that is above the AWQS CLASS D (HUMAN HEALTH) value.	###
- Bold values represent a results that is above the AWQS CLASS D (AQUATIC) value.	###
- Cell Bold values represent a results that is above the USEPA 2018-05 RSL Tap Water (HQ=0.1).	###
- Cell Shade values represent a results that is above the AWQS CLASS D (HUMAN HEALTH and AQUATIC) value.	###
- Cell Shade values represent a result that is above both the NYS AWQS Class D Standard and USEPA 2018-05 RSL Tap Water	###

10) Criteria action level source document and web address.

- The NYS Water Quality Standard values were obtained from the June 2018, 6 CRR-NY 703.5, Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations. https://www.dec.ny.gov/chemical/23853.html
- The 2017-06 USEPA RSL Tap Water (HQ=0.1) refers to the USEPA's Regional Screening Levels (HQ=0.1)
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

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Table A-5.2
Analytical Data for Surface Water Samples at Reeder Creek
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														REEDER CREEK		REEDER CREEK		REEDER CREEK	
Loc ID														SW-110		SW-120		SW-130	
Matrix														SURFACE WATER		SURFACE WATER		SURFACE WATER	
Sample ID														SW-110		SW-120		SW-130	
Sample Depth Interval (FT)														0-0.1		0-0.1		0-0.1	
Sample Date														11/7/1991		11/7/1991		11/7/1991	
QC Type														SA		SA		SA	
Study ID														OB RI		OB RI		OB RI	
Sample Round																			
Filtered														Total		Total		Total	
Criteria								2018-04 NYS AWQS CLASS C (HUMAN		2018-04 NYS AWQS CLASS C (AQUATIC)		2018-05 RSL Tap Water (HQ=0.1)							
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																			
1,2-Dichloroethane	UG/L	2	J	SW-140	11/7/1991	11%	1	9					0.17	1	5	U	5	U	5	U
Acetone	UG/L	0				0%	0	9					1,400	0	10	U	20	U	10	U
Carbon disulfide	UG/L	0				0%	0	9					81	0	5	U	5	U	5	U
Methylene chloride	UG/L	8	J	SW-300	12/8/1992	11%	1	9	200	0			11	0	5	U	5	U	5	U
Trichloroethene	UG/L	0				0%	0	9	40	0			0.28	0	5	U	5	U	5	U
Explosives																			
RDX	UG/L	0				0%	0	9					0.7	0	0.12	U	0.12	U	0.12	U
Tetryl	UG/L	0				0%	0	9					3.9	0	0.12	U	0.12	U	0.12	U
Semivolatile Organic Compounds																			
Bis(2-Ethylhexyl)phthalate	UG/L	0				0%	0	9			0.6	0	5.6	0	10	U	10	U	10	U
Inorganics																			
Aluminum	UG/L	402	J	SW-120	11/7/1991	29%	2	7			100	2	2,000	0	109	U	402	J	109	U
Arsenic	UG/L	0				0%	0	9			150	0	0.052	0	2.8	U	2.9	UJ	2.8	U
Barium	UG/L	114.6	J	SW-120	11/7/1991	89%	8	9					380	0	66.6	J	114.6	J	52.3	J
Beryllium	UG/L	4.9	J	SW-120	11/7/1991	11%	1	9			11	0	2.5	1	3.5	U	4.9	J	3.5	U
Calcium	UG/L	210,000	J	SW-120	11/7/1991	100%	9	9							121,000		210,000	J	100,000	
Chromium	UG/L	0				0%	0	9			16	0			9.6	U	6.1	UJ	9.5	U
Copper	UG/L	0				0%	0	9					80	0	19.7	U	14.4	UJ	19.6	U
Cyanide	UG/L	14.9		SW-300	12/8/1992	22%	2	9					0.15	2	10	U	10	U	10	U
Iron	UG/L	1,474		SW-150	11/8/1991	100%	6	6					1,400	1	98.4	J	812	J	236	
Lead	UG/L	2.2	J	SW-150	11/8/1991	11%	1	9					15	0	0.7	U	1.2	UJ	0.7	U
Magnesium	UG/L	31,000	J	SW-120	11/7/1991	100%	9	9							18,700		31,000	J	14,400	
Manganese	UG/L	466		SW-150	11/8/1991	100%	8	8					43	5	14.6	J	164.7	J	34.5	
Mercury	UG/L	0.19	J	SW-150	11/8/1991	11%	1	9	0.0007	1	0.77	0	0.063	1	0.08	U	0.08	U	0.08	U
Nickel	UG/L	0				0%	0	9					39	0	35.2	U	15.8	UJ	35	U
Potassium	UG/L	6,270	J	SW-150	11/8/1991	100%	6	6							3,800	J	4,749	J	3,070	J
Selenium	UG/L	1.6	J	SW-310	12/8/1992	33%	3	9			4.6	0	10	0	1.7	U	1	UJ	1.7	U
Sodium	UG/L	59,100	J	SW-196	11/12/1991	89%	8	9							26,500		46,600	J	24,100	
Vanadium	UG/L	39.2	J	SW-196	11/12/1991	11%	1	9			14	1	8.6	1	30.9	U	30.3	UJ	30.7	U
Zinc	UG/L	13.4	J	SW-196	11/12/1991	20%	1	5					600	0	13.6	U	29.2	R	13.5	U

Table A-5.2
Analytical Data for Surface Water Samples at Reeder Creek
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	2018-04 NYS AWQS CLASS C (HUMAN Action Level	2018-04 NYS AWQS CLASS C (HUMAN Num of Detects Above	2018-04 NYS AWQS CLASS C (AQUATIC) Action Level	2018-04 NYS AWQS CLASS C (AQUATIC) Num of Detects Above	2018-05 RSL Tap Water (HQ=0.1) Action Level	2018-05 RSL Tap Water (HQ=0.1) Num of Detects Above	REEDER CREEK SW-140 SURFACE WATER SW-140 0-0.1 11/7/1991 SA OB RI Total Value Qual	REEDER CREEK SW-150 SURFACE WATER SW-150 0-0.1 11/8/1991 SA OB RI Total Value Qual	REEDER CREEK SW-196 SURFACE WATER SW-196 0-0.1 11/12/1991 SA OB RI Total Value Qual
Volatile Organic Compounds																	
1,2-Dichloroethane	UG/L	2	J	SW-140	11/7/1991	11%	1	9					0.17	1	2 J	5 U	5 U
Acetone	UG/L	0				0%	0	9					1,400	0	10 U	10 U	10 U
Carbon disulfide	UG/L	0				0%	0	9					81	0	5 U	5 U	5 U
Methylene chloride	UG/L	8	J	SW-300	12/8/1992	11%	1	9	200	0			11	0	5 U	5 U	5 U
Trichloroethene	UG/L	0				0%	0	9	40	0			0.28	0	5 U	5 U	5 U
Explosives																	
RDX	UG/L	0				0%	0	9					0.7	0	0.12 U	0.12 U	0.12 U
Tetryl	UG/L	0				0%	0	9					3.9	0	0.12 U	0.4 U	0.4 U
Semivolatile Organic Compounds																	
Bis(2-Ethylhexyl)phthalate	UG/L	0				0%	0	9			0.6	0	5.6	0	10 U	10 U	10 U
Inorganics																	
Aluminum	UG/L	402	J	SW-120	11/7/1991	29%	2	7			100	2	2,000	0	109 U	248 J	97.5 UJ
Arsenic	UG/L	0				0%	0	9			150	0	0.052	0	2.8 U	2.8 U	3.7 UJ
Barium	UG/L	114.6	J	SW-120	11/7/1991	89%	8	9					380	0	51.2 J	112.7 J	52.2 UJ
Beryllium	UG/L	4.9	J	SW-120	11/7/1991	11%	1	9			11	0	2.5	1	3.5 U	3.5 U	1.2 UJ
Calcium	UG/L	210,000	J	SW-120	11/7/1991	100%	9	9							87,100	169,400	65,800 J
Chromium	UG/L	0				0%	0	9			16	0			9.6 U	9.6 U	6.1 UJ
Copper	UG/L	0				0%	0	9					80	0	19.7 U	19.6 U	14.4 UJ
Cyanide	UG/L	14.9		SW-300	12/8/1992	22%	2	9					0.15	2	10 U	10 U	10 J
Iron	UG/L	1,474		SW-150	11/8/1991	100%	6	6					1,400	1	314	1,474	75.3 J
Lead	UG/L	2.2	J	SW-150	11/8/1991	11%	1	9					15	0	0.7 U	3.2 J	0.7 UJ
Magnesium	UG/L	31,000	J	SW-120	11/7/1991	100%	9	9							12,800	25,600	8,980 J
Manganese	UG/L	466		SW-150	11/8/1991	100%	8	8					43	5	68.4	466	16.8 R
Mercury	UG/L	0.19	J	SW-150	11/8/1991	11%	1	9	0.0007	1	0.77	0	0.063	1	0.08 U	0.19 J	0.08 UJ
Nickel	UG/L	0				0%	0	9					39	0	35.2 U	35.2 U	15.9 UJ
Potassium	UG/L	6,270	J	SW-150	11/8/1991	100%	6	6							3,000 J	6,270 J	2,420 J
Selenium	UG/L	1.6	J	SW-310	12/8/1992	33%	3	9			4.6	0	10	0	1.7 U	1.7 U	1.7 UJ
Sodium	UG/L	59,100	J	SW-196	11/12/1991	89%	8	9							23,100	45,400 U	59,100 J
Vanadium	UG/L	39.2	J	SW-196	11/12/1991	11%	1	9			14	1	8.6	1	30.9 U	30.7 U	39.2 J
Zinc	UG/L	13.4	J	SW-196	11/12/1991	20%	1	5					600	0	13.6 U	13.6 U	13.4 J

Table A-5.2
Analytical Data for Surface Water Samples at Reeder Creek
Feasibility Study - OD Grounds
Seneca Army Depot Activity

Area														REEDER CREEK		REEDER CREEK		REEDER CREEK	
Loc ID														SW-300		SW-310		SW-320	
Matrix														SURFACE WATER		SURFACE WATER		SURFACE WATER	
Sample ID														SW-300		SW-310		SW-320	
Sample Depth Interval (FT)														0-0.1		0-0.1		0-0.1	
Sample Date														12/8/1992		12/8/1992		12/8/1992	
QC Type														SA		SA		SA	
Study ID														OB RI		OB RI		OB RI	
Sample Round																			
Filtered														Total		Total		Total	
Criteria									2018-04 NYS AWQS CLASS C (HUMAN		2018-04 NYS AWQS CLASS C (AQUATIC)		2018-05 RSL Tap Water (HQ=0.1)					
Parameter	Unit	Max Detected Value		Max Detected Loc ID	Sample Date	Frequency of Detects	Num of Detects	Num of Analyses	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Action Level	Num of Detects Above	Value	Qual	Value	Qual	Value	Qual
Volatile Organic Compounds																			
1,2-Dichloroethane	UG/L	2	J	SW-140	11/7/1991	11%	1	9					0.17	1	10	U	10	U	10	U
Acetone	UG/L	0				0%	0	9					1,400	0	10	U	10	U	10	U
Carbon disulfide	UG/L	0				0%	0	9					81	0	10	U	10	U	10	U
Methylene chloride	UG/L	8	J	SW-300	12/8/1992	11%	1	9	200	0			11	0	8	J	10	U	10	U
Trichloroethene	UG/L	0				0%	0	9	40	0			0.28	0	10	U	10	U	10	U
Explosives																			
RDX	UG/L	0				0%	0	9					0.7	0	0.21	U	0.15	U	0.14	U
Tetryl	UG/L	0				0%	0	9					3.9	0	0.12	U	0.12	U	0.12	U
Semivolatile Organic Compounds																			
Bis(2-Ethylhexyl)phthalate	UG/L	0				0%	0	9			0.6	0	5.6	0	21	U	10	U	14	U
Inorganics																			
Aluminum	UG/L	402	J	SW-120	11/7/1991	29%	2	7			100	2	2,000	0	126	R	62.6	U	130	R
Arsenic	UG/L	0				0%	0	9			150	0	0.052	0	1.2	U	1.2	U	1.2	U
Barium	UG/L	114.6	J	SW-120	11/7/1991	89%	8	9					380	0	51.7	J	47.2	J	51.3	J
Beryllium	UG/L	4.9	J	SW-120	11/7/1991	11%	1	9			11	0	2.5	1	0.3	U	0.3	U	0.3	U
Calcium	UG/L	210,000	J	SW-120	11/7/1991	100%	9	9							93,800		93,100		97,800	
Chromium	UG/L	0				0%	0	9			16	0			2	U	2	U	2	U
Copper	UG/L	0				0%	0	9					80	0	1.9	U	1.9	U	1.9	U
Cyanide	UG/L	14.9		SW-300	12/8/1992	22%	2	9					0.15	2	14.9		10	U	10	U
Iron	UG/L	1,474		SW-150	11/8/1991	100%	6	6					1,400	1	276	R	170	R	326	R
Lead	UG/L	2.2	J	SW-150	11/8/1991	11%	1	9					15	0	0.9	U	0.9	U	0.89	U
Magnesium	UG/L	31,000	J	SW-120	11/7/1991	100%	9	9							15,500		15,500		16,400	
Manganese	UG/L	466		SW-150	11/8/1991	100%	8	8					43	5	47		32		53	
Mercury	UG/L	0.19	J	SW-150	11/8/1991	11%	1	9	0.0007	1	0.77	0	0.063	1	0.06	U	0.06	U	0.06	U
Nickel	UG/L	0				0%	0	9					39	0	3.5	U	3.5	U	3.5	U
Potassium	UG/L	6,270	J	SW-150	11/8/1991	100%	6	6							1,890	R	1,780	R	1,300	R
Selenium	UG/L	1.6	J	SW-310	12/8/1992	33%	3	9			4.6	0	10	0	1.2	J	1.6	J	1.4	J
Sodium	UG/L	59,100	J	SW-196	11/12/1991	89%	8	9							11,900		10,300		10,600	
Vanadium	UG/L	39.2	J	SW-196	11/12/1991	11%	1	9			14	1	8.6	1	2.1	U	2.1	U	2.1	U
Zinc	UG/L	13.4	J	SW-196	11/12/1991	20%	1	5					600	0	3	R	3	R	5.3	R

Table A-6
Comparison of Total Metal in Soil to SPLP Extract Concentrations at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

							SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
							S45-0DH-4-01		S45-0DH-4-01		S45-TP-1-02		S45-TP-1-02		S45-TP-2-04		S45-TP-2-04		S45-R4-01		S45-R4-01	
							SOIL		Leachate		SOIL		Leachate		SOIL		Leachate		SOIL		Leachate	
							S45-0DH-4-01		S45-0DH-4-01		S45-TP-1-02		S45-TP-1-02		S45-TP-2-04		S45-TP-2-04		S45-R4-01		S45-R4-01	
	Soil Guidance						X		X		X		X		X		X		0		0	
	Values						Y		Y		Y		Y		Y		Y		0.2		0.2	
							3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		3/12/2010		4/1/2010		4/1/2010	
	EPA RSL	NYSDEC		NYSDEC			SA		SA		SA		SA		SA		SA		SA		SA	
	Residential	Unrestricted		GA GW	Number																	
	RSL	SCO		Effluent	of		mg/Kg		ug/L		mg/Kg		ug/L		mg/Kg		ug/L		mg/Kg		ug/L	
Parameter	mg/Kg	mg/Kg		ug/L	Exceedances		Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
ALUMINUM	7700						15000				14400				16500				19000			
ANTIMONY	3.1			6			0.47	U	ND		0.63	J	ND		0.29	J	2.6	J	0.18	U	ND	
ARSENIC	0.39	13		50			12.6		7.4	J	8.7		1.86	U	4.8		16		5.7		11.6	
BARIUM	1500	350		2000			220		495		101		132		227		1340		140		562	
BERYLLIUM	16	7.2					0.67				0.62				0.73				0.88			
CADMIUM	7	2.5		10	4		1100		11		13.4		0.6	J	7.6		18.9		1.1	J	4	J
CALCIUM							23200				62400				29500				12200			
CHROMIUM	12000	30		100			37.8		38.3		35		12.7	J	26.7		77.2		2804		52	
COBALT	2.3						14		10.5	J	12.9		2.3	J	11.3		32		10.9		11.7	J
COPPER	310	50		1000	2		1780		909		7310		139		2490		716		82.6		243	
IRON	5500						118000				60900				25600				24000			
LEAD	40	63		50	6		57.2		78		22.3		8.7		91		274		22.5		52	
MAGNESIUM							5680				9200				7380				6750			
MANGANESE	180	1600					648				574				407				428			
MERCURY	2.3	0.18		1.4	6		3.1		12.7 (1)		4.3		0.27 (1)		9.1		44.2 (1)		1.4		12.2	
NICKEL	150	30					46.2				54				38.2				37			
POTASSIUM							2160				2180				2400				2970			
SELENIUM	39	3.9		20			1.03	U	3.67	U	0.59	U	3.67	U	0.4	U	3.67	U	0.63	U	3.67	U
SILVER	39	2		100			205		6.2	J	53.7		0.75	J	0.63	J	3.5	J	0.42	J	2	J
SODIUM							103				151				189				79	J		
THALLIUM							0.44	U			0.25	U			0.17	U			0.27	U		
VANADIUM	0.55						24.4		50		22.3		19	J	26.9		98		33.6		6.8	J
ZINC	2300	109		5000 (3)			1270		767		150		100		1470		2770		160		1030	

Key	
0.55	Exceeds most stringent soil criterion
0.7	Exceeds most stringent groundwater criterion
(1)	Mercury data may be affected by holding times greater than 28 days.
(2)	Based on Federal MCL
(3)	NYSDEC Guidance Value, GA Freshwater Aesthetics

Table A-6
Comparison of Total Metal in Soil to SPLP Extract Concentrations at OD Grounds
Feasability Study - OD Grounds
Seneca Army Depot Activity

							SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45		SEAD-45	
							S45-RI-02		S45-RI-02		S45-R2-02		S45-R2-02		S45-R5-05		S45-R5-05		S45-R15-01	
							SOIL		Leachate		SOIL		Leachate		SOIL		Leachate		SOIL		Leachate	
							S45-RI-02		S45-RI-02		S45-R2-02		S45-R2-02		S45-R5-05		S45-R5-05		S45-R15-01		S45-R15-01	
	Soil Guidance Values						0		0		0		0		0.2		0.2		0.2		0.2	
							0.2		0.2		0.2		0.2		0.8		0.8		0.8		0.8	
							4/1/2010		4/1/2010		4/1/2010		4/1/2010		3/16/2010		3/16/2010		3/16/2010		3/16/2010	
	EPA RSL	NYSDEC		NYSDEC			SA		SA		SA		SA		SA		SA		SA		SA	
	Residential	Unrestricted		GA GW	Number																	
	RSL	SCO		Effluent	of		mg/Kg		ug/L		mg/Kg		ug/L		mg/Kg		ug/L		mg/Kg		ug/L	
Parameter	mg/Kg	mg/Kg		ug/L	Exceedances		Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)	Value	(Q)
ALUMINUM	7700						16200				17700				18700				19900			
ANTIMONY	3.1			6			0.64	J	*ND*		0.62	J	*3.7*	J	0.11	U	*ND*		0.25	U	*ND*	
ARSENIC	0.39	13		50			5.1		*13.6*		5.4		*18.9*		5.2		*9.8*		7.6		*6.8*	J
BARIUM	1500	350		2000			150		*777*		164		*940*		165		*703*		287		*487*	
BERYLLIUM	16	7.2					0.72				0.86				0.79				1			
CADMIUM	7	2.5		10	4		7.7		17.3		9.1		25.3		5.1		*8.7*	J	1.8	J	*1.2*	J
CALCIUM							25400				20300				29300				3630			
CHROMIUM	12000	30		100			27.4		*73*		27.7		*99.9*		26.7		*63.1*		24.6		*53.6*	
COBALT	2.3						12.3		*37.5*		11.8		*29*	J	10		*16.7*	J	26.8		*11.9*	J
COPPER	310	50		1000	2		794		1444		462		2260		219		*654*		22.8		*59.5*	
IRON	5500						25200				27600				25400				35300			
LEAD	40	63		50	6		69.2		147		72.3		193		42.9		71		22		*29*	
MAGNESIUM							7910				6560				7140				4080			
MANGANESE	180	1600					676				618				489				5040			
MERCURY	2.3	0.18		1.4	6		3.5		13.2		3		9.8		1.3		4.2 (1)		0.21		*0.34 (1)*	
NICKEL	150	30					39.6				39.8				33.4				29.8			
POTASSIUM							2450				2920				3220				2780			
SELENIUM	39	3.9		20			0.7	U	*3.67*	U	0.72	U	*3.67*	U	0.24	U	*3.67*	U	0.56	U	*3.67*	U
SILVER	39	2		100			3.2		*13.6*	J	3.6		*19.7*		0.46	J	*3.1*	J	0.17	U	*2.1*	J
SODIUM							87.7	J			90.9	J			127				87.4	J		
THALLIUM							0.29	U			0.3	U			0.1	U			0.24	U		
VANADIUM	0.55						27.3		*93*		30.9		*124*		30.1		*79*		30.7		*78*	
ZINC	2300	109		5000 (3)			1350		*3100*		321		*1750*		360		*1290*		101		*243*	

Key	
0.55	Exceeds most stringent soil criterion
0.7	Exceeds most stringent groundwater criterion
(1)	Mercury data may be affected by holding times greater than 28 days.
(2)	Based on Federal MCL
(3)	NYSDEC Guidance Value, GA Freshwater Aesthetics

APPENDIX B

RISK ASSESSMENTS

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APPENDIX B1
HUMAN HEALTH RISK ASSESSMENT REPORT
SENECA ARMY DEPOT ACTIVITY
OPEN DETONATION (OD) GROUNDS

August 19, 2015, Draft Revision 1

Task Order 0013

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TABLE OF CONTENTS

LIST OF TABLES *(Tables located at the end of this document)*

LIST OF FIGURES *(Figures located at the end of this document)*

ACRONYMS AND ABBREVIATIONS

≤	less than or equal to
µg	micrograms
ALM	adult lead model
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
COPC	constituents of potential concern
cm^2	square centimeter
CSM	conceptual site model
DAD	dermal absorbed dose
dL	deciliter
DQO	data quality objectives
ELCR	excess lifetime cancer risk
EPC	exposure point concentrations
FS	feasibility study
HEAST	health effects assessment summary table
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IEUBK	integrated exposure uptake biokinetic
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
kg	kilogram
L	liter
LOAEL	lowest observed adverse effect level
m^3	cubic meter
MCL	maximum contaminant level
MD	munitions debris
MDL	method detection limit
MEC	munitions and explosives of concern
mg	milligrams
MRL	minimal risk level
NYSDEC	New York State Department of Environmental Conservation
NOAEL	no observed adverse effect level
OB	open burning
OD	open detonation
OEHHA	California EPA Office of Environmental Health Hazard Assessment
Pb	lead
PEF	particulate emission factor
PPRTV	provisional peer-reviewed toxicity value
Q/C	default source concentration terms or values
RAGS	Risk Assessment Guidance for Superfund
REL	reference exposure level
RfC	reference concentrations
RfD	reference doses
RME	reasonable maximum exposure

ACRONYMS AND ABBREVIATIONS (*continued*)

RSL	regional screening level
SEDA	Seneca Army Depot Activity
SF	slope factor
STSC	Superfund Health Risk Technical Support Center
SVOC	semivolatile organic compound
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency
VF	volatilization factor

SECTION 1
INTRODUCTION

1.1 Overall Introduction

This risk assessment is being conducted to support the feasibility study (FS) for the Open Detonation (OD) Grounds, Seneca Army Depot Activity (SEDA). The risk assessment generally follows U.S. Environmental Protection Agency (USEPA) guidance for risk assessment (the Risk Assessment Guidance for Superfund [RAGS] series of guidance documents), and incorporates exposure scenarios and assumptions that are appropriate for current and anticipated future land use at this site. These scenarios and assumptions, as well as methods proposed to calculate exposure point concentrations and identify chemicals of potential concern, were presented in a human health risk assessment technical memorandum submitted to USEPA and the New York State Department of Environmental Conservation (NYSDEC) for review on August 7, 2014.

This risk assessment is an attachment to the FS. Therefore, complete historical site information is available within the FS. Section 1 of this report is a brief introduction, including a description of the site and the data evaluation for the human health risk assessment (HHRA). Section 2 describes the HHRA. Section 3 presents the references used in preparation of this document. Tables and figures referenced in this report follow Section 3.

1.2 Site Description

SEDA is located in Seneca County, New York (Figure 1.1), while the OD Grounds site is located in the northwest corner of SEDA (Figure 1.2). The site is largely meadow with some wooded and heavily brushed areas. The site consists of 403 acres and was used to perform open detonation (OD) and burning of munitions. OD activities no longer occur at this site. This acreage includes the area contained within a 2,500-foot radius centered on the OD Hill Area. Note that the Open Burning (OB) Grounds is a separate site that was previously addressed and are is included in the calculation of OD Grounds acreage. This Risk Assessment divides the OD Grounds into two areas for assessment purposes based on differing potential risk observed during previous investigations. The density of potential MEC is highest at the center of the OD Grounds, in the vicinity of the OD Hill where the demolition activities took place and areas in the immediate vicinity that received most of the "kick-outs" from those activities. This area is referred to as the "OD Hill area" in this Risk Assessment. The second area includes areas further away from the OD Hill that received kick-outs, but in lower densities. This second assessment area is referred to as the "Kickout Area".

Under the future use plan, the OD Grounds are located in the "Conservation/Recreation" parcel of SEDA. The planned future use for the OD Grounds is for conservation and passive recreational purposes where there is limited potential for soil contact (e.g., does not include playgrounds or ballparks, but would include hiking or nature trails). Planned future recreational use of the site does not include overnight camping.

Groundwater use at the site will be prohibited through implementation of a land use control as part of the final remedy; therefore, groundwater is not currently used for any purpose and is not anticipated to be used for any purpose in the future. Depth to groundwater is approximately 10 feet below ground surface. There will be land use restrictions in place that will prevent intrusive activity and future development of the site beyond its prescribed conservation/recreation use.

The only perennial surface water feature located within the OD Grounds is Reeder Creek, which flows north through the Kickout Area. Reeder Creek is not used for fishing or as a source of potable water. Additionally, the creek is not deep enough to support swimming. There are no perennial surface water bodies in the OD Hill Area.

Further details on the site characteristics (i.e., geology, hydrogeology, etc.), history, and future use are provided in Section 1.2 of the FS.

1.3 Data Evaluation

Historical soil, surface water, sediment, and groundwater data were evaluated for appropriateness and representativeness to determine usability for risk assessment. A data usability evaluation was conducted to evaluate whether the available current and historical data should be used in the risk assessment.

Chemical results with final validation qualifiers of any letter other than "U," "UJ," or "R" were considered detected; therefore "J" qualified data results were used in the risk assessment (USEPA 1989). Original data files are included in Attachment A.

To evaluate usability, data for each medium (and from each soil interval) within each exposure area (as defined below in Section 2.3) were consolidated into summary statistics tables that present the following for each analyte: number of samples analyzed, minimum and maximum detected values, minimum and maximum method detection limits (MDL) for nondetects, and the screening value. These summary statistics for soil (including ditch soil, see below), surface water, and groundwater samples at the OD Grounds, are presented in the following tables:

- Table 1.1 (surface soil, 0- less than or equal to (≤) 2 feet, OD Hill Area);
- Table 1.2 (subsurface soil, 0- ≤ 15 feet, OD Hill Area);
- Table 1.3 (surface soil, 0- ≤ 2 feet, Kickout Area);
- Table 1.4 (groundwater);
- Table 1.5 (surface water, upstream);
- Table 1.6 (surface water, ditch samples from OD Hill Area);
- Table 1.7 (surface water, Reeder Creek and Downstream of OD Hill Area).

Determination of data usability was based on evaluation of the spatial, chemical, and temporal representativeness of the available analytical data, and an assessment of whether these data are relevant to plausible exposure pathways at the OD Grounds. Representativeness of the data was evaluated using the criteria defined below.

- **Chemical representativeness** – Identifies whether analyses were conducted for constituents expected to be present, on the basis of an understanding of historical processes or practices and potential releases at the OD Grounds.
- **Exposure representativeness** – Identifies whether environmental media were evaluated where receptor exposure is most feasible (e.g., soil depths).
- **Spatial representativeness** – Identifies whether samples were collected with a sufficient density and areal coverage that the detected constituent concentrations represent a geographically integrated exposure for the receptors of concern.

- **Temporal representativeness** – Identifies whether samples were collected within a time frame such that detected constituent concentrations represent current site conditions. Data were also evaluated based on current standard practices to determine if historical data were collected in a manner that would meet current data quality objectives (DQO).

Soil data used in this risk assessment include data from samples collected in November 1993 and March 2010. Soil data are presented in two soil intervals: 0 to $\leq$ 2 feet below ground surface (bgs) (Tables 1.1 and 1.3) and 0 - $\leq$ 15 feet bgs (Table 1.2). Soil sample locations and exposure area are included on Figure 1.3.

Groundwater data used in this risk assessment include data from January and February 1994, June 1997, and December 1999 (Table 1.4). Groundwater sample locations and human health exposure areas are included on Figure 1.5. Groundwater samples collected within the OD Hill Area are not temporally representative (collected prior to 1995) but, as proposed in the technical memorandum, are included in the HHRA to spatially evaluate groundwater, as they are the most recent data available specific to this area. Groundwater samples collected from the OB Area (which is not being evaluated in this risk assessment) are not spatially representative (side-gradient to the potential source) but, as proposed in the technical memorandum, are included in the HHRA to temporally evaluate the OD Hill Area, as they are the most recent data available.

Surface water data used in the this risk assessment include data collected from ditches in 1993 from within the OD Hill Area, samples collected from Reeder Creek in 1991 and 1992 from the Kickout Area, and samples collected from Reeder Creek in 1997 in support of the investigation conducted at SEAD-12, which is located upgradient of the OD Grounds. Samples collected in Reeder Creek upstream of the OD Grounds will be evaluated separately from those collected within and downstream of the OD Grounds, as upstream samples are not expected to have been affected by activities at the OD Grounds (Table 1.7). The upstream samples will be used to determine the impact the OD Grounds may have on contaminant concentrations in Reeder Creek.

Historically, sediment samples were collected from Reeder Creek. However, subsequent to sample collection, remedial actions were taken in the creek, resulting in removal of all sediment in the vicinity of the OD Grounds. Therefore, historical samples are not representative of current conditions. In addition, Reeder Creek is currently inspected, and annual observations confirm that there is no sediment in the creek. Therefore, there are no complete sediment exposure pathways.

The data tables present all samples, primary and duplicates. The "best value" sample result of all primary and duplicate results was used. If both values represent detected concentrations, then the highest detected concentration was retained. If one value represents a detected concentration and one value is qualified as not detected, then the detected value was retained. If both values are qualified as not detected, the lowest reporting limit was retained.

Calcium, iron, magnesium, potassium, and sodium were not evaluated in the HHRA because they are essential nutrients and are generally not expected to pose an unacceptable risk to human receptors.

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SECTION 2
HUMAN HEALTH RISK ASSESSMENT

2.1 Risk Assessment Process

The HHRA provides an evaluation of the potential risks to human health posed by constituents detected in surface soil, combined surface and subsurface soil, groundwater, and surface water associated with the OD Grounds at SEDA. As presented in USEPA guidance documents, the HHRA is a four-step evaluation process that includes:

- Data evaluation and identification of a constituent of potential concern (COPC);
- Exposure assessment;
- Toxicity assessment; and
- Risk characterization.

Each step is discussed in detail in the following subsections. The HHRA was conducted using the following USEPA guidance documents:

- RAGS, Volume I: Human Health Evaluation Manual, Part A (Interim Final) (USEPA 1989)
- RAGS, Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (Final) (USEPA 2004)
- Soil Screening Guidance: Users Guide (USEPA 1996a)
- RAGS, Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment (Final) (USEPA 2009a)

2.2 Identification of Constituents of Potential Concern

2.2.1 Selection of Constituents of Potential Concern

Concentrations of detected constituents were compared to screening levels to identify COPCs. COPCs were selected by comparing the maximum concentration of each detected analyte in soil (for both soil intervals), groundwater, and surface water samples to selected screening levels. Analytes present at concentrations greater than screening levels were retained as COPCs for further evaluation; constituents detected at concentrations below these screening levels were not considered COPCs. The screening criteria selected for soil, groundwater, and surface water are the USEPA Regional Screening Levels (RSL) for Chemicals at Superfund Sites (USEPA 2014a). Detected analytes lacking screening levels were carried forward to the site-specific risk assessment and evaluated using surrogates, as discussed below.

USEPA RSLs for residential soil, based on a noncarcinogenic hazard quotient (HQ) of 0.1, were the selected screening values for soil. The maximum detected concentration of each detected analyte in surface soil (0 - $\leq$ 2 feet bgs) and combined surface and subsurface soil (0 - $\leq$ 15 feet bgs) were compared to these screening levels.

USEPA RSLs for tap water, based on a noncarcinogenic HQ of 0.1, were the selected screening values for groundwater and surface water. Tap water RSLs are based on ingestion, dermal contact, and inhalation of volatiles emitted from groundwater. Although surface water at the site is not used for drinking water, the USEPA RSLs for tap water were used for screening of surface water. The maximum detected concentration of each detected analyte in groundwater or surface water was compared to the selected screening value. For surface water, the maximum detected concentrations of

each detected analyte in surface water for each evaluation area (on-site drainage ditches, upstream in Reeder Creek, or downstream in Reeder Creek) were compared to the selected screening value.

Chromium can exist in the environment as chromium(III) and chromium(VI). The analytical results presented in this report are for chromium(total) and do not distinguish between the different valence states. The chromium(total) analytical results are screened using the RSLs for chromium(VI). Toxicity criteria are established for chromium(III) and chromium(VI); therefore, the risk estimate presented in Section 2.5 calculates risk for both chromium(III) and chromium(VI) using the chromium(total) exposure point concentration (EPC). Two separate risk estimates are presented. One risk estimate assumes the chromium is present as chromium(III) and the other risk assessment assumes the chromium is present as chromium(VI).

Potential risks associated with exposure to lead are evaluated using methods different from those used for carcinogens and noncarcinogens. The end point for lead evaluation is a blood lead level, rather than a carcinogenic risk or HQ. Therefore, lead is not included in the cumulative risk calculations in Section 2.5. Lead is evaluated using the USEPA Integrated Exposure Uptake Biokinetic (IEUBK) model for children (USEPA 2007) or the USEPA Adult Lead Model (ALM) (USEPA 2003; 2009b). These models estimate potential blood lead (Pb) concentrations (micrograms [µg]-Pb per deciliter [dL]-blood) based on assumed exposures to lead in environmental media.

The predicted blood-lead concentrations will be compared to the blood-lead level of concern of 10 µg/dL (USEPA 2007). USEPA typically considers that action may be warranted if the 95th percentile predicted blood-lead concentration exceeds 10 µg/dL (i.e., action may be considered if there is greater than a 5% chance a receptor exposed to lead could have a blood-lead level greater than 10 µg/dL). However, based on USEPA's current approach, blood-lead concentrations less than 10 µg/dL do not require further management of the risk associated with exposure to lead.

2.2.2 Constituents of Potential Concern Results

Surface Soil: As shown on Tables 2.1 and 2.3, the following 20 analytes were detected at concentrations exceeding selected screening criteria in either the OD Hill Area or the Kickout Area, and were identified as COPCs in surface soil:

- 2,4-Dinitrotoluene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- N-Nitrosodipropylamine
- Phenanthrene
- MCPA
- Nitroglycerine
- Aroclor-1254
- Aluminum
- Arsenic
- Cadmium
- Chromium (total)
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Silver
- Thallium
- Vanadium

Of these COPCs, benzo(g,h,i)perylene and phenanthrene were retained as COPCs because they do not have published screening levels.

Combined Surface and Subsurface Soil: As shown on Table 2.2, the following 21 analytes were detected at concentrations exceeding selected screening criteria in the OD Hill Area and are COPCs in combined surface and subsurface soil:

- 2,4-Dinitrotoluene
- 2,6-Dinitrotoluene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- N-Nitrosodipropylamine
- Phenanthrene
- Nitroglycerine
- Aroclor-1254
- Aluminum
- Antimony
- Arsenic
- Cadmium
- Chromium (total)
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Silver
- Thallium
- Vanadium

Of these COPCs, benzo(g,h,i)perylene and phenanthrene were retained as COPCs because they do not have published screening levels. No subsurface soil samples were collected in the Kickout Area.

Groundwater: As shown on Table 2.4, the following 16 analytes were detected at concentrations exceeding the selected screening criteria and are COPCs in groundwater:

- Bis(2-Ethylhexyl)phthalate
- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium (total)
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Nickel
- Thallium
- Vanadium

All analytes detected in groundwater have a published screening level.

Surface water: As shown on Table 2.5, the following 16 analytes were detected at concentrations exceeding the selected screening criteria and are COPCs in surface water:

- 1,2-Dichloroethane
- Copper

- RDX
- Aluminum
- Arsenic
- Barium
- Cadmium
- Chromium (total)
- Cobalt
- Cyanide
- Lead
- Manganese
- Mercury
- Nickel
- Vanadium
- Zinc

All analytes detected in surface water have a published screening level.

2.3 Exposure Assessment

The exposure assessment consists of three main steps:

1. Evaluation of exposure pathways and identification of receptors;
2. Estimation of EPCs; and
3. Estimation of human intake.

The risk assessment evaluates the reasonable maximum exposure (RME). The RME is designed to be a measure of "high-end" exposure. The most sensitive exposure parameters are identified and the maximum of several of these are used along with average values for the remaining parameters. Generally, per USEPA RAGS Part A (USEPA 1989), the concentration term used when estimating intake is the arithmetic average of the concentration that is contacted over the exposure duration. Although this concentration does not reflect the maximum concentration that could be contacted at any one time, it is regarded as a reasonable estimate of the concentration likely to be contacted over time. This is because in most situations, assuming long-term contact with the maximum concentration is not reasonable. Therefore, 95% upper confidence limits (UCL) on the mean concentrations are used to estimate exposure to contaminants when a sufficient number of samples are collected to reliably calculate a 95% UCL. This approach is intended to account for both uncertainty in the contaminant concentration and variability in the exposure parameters (such as exposure frequency or averaging time).

2.3.1 Conceptual Site Model

2.3.1.1 Evaluation of Exposure Pathways and Identification of Receptors

A conceptual site model (CSM) is used to qualitatively define the type of potential exposures to contaminants at or migrating from a site (i.e., to systematically evaluate the effect of chemicals in relevant media on potential receptors). The CSM describes onsite release points, affected physical media, types of contaminant transport and fate mechanisms that may be involved at the site, each group of potentially exposed populations or receptors, and how each receptor group may contact site-related contamination. The CSM is used to summarize existing site characterization data, including assumptions about land and groundwater use, and to complete the qualitative exposure pathway assessment.

An exposure pathway evaluation describes how a receptor could be exposed to COPCs at, or migrating from, a site. A potentially complete exposure pathway consists of four necessary elements:

- A source and mechanism of chemical release;

- An environmental transport medium;
- A point of potential contact with a receptor; and
- A feasible route of exposure at the exposure point.

The potentially complete exposure pathways and receptors at the OD Grounds are identified in this section. Consistent with RAGS (USEPA 1989), current and future land-use scenarios were considered for the site.

The site-specific CSM for potential human exposures is depicted in Figure 2.1 (OD Hill Area) and Figure 2.2 (Kickout Area) and is formulated according to applicable guidance, with the use of professional judgment and site-specific information on land use, water use, contaminant sources, release mechanisms, routes of migration, potential exposure points, potential routes of exposure, and potential receptor groups associated with the site. In accordance with the site-specific CSM, risk was quantitatively or qualitatively evaluated for the following potential human exposure scenarios:

- **Hypothetical Future Residents**: Although future residential land use is not anticipated, this scenario addresses the possibility for unrestricted land use in the future, including residential development with and without deep excavation and redistribution of soil. In some cases, residential development may require excavation, resulting in subsurface soil being redistributed at the surface. Therefore, future residential receptors will be evaluated for exposure to surface soil (0 to 2 feet bgs) and combined surface and subsurface soil (0 to 15 feet bgs). Future residents could include both children and adults. Hypothetical future residents can be exposed to constituents in soil through incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in air. Ingestion as drinking water and dermal contact (during showering/bathing) would be possible if a supply well were installed in the future. There are no volatile COPCs, so inhalation of volatiles from groundwater is not evaluated further. Potential exposure to surface water through incidental ingestion and dermal contact associated with wading may also occur.
- **Hypothetical Future Excavation/Construction Workers**: Hypothetical construction workers are assumed to be performing minor excavation activities, such as would be conducted during installation or repair of underground utilities or construction of building foundations. Therefore, hypothetical future excavation/construction workers can be exposed to constituents in soil to 15 feet bgs and shallow groundwater through incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in air. Ingestion of groundwater as a source of drinking water is not anticipated for the excavation/construction worker, but excavation/construction workers may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as none of the COPCs in groundwater are volatile. Potential exposure to surface water through incidental ingestion and dermal contact associated with wading may also occur.
- **Future Park Workers**: Future park workers are assumed to be exposed to soil through routine outdoor activities, including landscaping and grounds keeping activities. Therefore, future park workers can be exposed to constituents in soil to 2 feet bgs through incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in air. Dermal contact and ingestion of groundwater as a source of drinking water would be possible if a supply well were to be installed in the future, and park workers may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as none of the COPCs in groundwater are volatile. Potential exposure to surface water through incidental ingestion and dermal contact associated with wading may also occur.

- **Current and Future Recreational Users**: Recreational users, including children and adults, are assumed to be exposed to soil through routine outdoor activities, such as hiking. It is not expected that recreational use of the land would include digging. Therefore, future recreational users can be exposed to constituents in soil to 2 feet bgs through incidental ingestion, dermal contact, and inhalation of ambient dust and vapors in air. Dermal contact and ingestion of groundwater as a source of drinking water would be possible if a supply well were to be installed in the future, and recreational users may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as none of the COPCs in groundwater are volatile. Potential exposure to surface water through incidental ingestion and dermal contact associated with wading may also occur.

Exposure scenarios selected for evaluation are anticipated to account for the range of reasonably anticipated exposures under current and future conditions at SEDA. The scenarios selected are sufficiently conservative to adequately address other less common scenarios for soil, groundwater, and surface water.

There are no complete exposure pathways for sediment. Past remedial actions in Reeder Creek removed all sediment from the creek, and routine observations confirm that sediment has not returned to the area. Since drainage ditches located within the OD Hill Area are intermittent storm water conveyances, sediment samples (ditch soil) collected within the OD Hill Area are evaluated as surface soil.

The exposure assumptions used for estimating constituent intake are presented in Table 2.6 (soil), Table 2.7 (groundwater), and Table 2.8 (surface water). Estimated exposures to soil for hypothetical future residents were based on the assumption that a receptor would be exposed to soil for 350 days per year over a 6-year span as a child and a 20-year span as an adult. Estimated exposures for hypothetical excavation/construction workers were based on the assumption that an adult would be exposed to subsurface soil for 30 days per year, because excavation activities were assumed to be of one month duration over a one-year period. Estimated exposures for park workers were based on the USEPA assumption that an outdoor worker would contact surface soil for 225 work days per year over a 25-year period (USEPA 1991). Estimated exposures for future recreational users were based on the assumption that a recreational user would visit the site twice per month each year over a 6-year span as a child and a 20 year span as an adult.

Estimated exposures to groundwater for hypothetical future residents were based on the assumption that a receptor would contact groundwater for 350 days per year over a 6-year span as a child and a 20-year span as an adult. Estimated exposures for hypothetical excavation/construction workers were based on the assumption that an adult would contact groundwater for 30 days per year, because excavation activities were assumed to be of one month duration over a one-year period. Estimated exposures for park workers were based on the USEPA assumption that an outdoor worker would contact groundwater for 225 work days per year over a 25- year period (USEPA 1991). Estimated exposure for future recreational users were based on the assumption that a recreational user would visit the site twice per month each year over a 6-year span as a child and a 20-year span as an adult.

Estimated exposures to surface water for hypothetical future residents were based on the assumption that a receptor would contact surface water for 175 days per year over a 6-year span as a child and a 20-year span as an adult, because cold weather would preclude use of the creek for half of the year. Estimated exposures for hypothetical excavation/construction workers were based on the assumption that an adult would contact surface water for 30 days per year, because excavation activities were assumed to be of one month duration over a one-year period. Estimated exposures for park workers were based on the USEPA assumption that an outdoor worker would contact surface water for 113 work days per year over a 25-year period (USEPA 1991), because winter weather would preclude use of the creek for half the year. Estimated exposures for future recreational users were based on the assumption

that a recreational user would visit the site twice per month each year over a 6-year span as a child and a 20-year span as an adult.

2.3.1.2 Exposure Area

An exposure area is the area over which sampling data are aggregated for estimation of risk. The size and location of the exposure area is generally commensurate with the assumed activity patterns of each specific receptor. The exposure area is consistent with the areas defined by the site-specific characterization of the nature and extent of contamination at source areas. The exposure areas evaluated in this risk assessment were defined considering the results of the source area investigation and activity patterns of the potential receptors being evaluated in the HHRA. For evaluation of soil, the OD Hill Area and the Kickout Area were evaluated as separate exposure areas. All groundwater wells were located within the OD Hill Area or the OB Area. Groundwater evaluation was conducted on a combined data set, including data from all wells, as well as data from each well individually. For surface water, three exposure areas were evaluated, the on-site drainage ditches in the OD Hill Area, the portion of Reeder Creek upstream of the Kickout Area, and the portion of Reeder Creek that passes through the Kickout Area and all downstream locations. Once Reeder Creek enters the Kickout Area, all locations downstream from that point are potentially affected by munitions activities at the OD Grounds and considered together.

2.3.2 Estimation of Exposure Point Concentrations

EPCs are the concentrations of chemicals in a given medium to which a receptor may be exposed at a specific location known as the "exposure point." EPCs are estimated based on medium-specific data and are used to calculate the risk due to exposure to a specific analyte. Each groundwater sampling location was considered an exposure point. Therefore, an EPC was identified as the maximum detected concentration of each COPC in each well.

For receptors potentially exposed to surface soil, the EPC is derived from soil samples with a starting sample depth from 0 - ≤ 2 feet bgs. For receptors potentially exposed to both surface and subsurface soil, the EPC was derived from soil samples with a starting sample depth from 0 - ≤ 15 feet bgs. For each data group (i.e., soil interval), EPCs for risk estimation were calculated using the best statistical estimate of an upper bound on the average exposure concentrations, in accordance with USEPA guidance for statistical analysis of monitoring data (USEPA 1989; 1992; 2002a). These guidance documents consider the 95 percent UCL on the mean concentration as a conservative upper bound estimate that is not likely to underestimate the mean concentration and most likely overestimates that concentration. EPCs were calculated for each COPC using the USEPA's statistical program ProUCL, version 5.0.00 (USEPA 2013b). This procedure identifies the statistical distribution type (normal, gamma, lognormal, or non-parametric) for each constituent within the defined exposure area and computes the corresponding 95% UCL for the identified distribution type.

"U" or "UJ" flagged data results were evaluated for the EPC calculations as follows:

- If an analyte is never detected in the dataset, the analyte was not evaluated further.
- If results indicate the analyte is detected in some, but not all, samples, the EPC was calculated using ProUCL, with all data entered with the sample specific detection limit.

EPCs for soil were selected as follows:

  - If the sample size is less than 6, the maximum detected concentration was selected as the EPC.
  - If the sample size is 6 or greater, the ProUCL-"suggested UCL to use" was selected as the EPC without further evaluation of scientific validity.

EPCs for risk estimation were calculated for each receptor type as follows:

- Soil EPCs for the resident (without excavation), park worker, and recreational user scenarios were calculated by aggregating analytical data collected from the exposure area for surface soil (0 - ≤ 2 feet bgs).
- Soil EPCs for the resident (with excavation) and excavation/construction worker scenarios were calculated by aggregating analytical data collected from the exposure area for combined surface and subsurface soil (0 - ≤ 15 feet bgs).
- Groundwater EPCs were the maximum detected concentration of each COPC. In addition, risk for each well was estimated using the maximum detected concentration from each well.
- Surface water EPCs were the maximum detected concentration of each COPC. Risk for each surface water exposure area was estimated using the maximum detected concentration from each area.

2.3.2.1 Exposure Point Concentration Results

Surface Soil in the OD Hill Area: A sufficient number of samples were present to calculate 95% UCLs for the following COPCs in surface soil: 2,4-dinitrotoluene, aluminum, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, silver, and vanadium. Benzo(a)pyrene, benzo(g,h,i)perylene, N-nitrosodipropylamine, phenanthrene, nitroglycerine, and Aroclor-1254 had an insufficient sample size to calculate a UCL, thus the maximum detected concentration was used as the EPC. The EPCs, summary statistics, and the statistical method used to calculate the EPC for surface soil, are presented in Table 2.9. The ProUCL input tables and outputs are included in Attachment A of this risk assessment.

Combined Surface and Subsurface Soil in the OD Hill Area: A sufficient number of samples were present to calculate 95% UCLs for the following COPCs in combined surface and subsurface soil: 2,4-dinitrotoluene, benzo(a)pyrene, benzo(g,h,i)perylene, phenanthrene, aluminum, antimony, arsenic, cadmium, chromium, cobalt, copper, lead, manganese, mercury, silver, thallium, and vanadium. 2,6-dinitrotoluene, N-nitrosodipropylamine, nitroglycerine, and Aroclor-1254 had an insufficient sample size to calculate a UCL, thus the maximum detected concentration was used as the EPC. The EPCs, summary statistics, and the statistical method used to calculate the EPC for combined surface and subsurface soil are presented Table 2.10. The ProUCL input tables and outputs are included in Attachment A of this risk assessment.

Surface soil in the Kickout Area: A sufficient number of samples were present to calculate 95% UCLs for the following COPCs in surface soil: aluminum, arsenic, cadmium, chromium, cobalt, lead, manganese, mercury, and vanadium. Phenanthrene and MCPA had an insufficient sample size to calculate a UCL, thus the maximum detected concentration was used as the EPC. The EPCs, summary statistics, and the statistical method used to calculate the EPC for combined surface and subsurface soil are presented Table 2.11. The ProUCL input tables and outputs are included in Attachment A of this risk assessment.

Groundwater: Groundwater risk was first evaluated using maximum detected concentrations for each analyte, regardless of in which well that concentration was found. However, evaluation of risk for individual wells provides a more accurate representation of exposure, since potential future exposure would assume the presence of a supply well placed at a specific location on-site, drawing groundwater from a specific point. Therefore, groundwater risk was also calculated using the maximum detected concentration of each analyte in each well as the EPC. The maximum detected concentrations of all detected analytes in all wells combined and the maximum detected concentration from individual wells are presented in Table 2.12.

Surface Water: Surface water in the Reeder Creek flows to the north and northwest, on the perimeter of the OD Grounds. Additional surface water flows through drainage ditches through the OD Grounds to Reeder Creek. To determine the relative contribution of site-related chemicals to the surface water in Reeder Creek, the surface water samples in Reeder Creek upstream of the OD grounds, surface water samples in the drainage ditches through the OD Grounds, and surface water samples in Reeder Creek adjacent to the site and downstream of the site were evaluated separately. Therefore, the EPC was the maximum detected concentration from surface water samples collected within each of the three exposure areas, as shown in Table 2.13.

2.3.3 Estimation of Human Intake

The following equations were used to estimate human intake of COPCs in soil and groundwater. Supporting calculations are provided in Attachment B of this report.

2.3.3.1 Intake Equations for Ingestion of Soil

The following equation (USEPA 1989) was used to calculate the intake (expressed as milligrams [mg] per kilogram [kg] per day) associated with the incidental ingestion of carcinogenic and noncarcinogenic contaminants in soil:

$$Ingestion = \frac{C_S \times IRS \times 10^{-6} kg/mg \times EF \times ED}{AT \times BW \times 365 days/year} \quad (1)$$

The following age-weighted equation (USEPA 1989; 2014b) was used to calculate intake associated with incidental ingestion of carcinogenic contaminants in soil for the residential and recreational user exposure scenarios:

$$Intake = \frac{C_S \times IFS_{adj} \times EF \times 10^{-6} kg/mg}{AT \times 365 days/year} \quad (2)$$

where:

$$IFS_{adj} = \frac{ED_c \times IRS_c}{BW_c} + \frac{ED_a \times IRS_a}{BW_a} \quad (3)$$

where:

C_s = chemical concentration in soil (mg/kg)

IRS = soil ingestion factor [(mg-year)/(kg-day)]

IFS_{adj} = age-adjusted soil ingestion factor [(mg-year)/(kg-day)]

IRS_a = adult soil ingestion rate (mg/day)

IRS_c = child/adolescent soil ingestion rate (mg/day)

EF = exposure frequency (days/year)

ED_a = adult exposure duration (years)

ED_c = child/adolescent exposure duration (years)

BW_a = adult body weight (kg)

BW_c = child/adolescent body weight (kg)

AT = averaging time (years)

The exposure assumptions for estimating chemical intake from the ingestion of contaminants in soil are presented in Table 2.6.

2.3.3.2 Intake Equations for Dermal Contact with Soil

The following equations (USEPA 2004) were used to calculate the intake from dermal contact with carcinogenic and noncarcinogenic contaminants in soil:

$$DAD = \frac{DA_{event} \times EF \times ED \times EV \times SA}{BW \times AT \times 365 days/year} \quad (4)$$

where:

$$DA_{event} = C_s \times AF \times ABS \times 10^{-6} kg/mg \quad (5)$$

The following age-weighted equation (USEPA 2004) was used to calculate the intake from dermal contact with carcinogenic contaminants in soil under the residential and recreational user exposure scenarios:

$$DAD = \frac{C_s \times SFS_{adj} \times ABS \times EF \times EV \times 10^{-6} kg/mg}{AT \times 365 days/year} \quad (6)$$

where:

$$SFS_{adj} = \frac{ED_C \times AF_c \times SA_c}{BW_c} + \frac{ED_a \times AF_a \times SA_a}{BW_a} \quad (7)$$

where:

DAD = dermally absorbed dose (mg/kg-day)

C_s = chemical concentration in soil (mg/kg)

ABS = absorption fraction (unitless)

SFS_{adj} = age-adjusted dermal contact factor [(mg-year)/(kg-event)]

SA_a = adult exposed skin surface area (cm^2)

SA_c = child/adolescent exposed skin surface area (cm^2)

AF_a = adult soil-to-skin adherence factor (mg/cm^2-event)

AF_c = child/adolescent soil-to-skin adherence factor (mg/cm^2-event)

EF = exposure frequency (days/year)

ED_a = adult exposure duration (years)

ED_c = child/adolescent exposure duration (years)

EV = event frequency (events/day)

BW_a = adult body weight (kg)

BW_c = child/adolescent body weight (kg)

AT = averaging time (years)

Exposure assumptions for estimating exposure from dermal contact with soil are presented in Table 2.6. Dermal absorption fractions were obtained from the dermal assessment guidance (USEPA 2004).

2.3.3.3 Equations for Inhalation of Ambient Dust or Vapors

The exposure concentrations for volatile/particulate COPCs in outdoor air, in µg/m^3, were estimated as follows (USEPA 2009a):

$$EC(air) = \frac{C_a \times ET \times EF \times ED}{AT \times 365 days/year} \quad (8)$$

where:

C_a = contaminant concentration in air (µg/cubic meter [m^3])
EC = exposure concentration (µg/m^3)
ED =exposure duration (years) = exposure duration, adult (ED_a) + exposure duration, child (ED_c)
EF =exposure frequency (days/year)
ET = exposure time as a fraction of the day spent at the site (unitless)
AT = averaging time (years)

For exposure scenarios where a receptor would be exposed to ambient dust and vapors in air, the contaminant concentration in air, C_a (µg/m^3), was calculated using the following equation derived from USEPA RSL User's Guide (USEPA 2014b):

$$C_a = C_s \times 1{,}000 \mu g/mg \times \left[\frac{1}{VF} + \frac{1}{PEF}\right] \quad (9)$$

For exposure scenarios where a receptor would be exposed to inorganic analytes in ambient dust particles in air, the contaminant concentration in air, C_a (µg/m^3), was calculated using the following equation derived from USEPA RSL User's Guide (USEPA 2014b):

$$C_a = C_s \times \frac{1{,}000 \mu g}{mg} \times \left(\frac{1}{PEF}\right) \quad (10)$$

The volatilization factor (VF) was estimated using the following equation (USEPA 2002b; 2014b):

$$VF = {}^{Q}/_{C} \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times \rho_b \times D_A)} \times 10^{-4}\ {}^{m^2}/_{cm^2} \quad (11)$$

where:

$$D_A = \frac{\left[\left(\theta_a^{10/3} \times D_i \times H' + \theta_w^{10/3} \times D_w\right)/ n^2\right]}{\rho_b \times K_d + \theta_w + \theta_a \times H'} \quad (12)$$

where:

VF	=	Chemical-specific volatilization factor (m^3/kg)
Q/C	=	Inverse of mean concentration at center of square source area (grams[g] per square meter per second [m^2-s] per kg/m^3)
D_A	=	Apparent diffusivity (cm^2 per second [s])
T	=	Exposure interval (s)
ρ_b	=	Dry soil bulk density (g/cm^3)
θ_a	=	Air-filled soil porosity (L_{air}/L_{soil}) = n-θ_w
θ_w	=	Water-filled soil porosity (L_{water}/L_{soil})
n	=	Total soil porosity (L_{pore}/L_{soil}) = 1- (ρ_b / ρ_s)
ρ_s	=	soil particle density (g/cm^3)
D_i	=	Diffusivity in air (cm^2/s)
H'	=	Henry's law constant (unitless)
D_w	=	Diffusivity in water (cm^2/s)
K_d	=	Soil-water partition coefficient (cm^3/g) (= K_{OC} X f_{OC})
K_{OC}	=	Soil organic carbon-water partition coefficient (cm^3/g)
f_{OC}	=	Organic carbon content of soil (gram[s] per gram [g/g])
PEF	=	Particulate emission factor (m^3/kg)

The soil-to-air VF was used to define the relationship between the concentrations of COPCs in soil and the flux of volatilized COPCs to air. VFs were calculated using methods described in Soil Screening Guidance: User's Guide (USEPA 1996a), Supplemental Guidance for Developing Soil Screening Levels (USEPA 2002b), and the RSL User's Guide (USEPA 2014b). Calculation of VF involves use of site-specific, chemical-specific, and default factors. USEPA (1996a; 2002b) guidance provides default source concentration terms (called Q/C terms or values for the site-specific dispersion model) based on meteorological conditions specific to 29 locations throughout the country and the size of the contaminant source. Per USEPA (1996a), a Q/C value best representing the area's size and meteorological conditions at the site is used in the VF calculation. For this site, the Q/C value is the default value provided by USEPA (2014b).

In addition, soil saturation must be considered when calculating the VF (USEPA 1996a). Soil saturation corresponds to the COPC concentration in soil at which the adsorptive limits of the soil particles, the solubility limits of the soil pore water, and saturation of soil pore air have been reached. Above this concentration, the COPC in soil may be present in free phase. Chemical-specific soil saturation concentrations must be compared with the concentration of each volatile soil COPC because a basic principle of the VF calculation is not applicable when free-phase contaminants are present. Therefore, the VF is applicable only if the soil COPC concentration is equal to or less than the soil saturation concentration. Soil saturation concentrations were calculated per USEPA (1996a; 2002b, 2014b) as follows below.

$$C_{sat} = \frac{S}{\rho_b} \times K_d \times \rho_b + \Theta_w + H' \times \Theta_a \quad (13)$$

where:

C_{sat} = soil saturation concentration (mg/kg)
S = solubility in water (mg/L-water)
ρ_b = dry soil bulk density (g/cm^3)
K_d = soil-water partition coefficient (cm^3/g) =K_{oc} x f_{oc}
K_{oc} = soil organic carbon/water partition coefficient (cm^3/g)
f_{oc} = fraction organic carbon in soil (g/g)
Θ_w = water-filled soil porosity (L_{water}/L_{soil})
H' = Henry's law constant (dimensionless)
Θ_a = air-filled soil porosity (L_{air}/L_{soil}), =n- Θ_w
n = total soil porosity (L_{pore}/L_{soil}), =1-(ρ_b/ρ_s)
ρ_s = soil particle density (g/cm^3)

If the soil COPC concentration is greater than the soil saturation concentration, the following equation was used to calculate the contaminant concentration in air, C_a ($\mu g/m^3$):

$$C_a = \left(C_s \times \frac{1{,}000\mu g}{mg} \times \left(\frac{1}{PEF}\right)\right) + \left(C_{sat} \times \frac{1{,}000\mu g}{mg} \times \left(\frac{1}{VF}\right)\right) \quad (14)$$

If the soil COPC concentration is less than or equal to the soil saturation concentration, the following equation was used to calculate the contaminant concentration in air, C_a ($\mu g/m^3$):

$$C_a = C_S \times \frac{1{,}000\mu g}{mg} \times \left(\frac{1}{VF} + \frac{1}{PEF}\right) \quad (15)$$

where:
C_a = Contaminant concentration in air ($\mu g/m^3$)
C_s = COPC concentration in soil (mg/kg)
C_{sat} = soil saturation concentration (mg/kg)
VF = Chemical-specific volatilization factor (m^3/kg)
PEF = Particulate emission factor (m^3/kg)

The particulate emission factor (PEF) relates the concentration of the soil COPC to the concentration of dust particles in the air. This calculation addresses dust generated from open sources, which is termed "fugitive" because it is not discharged into the atmosphere in a confined flow. PEF calculations include the default Q/C term, as described above.

The PEF was estimated using the following equation (USEPA 2002b; 2014b):

$$PEF = {}^{Q}/_{C} \times \frac{3{,}600\ {}^{seconds}/_{hour}}{0.036 \times (1-V) \times \left({}^{U_m}/_{U_t}\right)^3 \times F(x)} \quad (16)$$

where:

			Default	Source
PEF	=	particulate emission factor (m^3/kg)	1.32 X 10^9	--
Q/C	=	inverse of mean concentration at center of square source area (g/m^2-s per kg/m^3)	90.80	USEPA 1996a (p. 32)
V	=	fraction of vegetative cover (unitless)	0.5 (50%)	USEPA 1996a (pg. 23)
U_m	=	mean annual wind speed (m/s)	4.69	USEPA 1996a (pg. 23)
U_t	=	equivalent threshold value of wind speed at 7 m (m/s)	11.32	USEPA 1996a (pg. 23)
F(x)	=	function dependent on U_m/U_t derived using Cowherd, et al. (1985) (unitless)	0.194	USEPA 1996a (pg. 23)

The soil COPC concentration is compared to the soil saturation concentration in Attachment B. As shown in Attachment B, the soil COPC concentration was less than the soil saturation concentration for all COPCs at each soil interval, within each soil exposure area. Therefore, Equation 14, above, was used to estimate the contaminant concentration in air. The exposure assumptions used to estimate exposure from inhalation of dust and vapors in ambient air are presented in Table 2.6.

2.3.3.4 Intake Equations for Ingestion of Groundwater or Surface Water

The following equation (USEPA 1989) was used to calculate the intake of carcinogenic and noncarcinogenic constituents associated with ingestion of groundwater or surface water:

$$Intake = \frac{C_w \times IRW \times EF \times ED}{AT \times BW \times 365 days/year} \quad (17)$$

The following age-weighted equation (USEPA 1989; 2014b) was used to calculate the intake of carcinogenic constituents associated with the ingestion of groundwater or surface water under the residential and recreational user exposure scenarios:

$$Intake = \frac{C_w \times IFW_{adj} \times EF}{AT \times 365 days/year} \quad (18)$$

where:

$$IFW_{adj} = \frac{ED_c \times IRW_c}{BW_c} + \frac{ED_a \times IRW_a}{BW_a} \quad (19)$$

where:

C_W = chemical concentration in groundwater milligrams per liter (mg/liter [L])

IFW_{adj} = age-adjusted water ingestion factor [(L-year)/(kg-day)]

IRW_a = adult groundwater ingestion rate (L/day)

IRW_c = child/adolescent groundwater ingestion rate (L/day)

EF = exposure frequency (days/year)

ED_a = adult exposure duration (years)

ED_c = child/adolescent exposure duration (years)

BW_a = adult body weight (kg)

BW_c = child/adolescent body weight (kg)

AT = averaging time (days)

Exposure assumptions for estimating chemical intake from ingestion of groundwater are presented in Table 2.7 and exposure assumptions for estimating chemical intake from ingestion of surface water are presented in Table 2.8.

2.3.3.5 Intake Equations for Dermal Contact with Groundwater or Surface Water

The following equation (USEPA 2004) was used to calculate the intake associated with dermal contact with carcinogenic and noncarcinogenic constituents in groundwater or surface water under the excavation/construction worker exposure scenario:

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365 days/year} \quad (20)$$

The following age-weighted equation, derived from Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (USEPA 2004), was used to calculate the intake associated with dermal contact with carcinogenic constituents in groundwater or surface water under the residential and recreational user exposure scenarios:

$$DAD = \frac{DA_{event} \times SFW_{adj}}{AT \times 365 days/year} \quad (21)$$

where:

$$SFW_{adj} = \frac{EV_c \times ED_c \times EF \times SA_c}{BW_c} + \frac{EV_a \times ED_a \times EF \times SA_a}{BW_a} \quad (22)$$

where:

DAD = dermally absorbed dose (mg/kg-day)

DA_{event} = absorbed dose per event, calculated for inorganic and organic chemicals, as applicable, in accordance with USEPA 2004 (mg/cm^2-event) (see below)

SFW_{adj} = age-adjusted water dermal contact factor [(cm^2-event)/kg]
EF = exposure frequency (days/year)
ED_a = adult exposure duration (years)
ED_c = child/adolescent exposure duration (years)
EV_a = event frequency, adult (events/day)
EV_c = event frequency, child (events/day)
SA_a = adult exposed skin surface area (cm^2)
SA_c = child/adolescent exposed skin surface area (cm^2)
BW_a = adult body weight (kg)
BW_c = child/adolescent body weight (kg)
AT = averaging time (days)

The following equation (USEPA 2004) was used to calculate DA_{event} (mg/cm^2-event) for inorganic compounds:

$$DA_{event} = K_p \times C_w \times t_{event} \quad (23)$$

where:

DA_{event} = absorbed dose per event (mg/cm^2-event)
K_p = dermal permeability coefficient of compound in water (cm/hour)
C_w = chemical concentration in water (mg/cm^3)
t_{event} = event duration (hours/event)

The following equation (USEPA 2004) was used to calculate DA_{event} (mg/cm^2-event) for organic compounds:

If $t_{event} \leq t^*$, then:

$$DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}} \quad (24)$$

If $t_{event} > t^*$, then:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right] \quad (25)$$

where:

DA_{event} = absorbed dose per event (mg/cm^2-event)

FA = fraction absorbed water (dimensionless)

K_p = dermal permeability coefficient of compound in water (cm/hour)

C_w = chemical concentration in water (mg/cm^3)

τ_{event} = lag time per event (hour/event)

t_{event} = event duration (hours/event)

t* = time to reach steady-state (hour) = 2.4 τ_{event}

B = dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless)

Exposure assumptions used to estimate exposure from dermal contact with groundwater are presented in Table 2.7. The exposure assumptions used to estimate exposure from dermal contact with surface water are presented in Table 2.8.

2.4 Toxicity Assessment

In accordance with USEPA guidance (USEPA 2003a, 2014b), toxicity values (slope factors [SF], Inhalation unit risk [IUR], reference doses [RfD]), and reference concentrations [RfC] used in the risk assessment were obtained from the following hierarchy of sources:

1. USEPA's Integrated Risk Information System (IRIS) (USEPA 2014c).
2. The Provisional Peer-Reviewed Toxicity Values (PPRTV) derived by USEPA's Superfund Health Risk Technical Support Center (STSC) for the USEPA Superfund program (USEPA 2014d).
3. The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk levels (MRL) (ATSDR 2014).
4. The California Environmental Protection Agency (OEHHA) Office of Environmental Health Hazard Assessment's Chronic Reference Exposure Levels (REL) from October 2013 and the Cancer Potency Values from July 21, 2009 with updates in 2011 for dioxin/furans and dioxin-like PCBs (OEHHA 2014).
5. Health Effects Assessment Summary Tables (HEAST) USEPA. Health Effects Assessment Summary Tables (HEAST) (USEPA 1997).
6. RSL Users Guide (USEPA 2014b).

Toxicity criteria used in the risk assessment are consistent with those presented by USEPA in the May 2014 RSL table (i.e., current at the time the first risk assessment was completed). The toxicity criteria in the USEPA RSL table were selected using the aforementioned hierarchy. Uncertainties associated with this approach are discussed in Section 2.5.5.4.

Chromium can exist in the environment as chromium(III) and chromium(VI). Analytical results presented in this report are for chromium(total) and do not distinguish between the different valence states. There are no toxicity criteria for chromium(total). Risk due to exposure to both chromium(III) and chromium(VI) was estimated using the chromium(III) and chromium(VI) toxicity data and the chromium(total) results.

USEPA has not developed toxicity values specific to the dermal absorption pathway. However, dermal toxicity values were derived from the oral toxicity values as described in USEPA's most recent dermal risk assessment guidance (USEPA 2004). Toxicity values provided by USEPA reflect administered-

dose values; that is, they represent concentrations that will be protective following ingestion or inhalation. The dermal route of exposure, however, evaluates the toxicity of concentrations of chemicals in the blood (absorbed). Therefore, the absorbed-dose concentrations identified for dermal exposure must be compared to absorbed-dose toxicity values. Absorbed-dose toxicity values are derived by applying oral absorption factors to administered-dose toxicity values. Oral absorption factors used in the HHRA were obtained from Risk Assessment Guidance for Superfund, Part E (USEPA 2004).

Chemical-specific toxicity values used in the HHRA are shown in Table 2.14 (soil), Table 2.15 (groundwater), and Table 2.16 (surface water).

2.5 Risk Characterization

The final step in the risk assessment process is risk characterization. The purpose of the risk characterization step is to 1) review results from the exposure and toxicity assessments; 2) quantitatively estimate the potential for carcinogenic (i.e., risk) and noncarcinogenic (i.e., hazard) effects; and 3) assess and discuss uncertainties associated with each of the aforementioned steps. To characterize potential noncarcinogenic effects, estimated exposure concentrations of COPCs were compared with their respective toxicity values. To characterize potential carcinogenic effects, the incremental probability of an individual developing cancer over a lifetime was calculated from estimated exposure concentrations and chemical-specific dose/response information (i.e., carcinogenic toxicity factors). Cancer risk (for carcinogens) and HQ (for noncarcinogens) estimates were calculated as described below for each COPC.

Each COPC detected at a concentration greater than the selected COPC screening values was included in the cumulative risk calculations. However, metals detected below background were excluded from the cumulative risk calculations as detailed below in Section 2.5.1.

2.5.1 Noncancer Hazard Estimation

Potential health hazards associated with exposure to noncarcinogenic compounds were evaluated by calculating a HQ. The potential HQ was calculated as the ratio of the intake (via ingestion) or dermal absorbed dose (DAD) (via dermal contact) to the RfD_o or dermal reference dose (RfD_d), respectively, as follows (USEPA 1989):

$$HQ = Intake / RfD_o \quad (26)$$

$$HQ = DAD / RfD_d \quad (27)$$

where:

HQ = Noncancer hazard quotient (unitless)
Intake = Chronic daily ingestion averaged over a lifetime (mg/kg-day)
RfD_o = Oral reference dose (mg/kg-day)
DAD = Dermally absorbed dose (mg/kg-day)
RfD_d = Dermal reference dose (mg/kg-day)

For noncancer effects by inhalation exposure, the following equation was used (USEPA 2009a):

$$HQ_{inh} = EC\ (air) \Big/ (RfC\ x\ 1{,}000\ \tfrac{\mu g}{mg}) \quad (28)$$

where:

HQ_{inh} = Noncancer hazard quotient from inhalation (unitless)
EC (air) = Exposure concentration in air ($\mu g/m^3$)
RfC = Noncancer reference concentration (mg/m^3)

If the estimated daily intake for any single constituent is greater than its RfD or RfC, the HQ will exceed 1. An HQ that exceeds 1 indicates a potential for adverse health effects associated with exposure to that constituent.

The supporting calculations are provided in Attachment B of this report.

2.5.2 Cancer Risk Estimation

Individual cancer risk was calculated as the product of exposure (intake for ingestion and DAD for dermal contact) to a constituent (in mg/kg-day) and the SF (SF_o for ingestion and SF_d for dermal contact) for that constituent (in $(mg/kg\text{-}day)^{-1}$, as follows (USEPA 1989):

$$Risk = Intake \times SF_o \quad (29)$$

$$Risk = DAD \times SF_d \quad (30)$$

where:

Risk = Excess lifetime cancer risk (unitless probability)
Intake = Chronic daily ingestion averaged over a lifetime (mg/kg-day)
SF_o = Oral cancer slope factor $(mg/kg\text{-}day)^{-1}$
DAD = Dermally absorbed dose (mg/kg-day)
SF_d = Dermal cancer slope factor $(mg/kg\text{-}day)^{-1}$

Inhalation risk is calculated by multiplying the exposure concentration by the IUR. Inhalation risk was estimated by using the following formula (USEPA 2009a):

$$Risk_{inh} = EC(air) \times IUR \quad (31)$$

where:

$Risk_{inh}$ = Excess lifetime cancer risk from inhalation (unitless probability)
EC (air) = Exposure concentration in air ($\mu g/m^3$)
IUR = Inhalation unit risk $(\mu g/m^3)^{-1}$

Each SF is accompanied by a weight-of-evidence classification that considers the available data for a constituent in order to evaluate the likelihood that the constituent is a potential human carcinogen. The evidence is characterized separately for studies in humans and studies in laboratory animals as sufficient, limited, inadequate, no data, or evidence of noncarcinogenicity. The USEPA recommends that cancer risk estimates should always be accompanied by a weight-of-evidence classification to indicate the strength of evidence that a constituent is a human carcinogen (USEPA 1989). For the purposes of this evaluation, the potential for unacceptable human health risk is identified when the multi-constituent aggregate risk for the direct-contact pathways exceeds an excess lifetime cancer risk (ELCR) of 1×10^{-5}. Supporting calculations are provided in Attachment B of this report.

2.5.3 Cumulative Risk

Each COPC detected at a concentration greater than the selected COPC screening values was included in the cumulative risk calculations. Cancer risk from exposure to multiple carcinogens and multiple pathways was assumed to be additive, based on the Guidelines for Carcinogen Risk Assessment (USEPA 2005). The following equation was used to calculate the total risk from exposure to multiple substances (USEPA 1989):

$$Risk_T = \sum Risk_i \quad (32)$$

where:

$Risk_T$ = Total Risk for multiple constituents per exposure pathway (unitless)
$Risk_i$ = Risk for the i^{th} constituent (unitless)

The following equation was used to calculate the cumulative risk (USEPA 1989):

$$\text{Cumulative Cancer Risk} = Risk_T \text{ (inhalation)} + Risk_T \text{ (dermal)} + Risk_T \text{ (ingestion)} \quad (33)$$

A hazard index (HI) is calculated to assess the potential for noncancer effects posed by more than one constituent. The HI approach assumes that simultaneous sub-threshold exposures to several constituents across all media and pathways of exposure 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 sub-threshold exposures to the acceptable exposure (the RfD or RfC). The HI is equal to the sum of the HQs, and was calculated as follows (USEPA 1989):

$$HI = \sum HQ_i \quad (34)$$

where:

HQ_i = Hazard quotient for the i^{th} constituent (unitless)

For the purposes of this evaluation, the potential for unacceptable human health risk is identified when the multi-constituent aggregate risk for the direct-contact pathways exceeds a noncancer HI of 1.

In cases where the total cumulative HI exceeds 1, target organs would be considered, since non-carcinogens that affect different target organs are not expected to have cumulative effects.

2.5.4 Risk Characterization Results

The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated media at the OD Grounds. As discussed in Section 2.3.1.l, all potentially complete exposure pathways for the site were evaluated or assumed to be evaluated based on more protective exposure scenarios (e.g., the ingestion of groundwater as a source of drinking water is protective of incidental ingestion). The exposure pathways were outlined in Section 2.3.1.l and were also shown on the CSMs (Figure 2.1 and Figure 2.2). Site-specific carcinogenic risks and noncarcinogenic hazards were estimated for receptors, exposure pathways, and COPCs per the methods described previously in this report. Results of the risk characterization are presented in this section.

2.5.4.1 OD Hill Area

COPCs were identified at the OD Hill in surface soil, combined surface and subsurface soil, and groundwater. The following subsections present results of the risk characterization for the OD Hill Area.

2.5.4.1.1 Surface Soil Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in surface soil, historical surface soil samples were evaluated. As described in Section 2.2.2 and shown on Table 2.1, a total of 18 constituents were identified as COPCs in surface soil at the OD Hill Area. EPCs for these COPCs used in the risk assessment are presented in Table 2.9.

The pathway specific and cumulative risks for surface soil are summarized by receptor in Tables 2.17 through 2.20.

2.5.4.1.1.1 Carcinogenic Risk

Hypothetical Future Resident

Cumulative carcinogenic risk for a hypothetical future resident, in the absence of excavation, is estimated to be 3×10^{-5} (Table 2.17), which is within USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 7×10^{-5}, which is within USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the hypothetical future resident.

Hypothetical Future Excavation/Construction Worker

Cumulative carcinogenic risk for a hypothetical future excavation/construction worker is estimated to be 8×10^{-8} (Table 2.18), which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 2×10^{-7}, which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, the estimated risk associated with exposure to combined surface and subsurface soil for the hypothetical future resident fall within USEPAs acceptable risk range, indicating that further consideration is required. The potential for risk to hypothetical future excavation/construction worker is further considered in the evaluation of LUCs in the Feasibility Study.

Future Park Worker

The cumulative carcinogenic risk for a future park worker is estimated to be 6×10^{-6} (Table 2.19), which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes the evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 1×10^{-5}, which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the future park worker.

Current and Future Recreational User

Cumulative carcinogenic risk for a current and future recreational user is estimated to be 2×10^{-6} (Table 2.20), which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 4×10^{-6}, which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the recreational user.

2.5.4.1.1.2 Noncarcinogenic Hazard

Hypothetical Future Child Resident

The HI for the hypothetical child future resident, in the absence of excavation, is estimated to be 6 (Table 2.17), which is greater than the hazard goal of 1. Cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation. COPCs driving the HI are Aroclor-1254 and cadmium. The critical effects associated with exposure to Aroclor-1254 are varied and include ocular exudate, inflamed and prominent Meibomian glands, distorted growth of finger and toe nails, and decreased antibody (IgG and IgM) response to sheep erythrocytes. The critical effect associated with exposure to cadmium is significant proteinuria. Based on evaluation of the critical effects of the hazard drivers, the effects are not likely additive. However, the HIs of Aroclor-1254 and cadmium separately exceed the hazard goal of 1.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical child future resident, the cumulative hazard associated with exposure all COPCs, including chromium(VI) in surface soil, is 6, which is greater than the hazard goal of 1.

Hypothetical Future Adult Resident

The HI for the hypothetical adult future resident, in the absence of excavation, is estimated to be 0.6 (Table 2.17), which is less than the hazard goal of 1.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical adult future resident, the cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.6, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the hypothetical future adult resident.

Hypothetical Future Excavation/Construction Worker

The HI for the hypothetical future excavation/construction worker is estimated to be 0.1 (Table 2.18), which is less than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical future construction/excavation worker, the cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is

0.1, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the hypothetical future excavation/construction worker.

Future Park Worker

The HI for a future park worker is estimated to be 0.4 (Table 2.19), which is less than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical future park worker, the cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.4, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the future park worker.

Current and Future Child Recreational User

The HI for the current and future child recreational user is estimated to be 0.04 (Table 2.20), which is less than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the current and future child recreational user, the cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.04, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the child recreational user.

Hypothetical Future Adult Recreational User

The HI for the current and future adult resident is estimated to be 0.04 (Table 2.20), which is less than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the current and future adult recreational user, the cumulative hazard associated with exposure to all COPCs including chromium(VI) in surface soil is 0.04, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the adult recreational user.

2.5.4.2 Combined Surface and Subsurface Soil Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in combined surface and subsurface soil in the OD Hill Area, historical surface and subsurface soil samples were evaluated. As described in Section 2.2.2, 20 constituents were identified as COPCs in the combined surface and subsurface soil.

The pathway-specific and cumulative risks for surface soil are summarized by receptor in Tables 2.21 and 2.22.

2.5.4.2.1 Carcinogenic Risk

Hypothetical Future Resident

The cumulative carcinogenic risk for a hypothetical future resident, following excavation and redistribution of soil, is estimated to be 6×10^{-5} (Table 2.21), which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the cumulative carcinogenic risk associated with exposure to chromium(VI) was calculated. Risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 9×10^{-5}, which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, the estimated risk associated with exposure to combined surface and subsurface soil for the hypothetical future resident fall within USEPAs acceptable risk range, indicating that further consideration is required. The potential for risk to hypothetical future residents is further considered in the evaluation of LUCs in the Feasibility Study.

Hypothetical Future Excavation/Construction Worker

The cumulative carcinogenic risk for a hypothetical future excavation/construction worker is estimated to be 6×10^{-8} (Table 2.22), which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 10×10^{-8}, which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to combined surface and subsurface soil for the hypothetical future excavation/construction worker.

2.5.4.2.2 Noncarcinogenic Hazard

Hypothetical Future Child Resident

The HI for the hypothetical future child resident, following excavation and redistribution of soil, is estimated to be 5 (Table 2.21), which is greater than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation. The COPCs driving the HI are Aroclor-1254 and cadmium. The critical effects associated with exposure to Aroclor-1254 are varied and include ocular exudate, inflamed and prominent Meibomian glands, distorted growth of finger and toe nails, and decreased antibody (IgG and IgM) response to sheep erythrocytes. The critical effect associated with exposure to cadmium is significant proteinuria. Based on evaluation of the critical effects of the hazard drivers, the effects are not likely additive. However, the HIs of Aroclor-1254 and cadmium separately exceed the hazard goal of 1.

Hypothetical Future Adult Resident

The HI for the hypothetical adult future resident, following excavation and redistribution of soil, is estimated to be 0.5 (Table 2.21), which is less than the hazard goal of 1. The cumulative hazard includes the evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical adult future resident, the cumulative hazard associated with exposure all COPCs including chromium(VI) in surface soil is 0.7, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to combined surface and subsurface soil for the hypothetical future adult resident.

Hypothetical Future Excavation/Construction Worker

The HI for the hypothetical future excavation/construction worker is estimated to be 0.05 (Table 2.22), which is less than the hazard goal of 1. The cumulative hazard includes the evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. For the hypothetical future excavation/construction worker, the cumulative hazard associated with exposure all COPCs including chromium(VI) in surface soil is 0.06, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to combined surface and subsurface soil for the hypothetical future excavation/construction worker.

2.5.4.3 Groundwater Risk Characterization

To determine the risk/hazard associated with exposure to contaminants via exposure to groundwater, historical groundwater samples collected from monitoring wells at the site were evaluated. As described in Section 2.2.2, COPCs were identified through comparison of maximum detected concentrations observed in any well to screening values. Based on this comparison, 16 COPCs were identified (15 metals and one semivolatile organic compound [SVOC]). The calculated risks and hazards for the maximum detected concentration from any well onsite are provided in Tables 2.23 through 2.26. The calculated risks and hazards for each well were also evaluated to provide a spatial representation of the risks/hazards within the exposure area. Results of this spatial risk characterization analysis are provided in Tables 2.27 through 2.58 and presented on Figures 2.3 through 2.5. A summary of the carcinogenic risk and noncarcinogenic hazards for each receptor and each well is presented in Table 2.59.

2.5.4.3.1 Carcinogenic Risk

Hypothetical Future Resident

Cumulative carcinogenic risks for all COPCs, including chromium(III) to hypothetical future residents, including children and adults, range from 2×10^{-6} to 2×10^{-4} (Table 2.59). The risk estimate for hypothetical future residents is greater than the upper end of the cumulative carcinogenic risk goal of 1×10^{-4} in one well, MW45-4. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The primary contributor to this risk estimate was arsenic. However, the maximum detected arsenic concentration at the site (9.5 µg/L) is less than the promulgated maximum contaminant level (MCL) of 10 µg/L, a concentration allowed in potable water supplies.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative carcinogenic risks for all COPCs, including chromium(VI) to hypothetical future residents, including children and adults, range from 2×10^{-6} to 1 x

10^{-3} (Table 2.59). The risk estimate for hypothetical future residents, if chromium(VI) is present, is greater than the upper end of the acceptable carcinogenic risk range of 1×10^{-4} in three wells; MW4, MW45-3, and MW45-4. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Primary contributors to this risk estimate were arsenic and chromium(VI). However, the maximum detected arsenic concentration at the site (9.5 µg/L) is less than the promulgated MCL of 10 µg/L, a concentration allowed in potable water supplies, and chromium(VI) is not expected to be present at the site based on past munitions-related activities.

Hypothetical Future Construction/Excavation Worker

Cumulative carcinogenic risks for all COPCs, including chromium(III) to hypothetical future construction/excavation workers range from 2×10^{-10} to 2×10^{-8} (Table 2.59). The risk estimate for hypothetical future construction/excavation workers is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4} in all wells. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate, there are no unacceptable risks anticipated for construction/excavation workers who may come into contact with groundwater at the site.

While the presence of chromium(VI) is not expected, the carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative carcinogenic risks for all COPCs, including chromium(VI) to hypothetical future construction/excavation workers range from 2×10^{-10} to 1×10^{-7} (Table 2.59). The risk estimate for hypothetical future construction/excavation workers is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4} in all wells. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable risks anticipated for construction/excavation workers who may come into contact with groundwater at the site.

Future Park Worker

Cumulative carcinogenic risks for all COPCs including chromium(III) to future park workers range from 3×10^{-6} to 1×10^{-4} (Table 2.59). The risk estimate for future park workers is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4} in all wells. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable risks anticipated for future park workers who may come into contact with groundwater at the site.

While the presence of chromium(VI) is not expected, the carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative carcinogenic risks for all COPCs, including chromium(VI) to future park workers range from 1×10^{-6} to 5×10^{-4} (Table 2.59). The risk estimate for future park workers, if chromium(VI) is present, is greater than the upper end of the acceptable carcinogenic risk range of 1×10^{-4} in three wells; MW4, MW45-3, and MW45-4. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile.

Primary contributors to this risk estimate were arsenic and chromium(VI). However, the maximum detected arsenic concentration at the site (9.5 µg/L) is less than the promulgated MCL of 10 µg/L, a concentration allowed in potable water supplies, and chromium(VI) is not expected to be present at the site based on past munitions-related activities.

Current and Future Recreational User

Cumulative carcinogenic risks to hypothetical current and future recreational users range from 1 x 10^{-7} to 1 x 10^{-5} (Table 2.59). The risk estimate for current and future recreational users is less than the upper end of the acceptable carcinogenic risk range of 1 × 10^{-4} in all wells. Current recreational users of the site are not anticipated to come into contact with groundwater. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable risks anticipated for current and future recreational users who may come into contact with groundwater at the site.

While the presence of chromium(VI) is not expected, the carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative carcinogenic risks for all COPCs, including chromium(VI) to current and future recreational users range from 2 x 10^{-7} to 6 x 10^{-5} (Table 2.59). The risk estimate for current and future recreational users, if chromium(VI) is present, is less than the upper end of the acceptable carcinogenic risk range of 1 × 10^{-4} in all wells. The risk estimate includes evaluation of risk associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable risks anticipated for current and future recreational users who may come into contact with groundwater at the site.

2.5.4.3.2 Noncarcinogenic Hazard

Hypothetical Future Resident

The cumulative noncarcinogenic HIs for all COPCs, including chromium(III) for hypothetical future residents range from 4 to 51 for children and 2 to 30 for adults (Table 2.59), with the greatest HI being found in monitoring well MW45-4. These HIs are greater than the target HI of 1 for all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium, cobalt, manganese, aluminum, and arsenic. Since each of these constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium (VI) was calculated. The cumulative noncarcinogenic HIs, if chromium(VI) is present, for hypothetical future residents range from 4 to 54 for children and 2 to 32 for adults (Table 2.59), with the greatest HI being found in monitoring well MW45-4. These HIs are greater than the target HI of 1 for all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium, cobalt, manganese, aluminum, and arsenic. Since each of these

constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

Hypothetical Future Construction/Excavation Worker

Cumulative noncarcinogenic HIs for all COPCs, including chromium(III) for hypothetical future construction/excavation workers range from 0.009 to 0.1 (Table 2.59). The HI is less than the target HI of 1 in all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact, should groundwater be encountered during excavation activities. Inhalation of volatiles emitted from groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable hazards anticipated for hypothetical future construction workers who may come into contact with groundwater at the site.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative noncarcinogenic HIs, if chromium(VI) is present, for hypothetical future construction/excavation workers range from 0.009 to 0.2 (Table 2.59). The HI is less than the target hazard index of 1 in all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact, should groundwater be encountered during excavation activities. Inhalation of volatiles emitted from groundwater was not evaluated, as none of the COPCs are volatile. Based on results of this risk estimate there are no unacceptable hazards anticipated for hypothetical future construction workers who may come into contact with groundwater at the site.

Future Park Worker

Cumulative noncarcinogenic HIs for future park workers range from 1 to 19 (Table 2.59), with the greatest HI being found in monitoring well MW45-4. These HIs are greater than or equal to the target hazard index of 1 for all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium, cobalt, manganese, aluminum, and arsenic. Since each of these constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative noncarcinogenic HIs, if chromium(VI) is present, for future park workers range from 1 to 20 (Table 2.59), with the greatest HI being found in monitoring well MW45-4. These HIs are greater than the target hazard index of 1 for all wells. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium, cobalt, manganese, aluminum, and arsenic. Since each of these constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

Current and Future Recreational User

Cumulative noncarcinogenic HIs for all COPCs, including chromium(III) for current and future recreational users range from 0.2 to 3 for children and 0.1 to 2 for adults (Table 2.59), with the greatest

HI being found in monitoring well MW45-4. These HIs are greater than the target HI of 1 in well MW45-4. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium and cobalt. Since each of these constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative noncarcinogenic HIs, if chromium(VI) is present for current and future recreational users range from 0.2 to 5 for children and 0.1 to 2 for adults (Table 2.59), with the greatest HI being found in monitoring well MW45-4. These HIs are greater than the target HI of 1 in well MW45-4. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The main contributors to the HIs greater than 1 were thallium and cobalt. Since each of these constituents has an individual HQ greater than 1, evaluation of critical toxic endpoints and target organs was not conducted.

2.5.4.4 Evaluation of Lead Hazards

Evaluation of the health hazards associated with exposure to lead in environmental media consists of evaluating a different toxic endpoint than that associated with carcinogens and other noncarcinogens. Lead exposure is evaluated based on the potential to increase blood lead levels above a certain threshold. Currently USEPA establishes that threshold as 10 µg/dL. There are two models the USEPA recommends for evaluating the potential toxicity of lead, the adult lead model (ALM) and the IEUBK model.

Since the most sensitive adult receptor is an exposed pregnant adult, the ALM is used to determine the potential for unacceptable fetal blood lead levels following the mother's exposure to lead-contaminated soil. Results of the ALM for surface soil are presented in Table 2.60, while results of the ALM for subsurface soil are presented in Table 2.61. As shown in the tables, exposure to lead in surface or subsurface soil is not expected to elevate fetal blood lead levels above the threshold of 10 µg/dL, based on the 95% UCL on the mean soil lead concentration.

The IEUBK evaluates the potential for child exposure to result in blood lead levels greater than the threshold of 10 µg/dL. To do so, it evaluates lead exposure from all potential sources, including soil, water, diet, and air. To evaluate the potential lead concentrations observed in soil, groundwater, and surface water at the OD Grounds to result in elevated blood lead levels in children that may be present on site, the IEUBK model was run using the 95% UCL on the mean lead concentrations for surface soil, the concentration for combined surface and subsurface soil, the concentration for each monitoring well, and the concentration for surface water at the site. Output of the IEUBK model is presented in Attachment C. As shown in Table 2.62, exposure to lead in soil and groundwater by hypothetical future child residents results in a predicted blood lead level greater than 10 µg/dL, in greater than 5% of the exposed children, in only MW45-4, the well with the highest observed lead concentration.

2.5.4.5 Kickout Area

COPCs were identified at the Kickout Area in surface soil. The following subsections present results of the risk characterization for the Kickout Area.

2.5.4.5.1 Carcinogenic Risk

Hypothetical Future Resident

The cumulative carcinogenic risk for a hypothetical future resident, in the absence of excavation, is estimated to be 7×10^{-7} (Table 2.63), which is less than USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. The cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 2×10^{-5}, which is within the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the hypothetical future resident.

Hypothetical Future Excavation/Construction Worker

Cumulative carcinogenic risk for a hypothetical future excavation/construction worker is estimated to be 2×10^{-8} (Table 2.64), which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface soil is 4×10^{-8}, which is less than the USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the hypothetical future excavation/construction worker.

Future Park Worker

The cumulative carcinogenic risk for a future park worker is estimated to be 3×10^{-6} (Table 2.65), which is within USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Cumulative risk includes evaluation of risk associated with chromium(III). Risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium(VI) was calculated. The cumulative risk associated with exposure to all COPCs including chromium(VI) in surface soil is 7×10^{-6}, which is within USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the future park worker.

Current and Future Recreational User

The cumulative carcinogenic risk for current and future recreational user is estimated to be 1×10^{-6} (Table 2.66), which is within USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}. The cumulative risk includes the evaluation of risk associated with chromium(III). The risk includes evaluation of risk associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, carcinogenic risk associated with exposure to chromium (VI) was calculated. The cumulative risk associated with exposure to all COPCs including chromium(VI) in surface soil is 3×10^{-6}, which is within USEPA's acceptable carcinogenic risk range of

1×10^{-4} to 1×10^{-6}. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risks associated with exposure to surface soil for the future recreational user.

2.5.4.5.2 Noncarcinogenic Hazard

Hypothetical Future Resident

The HI for the hypothetical future resident, in the absence of excavation, is estimated to be 3 for a child resident and 0.3 for an adult resident (Table 2.63), which is greater than the hazard goal of 1 for the child resident, and less than the hazard goal of 1 for the adult resident. Cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation. The COPC driving the HI is cobalt. Critical effects associated with exposure to cobalt are respiratory, including decreased pulmonary function, asthma, interstitial lung disease, wheezing, and dyspnea.

While the presence of chromium(VI) is not expected, noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. Cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 3 for the child resident, and 0.3 for the adult resident, which is greater than the cumulative risk goal of 1 for the child resident, and less than the cumulative risk goal of 1 for the adult resident. The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation. The COPC driving the hazard index is cobalt. Critical effects associated with exposure to cobalt are respiratory, including decreased pulmonary function, asthma, interstitial lung disease, wheezing, and dyspnea.

Hypothetical Future Excavation/Construction Worker

The HI for the hypothetical future excavation/construction worker is estimated to be 0.03 (Table 2.64), which is less than the hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.03 for the hypothetical future excavation/construction worker, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the hypothetical future excavation/construction worker. The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

Future Park Worker

The HI for a future park worker is estimated to be 0.2 (Table 2.65), which is less than hazard goal of 1. The cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.2 for the future park worker, which is less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the future park worker. The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

Current and Future Recreational User

The HI for the current and future recreational user is estimated to be 0.00002 for a child recreational user, and 0.000002 for an adult recreational user (Table 2.66), which is less than the hazard goal of 1. Cumulative hazard includes evaluation of risk associated with chromium(III). The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

While the presence of chromium(VI) is not expected, the noncarcinogenic hazard associated with exposure to chromium(VI) was calculated. The cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface soil is 0.008 for the current and future child recreational user, and 0.0008 for the current and future adult recreational user, both of which are less than the hazard goal of 1. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface soil for the recreational user. The HI includes evaluation of hazards associated with exposure to contaminants in surface soil via ingestion, dermal contact, and inhalation.

2.5.4.6 Surface Water Risk Characterization

To determine the risk/hazard associated with exposure to contaminants in surface water, historical surface water samples collected from drainage ditches within the OD Hill Area and from Reeder Creek were evaluated. As described in Section 2.2.2, COPCs were identified through comparison of maximum detected concentrations observed in any surface water sample to screening values. Based on this comparison, 16 COPCs were identified (one SVOC, one explosive, and 14 metals). Three exposure areas were identified; the on-site drainage ditches, the Reeder Creek samples upstream of the OD Grounds, and the Reeder Creek samples within and downstream of the OD Grounds, and the calculated risks and hazards for each of three areas were evaluated. Results of this risk characterization analysis are provided in Tables 2.67 through 2.78. A summary of the carcinogenic risk and nonarcinogenic hazards for each receptor and each surface water exposure area is presented in Table 2.79.

2.5.4.6.1 Reeder Creek – Upstream Samples

Results of the carcinogenic and noncarcinogenic risk/hazard assessments for the Reeder Creek – Upstream samples are presented in Tables 2.67 through 2.70. There were no carcinogenic COPCs identified in the Reeder Creek – Upstream samples. Therefore, no carcinogenic risk assessment was performed, and there is no anticipated carcinogenic risk associated with exposure to Reeder Creek upstream of the OD Grounds. As summarized in Table 2.79, noncarcinogenic hazards calculated using the upstream samples ranged from 0.003 for the future park worker to 0.09 for the hypothetical future child resident. Chromium(total) was not detected in any samples from the upstream data set; therefore, only one risk estimate is presented. Based on the exposure scenarios evaluated in this HHRA, there are no unacceptable hazards associated with exposure to surface water upstream of the OD Grounds for any receptor.

2.5.4.6.2 On-Site Drainage Ditches

Results of the carcinogenic and noncarcinogenic risk/hazard assessments for the On-site Drainage Ditches are presented in Tables 2.71 through 2.74. As summarized in Table 2.79, the carcinogenic risk for exposure to surface water ranged from 2×10^{-9} to 5×10^{-7}, which is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4}. Cumulative risk includes evaluation of risk associated with chromium(III). As summarized in Table 2.79, noncarcinogenic hazards calculated using samples from the On-site Drainage Ditches ranged from 0.03 for the future park worker to 0.6 for the hypothetical future child resident. Therefore, based on the exposure scenarios evaluated in this HHRA,

there are no unacceptable risk/hazards associated with exposure to surface water upstream of the OD Grounds for any receptor.

While the presence of chromium(VI) is not expected, the carcinogenic risk/hazard associated with exposure to chromium(VI) was calculated. Cumulative risk associated with exposure to all COPCs, including chromium(VI) in surface water ranges from 3×10^{-7} for the hypothetical excavation/construction worker to 8×10^{-5} for the hypothetical future resident. The cumulative carcinogenic risk for the on-site drainage ditches, exposure of hypothetical future residents to surface water is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4}. The cumulative hazard associated with exposure to all COPCs, including chromium(VI) in surface water using the on-site drainage ditches ranged from 0.03 for the future park worker to 0.9 for the hypothetical future child resident. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risk/hazards associated with exposure to surface in the on-site drainage ditches for any receptor.

2.5.4.63.3 Reeder Creek – On-Site and Downstream Samples

Results of the carcinogenic and noncarcinogenic risk/hazard assessments for the Reeder Creek – Downstream samples are presented in Tables 2.75 through 2.78. As summarized in Table 2.79, the carcinogenic risk for exposure to surface water ranged from7×10^{-9} to 6×10^{-8}, which is less than the upper end of the acceptable carcinogenic risk range of 1×10^{-4}. Chromium(total) was not detected in any samples from the upstream data set; therefore, only one risk estimate is presented. As summarized in Table 2.79, noncarcinogenic hazards calculated using the Reeder Creek - Downstream samples ranged from 0.003 for the hypothetical construction/excavation worker to 0.7 for the hypothetical future child resident. Therefore, based on the exposure scenarios evaluated in this HHRA, there are no unacceptable risk/hazards associated with exposure to surface water in Reeder Creek on-site or downstream of the OD Grounds for any receptor.

2.5.5 Risk Assessment Uncertainties

All HHRAs involve use of assumptions, professional judgments, and imperfect data to varying degrees, which result in uncertainty in the final estimates of risk. Risk assessments in general are often based on conservative assumptions and scenarios. Uncertainty can be introduced into a health risk assessment at every step of the process outlined in this document. Uncertainties are present in a risk assessment because it requires integration of the following:

- Release of constituents into the environment, and the areal and vertical distribution of these materials in soil and groundwater;
- Fate and transport of constituents in a variety of different and variable environments by processes that are often poorly understood or too complex to quantify accurately;
- Potential for adverse health effects in humans based on extrapolations from animal studies; and
- Probability of adverse effects in a human population that is highly variable with respect to genetics, age, activity level, and lifestyle.

This section qualitatively describes the inherent and site-specific uncertainties of the assessments process.

2.5.5.1 Uncertainty in Data Collection and Evaluation

Analysis of uncertainties focuses on determining whether the available data are representative of contaminant concentrations and site conditions, and whether features of sampling, analyses, or statistical treatment of the data result in an over- or underestimation of potential risk.

Historical samples were collected from areas expected to be contaminated based on the understanding of past site activities; it is unlikely chemicals were present at health-significant levels and not detected in at least one sample.

Constituents detected at the site were retained for the risk assessment regardless of how frequently they were detected. USEPA's ProUCL 5.0.00 calculates UCLs for datasets with small sample sizes to accommodate the Incremental Sampling Method (USEPA 2013b). Because the soil samples collected were collected as discrete samples, not all UCLs calculated or suggested by ProUCL are appropriate for use in the risk calculations. Parametric and non-parametric methods (i.e., Student's-t and KM [Chebyshev]) were used to determine the 95% UCL for analytes with six or more samples. For analytes with six samples or less, the maximum detected concentration was used as the exposure point concentration. The use of the maximum detected concentration introduces uncertainty into the risk assessment, since use of one analytical result likely does not accurately represent the concentration of the constituent in the volume of soil or water being evaluated. In cases where the analyte is infrequently detected, the use of the maximum concentration will likely overestimate the actual EPC, resulting in an overestimate of the risk. In cases with few total samples, the use of the maximum detected concentration can either over- or underestimate the exposure concentration depending on distribution of the actual concentrations in the medium of concern.

Constituents that were never detected in any samples were eliminated from the risk assessment. It is possible that some constituents eliminated from consideration in the risk assessment may have actually been present in samples at concentrations lower than the reporting limit. If constituents eliminated from the risk assessment were actually present in the environmental medium, the cumulative risk could be underestimated. Constituents detected at concentrations less than the selected screening criteria were eliminated from the risk assessment. It is possible that some of these constituents may have been present at greater concentrations in areas that were not sampled, thus underestimating the potential exposure concentrations. However, the sampling plan attempted to reduce this uncertainty through the use of a consistent analytical approach as well as a biased sampling approach. Since samples were collected from areas identified in the CSM as areas most likely to be contaminated based on the understanding of past site activities, it is unlikely any constituents were present at health-significant levels and not detected.

Steady-state conditions (i.e., the observed concentrations remain the same in the environmental media for the foreseeable future) were assumed for evaluation of potential future exposures. The assumption of steady-state conditions may tend to overestimate long-term exposure and health risk because contaminant concentrations may decline over time due to natural dissipation processes (e.g., biological and chemical degradation) or dilution through transport processes. In some cases, depending on the contaminant and or the release mechanisms involved, steady-state assumptions could potentially underestimate risk (e.g., breakdown products that are more toxic than the parent compound or a continuous source contributing to contamination in another medium). Due to the age of the data used in this risk assessment, these uncertainties may be accentuated.

2.5.5.2 Uncertainty in Exposure Assessment

Risk assessment estimates are conditional on actual and potential exposure pathways identified at the site. If exposure does not occur, no risks are present. Furthermore, the risk assessment process does not factor in the probability of exposure occurring. For example, there may not be a reason for a construction worker to excavate in a contaminated area, as future development is hypothetical. Additionally, an uncertainty associated with the estimates of future residential risk is that future residential development of the site is also unlikely.

Current land uses and characterization of the site's current physical setting provided the basis for predicting future land use at and in the vicinity of the site. The assumption of steady-state conditions was also used in predicting future contaminant concentrations. As will be discussed in the uncertainty section, this assumption tends to overestimate potential future exposure levels because concentrations of chemicals may decline with time.

There is also some concern as to how well an exposure scenario approximates the actual conditions that a receptor may be exposed to at a given site. Potential human exposures could deviate from those used in the risk assessment through differences in exposure frequency, contact rates, exposure durations, body weight, and life span. Each factor has a degree of uncertainty associated with it that could over- or underestimate risk.

Evaluation of risk for residential settings includes calculation of the risk to children. Other sensitive subpopulations such as elderly people, pregnant or nursing women, and people with chronic illnesses were not specifically evaluated in this risk assessment. These subpopulations may be more sensitive to certain chemical exposures. However, USEPA generally considers sensitive subpopulations when developing toxicity factors. Whenever possible, exposure assumptions were made to protect sensitive subpopulations. Additionally, there are no daycare or school facilities, healthcare facilities, nursing homes, retirement communities, or residential areas with children onsite currently onsite.

Risks and hazards associated with inhalation of COPCs in surface water were not calculated. There is not a scenario where a significant exposure would result from inhalation of contaminants in surface water. Elimination of this pathway from further evaluation may underestimate the cumulative risk to receptors exposed to surface water.

2.5.5.3 Uncertainty in Toxicity Assessment

Some uncertainty is also inherent in the toxicity values used in the risk assessment. Carcinogenic slope factors and route-specific values were derived only for compounds shown to cause an increased incidence of tumors in either human or animal studies. This dose-response curve is then assumed to be linear at low doses (e.g., those found in situations of environmental contamination) and is used to predict tumor incidence at low exposure levels. When an animal study is used, the final SF is adjusted to account for extrapolation of animal data to humans. If the studies used to derive the SF were conducted for less than the life span of the test organism, the final SF was also adjusted to reflect risk associated with lifetime exposure.

The SF is generally a 95% UCL of the probability of a response based on experimental animal data in the multistage model. This means the site-specific constituent risk is not likely to exceed the risk estimate derived through the model and is likely to be less than the predicted risk.

The chronic RfD for a compound is based on studies where either human or animal populations were exposed to a given compound by a given route of exposure for a major portion of the life span (as a USEPA guideline, seven years to a lifetime; USEPA 1989). RfDs are derived by determining dose-specific effect levels from available quantitative studies and applying uncertainty factors to the most appropriate effect level to determine an RfD for humans. Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the data. Typically, an uncertainty factor of 100 to 1,000 is used in the professional judgment of uncertainties. General uncertainties in the derivation of RfDs may be associated with factors such as (1) variations in the general population (to protect sensitive receptors), (2) extrapolation of animal data to humans, (3) use of a subchronic study versus a chronic study to determine the no -observed adverse effect level (NOAEL), or (4) use of a lowest-observed-adverse-effect level (LOAEL) versus a NOAEL. Both the uncertainty and modifying factors are conservative in nature and tend to overestimate risk.

Although the most current toxicity values assigned by USEPA are used in the risk assessment, these values may not be available for all compounds. The toxicity classification of a chemical may be under review or not available. If data are lacking, the chemical may not be accounted for in the estimates of potential risk.

Site-specific valence-specific data for chromium was unavailable and toxicity criteria are not available for chromium(total). Therefore, the risk due to exposure to both chromium(III) and chromium(VI) was estimated using the chromium(III) and chromium(VI) toxicity data and chromium(total) results. Risks were estimated for all the COPCs and either chromium(III) or chromium(VI), as presented in Attachment B. Chromium(VI) is not expected at the site, since chromium in soil tends to form insoluble complexes consisting of trivalent chromium molecules. Over time, in most soils, hexavalent chromium is reduced to trivalent chromium. The soil pH in this part of Seneca Army Depot ranges from approximately 6.4 in the alluvial soils to 6.7 in the Angola and Romulus formations. This slight acidity will tend to favor the formation of trivalent chromium complexes that remain insoluble, thus limiting exposure and risk. Chromium(III) is associated only with noncarcinogenic effects, while chromium(VI) is associated with both carcinogenic and noncarcinogenic effects. Assuming one valence state over the other may under- or over- estimate risk.

2.5.5.4 Uncertainty in Estimating Chemical Risk

The expression of potential risk associated with contaminants detected at the site is a result of the combined steps of data evaluation, exposure assessment, and toxicity assessment. This combination can magnify the uncertainties present in these steps of the risk assessment process.

Groundwater onsite is not currently used as a drinking water resource. There are no current residents onsite. Estimates for carcinogenic risk to hypothetical future residents exceed USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6} in one groundwater well (MW45-4). The main contribution to the carcinogenic risk for these receptors is due to the estimated risk of ingestion of groundwater. Estimates for noncarcinogenic hazard to hypothetical future residents (child and adult), future park workers, and current and future recreational users (child and adult) exceed the HI of 1. The main contributor to noncarcinogenic hazard for these receptors is due to the estimated hazard associated with ingestion of groundwater; therefore, there may be an unacceptable risk/hazard to human health if groundwater were to be used in the future as a drinking water resource.

Additional uncertainties are incorporated into the risk assessment when exposures to several substances are summed. Exposure to multiple chemicals may result in interactions between the chemicals in ways that may not be predictable. The assumption is that exposure to multiple chemicals is additive, that is, the carcinogenic risk or hazard quotient for each constituent is simply added together to estimate the cumulative risk or hazard. However, in reality some constituents may produce a synergistic effect, where the risk associated with exposure to these chemicals is actually greater than the sum of the carcinogenic risk or hazard quotients. In such a case, the risk assessment will underestimate the risk. In other cases, some constituents may interact antagonistically, such that the risk associated with exposure to these chemicals is less than the sum of the carcinogenic risk or hazard quotients. In these cases, the risk assessment will overestimate the risk associated with exposure to these chemicals.

2.6 Conclusions

This HHRA was conducted to evaluate the potential for human health effects as a result of potential exposures to chemicals in soil, groundwater, and surface water at the OD Grounds at the Seneca Army Depot Activity.

Cumulative carcinogenic risks and noncarcinogenic hazards estimated for the four receptor groups at the site are shown in Table 2.80. The cumulative risk/hazard estimates described below include

chromium(III). The cumulative risk/hazard estimates that include chromium(VI) show similar patterns (Table 2.80). Chromium(VI) is not expected to be present at the site based on past munitions-related activities and is not summarized below. COPCs that drive the risk value are shown in Table 2.80.

- Hypothetical future resident exposed to surface soil, combined surface and subsurface soil, groundwater as potable water, and surface water:
    - Cumulative carcinogenic risks range from 2×10^{-4} (groundwater in MW45-4) to 7×10^{-7} (surface soil in Kickout Area). The highest cumulative carcinogenic risk, which is outside USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}, is due to exposure to groundwater as potable water in the center of the OD Hill Area.
    - Cumulative noncarcinogenic hazards for a child range from 0.6 (surface water) to 51 (groundwater in MW45-4). The highest cumulative HI greater than 1 is due to exposure to groundwater as potable water in the center of the OD Hill Area.
    - Cumulative noncarcinogenic hazards for an adult range from 0.2 (surface water) to 30 (groundwater in MW45-4). The highest cumulative HI greater than 1 is due to exposure to groundwater as potable water in the center of the OD Hill Area.
    - Exposure to lead in soil and groundwater by hypothetical future child residents results in a predicted blood lead level greater than 10 µg/dL, in greater than 5% of the exposed children in MW45-4.
- Hypothetical construction workers exposed to surface soil, combined surface and subsurface soil, groundwater as potable water, and surface water:
    - Cumulative carcinogenic risks range from 2×10^{-8} (surface soil in Kickout Area) to 2×10^{-9} (surface water onsite). All carcinogenic risks are less than USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}.
    - Cumulative noncarcinogenic hazards for an adult range from 0.03 (surface soil in Kickout Area) to 0.1 (surface soil in OD Hill Area). All noncarcinogenic hazard HIs are less than 1.
- Future park workers exposed to surface soil, groundwater as potable water, and surface water:
    - Cumulative carcinogenic risks range from 1×10^{-4} (groundwater in MW45-4) to 1×10^{-7} (surface water onsite). All carcinogenic risks are within or less than USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}.
    - The cumulative noncarcinogenic hazards for an adult range from 0.03 (surface water onsite) to 19 (groundwater in MW454). The highest cumulative HI greater than 1 is due to exposure to groundwater as potable water in the center of the OD Hill Area.
- Current and future recreational users exposed to surface soil, groundwater as potable water, and surface water:
    - Cumulative carcinogenic risks range from 1×10^{-5} (groundwater in MW45-4) to 6×10^{-8} (surface water onsite). All carcinogenic risks are within or less than USEPA's acceptable carcinogenic risk range of 1×10^{-4} to 1×10^{-6}.
    - Cumulative noncarcinogenic hazards for a child range from 0.09 (surface water onsite) to 3 (groundwater in MW45-4). The highest cumulative HI greater than 1 is due to exposure to groundwater as potable water in the center of the OD Hill Area.

- Cumulative noncarcinogenic hazards for an adult range from 0.03 (surface water) to 2 (groundwater in MW45-4). The highest cumulative HI greater than 1 is due to exposure to groundwater as potable water in the center of the OD Hill Area.

Unacceptable risk to a future resident due to exposure to groundwater was identified (1.8×10^{-4}), along with unacceptable hazards to a future adult/child resident (HI=30/51), future park worker (HI=19), and adult/child recreational user (HI=2.0/3.4). In addition, unacceptable hazards due to exposure to soil at both the OD Hill Area and Kickout Area were also identified for a future child resident and risks to a future resident also exceeded 1E-06. Exposure to these risks will be mitigated through the use of the land use controls which will prevent residential development and prohibit the use of groundwater.

Uncertainties may result in overestimated current risks/hazards. Most notably, onsite groundwater is not currently used as a potable drinking water source so the risk/hazard estimates herein may be overestimated. The estimated risks/hazards associated with potable groundwater would apply only if a well were installed for potable water. Further, there are no buildings currently onsite and there are no plans for development of the site in the future. Therefore, near- and long-term residential scenarios are hypothetical and conservative since there are no residential properties onsite currently and it is unlikely the site will be developed as residential property. Therefore, based on the exposure scenarios evaluated in this risk assessment, there are no unacceptable risks/hazards expected for any receptor as a result of exposure to soil, groundwater, or surface water based on current, or reasonably anticipated future land use.

SECTION 3
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TABLES

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Table 1.1
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Open Detonation (OD) Hill
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds							
1,1,1-Trichloroethane	71-55-6	--	0	9	0%	810	0
1,1,2,2-Tetrachloroethane	79-34-5	--	0	9	0%	0.6	0
1,1,2-Trichloroethane	79-00-5	--	0	9	0%	0.15	0
1,1-Dichloroethane	75-34-3	--	0	9	0%	3.6	0
1,1-Dichloroethene	75-35-4	--	0	9	0%	23	0
1,2-Dichloroethane	107-06-2	--	0	9	0%	0.46	0
1,2-Dichloroethene (total)	540-59-0	--	0	9	0%	N/A	0
1,2-Dichloropropane	78-87-5	--	0	9	0%	1	0
Acetone	67-64-1	--	0	9	0%	6100	0
Benzene	71-43-2	--	0	9	0%	1.2	0
Bromodichloromethane	75-27-4	--	0	9	0%	0.29	0
Bromoform	75-25-2	--	0	9	0%	67	0
Carbon disulfide	75-15-0	--	0	9	0%	77	0
Carbon tetrachloride	56-23-5	--	0	9	0%	0.65	0
Chlorobenzene	108-90-7	--	0	9	0%	28	0
Chlorodibromomethane	124-48-1	--	0	9	0%	0.73	0
Chloroethane	75-00-3	--	0	9	0%	1400	0
Chloroform	67-66-3	--	0	9	0%	0.32	0
Cis-1,3-Dichloropropene	10061-01-5	--	0	9	0%	N/A	0
Ethyl benzene	100-41-4	--	0	9	0%	5.8	0
Methyl bromide	74-83-9	--	0	9	0%	0.68	0
Methyl butyl ketone	591-78-6	--	0	9	0%	20	0
Methyl chloride	74-87-3	--	0	9	0%	11	0
Methyl ethyl ketone	78-93-3	--	0	9	0%	2700	0
Methyl isobutyl ketone	108-10-1	--	0	9	0%	530	0
Methylene chloride	75-09-2	--	0	9	0%	35	0
Styrene	100-42-5	--	0	9	0%	600	0
Tetrachloroethene	127-18-4	--	0	9	0%	8.1	0
Toluene	108-88-3	--	0	9	0%	490	0
Total Xylenes	1330-20-7	--	0	9	0%	58	0
Trans-1,3-Dichloropropene	10061-02-6	--	0	9	0%	N/A	0
Trichloroethene	79-01-6	--	0	9	0%	0.41	0
Vinyl chloride	75-01-4	--	0	9	0%	0.059	0
Semivolatile Organic Compounds							
1,2,4-Trichlorobenzene	120-82-1	--	0	25	0%	5.8	0
1,2-Dichlorobenzene	95-50-1	--	0	25	0%	180	0
1,3-Dichlorobenzene	541-73-1	--	0	25	0%	N/A	0
1,4-Dichlorobenzene	106-46-7	--	0	25	0%	2.6	0
2,2'-oxybis(1-Chloropropane)	108-60-1	--	0	9	0%	4.9	0
2,4,5-Trichlorophenol	95-95-4	--	0	25	0%	620	0
2,4,6-Trichlorophenol	88-06-2	--	0	25	0%	6.2	0
2,4-Dichlorophenol	120-83-2	--	0	25	0%	18	0
2,4-Dimethylphenol	105-67-9	--	0	25	0%	120	0
2,4-Dinitrophenol	51-28-5	--	0	25	0%	12	0
2,4-Dinitrotoluene	121-14-2	2.5	7	25	28%	1.7	1
2,6-Dinitrotoluene	606-20-2	0.041	1	25	4%	0.36	0
2-Chloronaphthalene	91-58-7	--	0	25	0%	630	0
2-Chlorophenol	95-57-8	--	0	25	0%	39	0
2-Methylnaphthalene	91-57-6	--	0	25	0%	23	0
2-Methylphenol	95-48-7	--	0	25	0%	310	0
2-Nitroaniline	88-74-4	--	0	25	0%	61	0
2-Nitrophenol	88-75-5	--	0	25	0%	N/A	0
3 or 4-Methylphenol	N/A	--	0	16	0%	N/A	0
3,3'-Dichlorobenzidine	91-94-1	--	0	25	0%	1.2	0
3-Nitroaniline	99-09-2	--	0	25	0%	N/A	0
4,6-Dinitro-2-methylphenol	534-52-1	--	0	25	0%	0.49	0
4-Bromophenyl phenyl ether	101-55-3	--	0	25	0%	N/A	0
4-Chloro-3-methylphenol	59-50-7	--	0	25	0%	620	0
4-Chloroaniline	106-47-8	--	0	25	0%	2.7	0
4-Chlorophenyl phenyl ether	7005-72-3	--	0	25	0%	N/A	0
4-Methylphenol	106-44-5	--	0	9	0%	620	0
4-Nitroaniline	100-01-6	--	0	25	0%	25	0
4-Nitrophenol	100-02-7	--	0	25	0%	N/A	0
Acenaphthene	83-32-9	--	0	25	0%	350	0
Acenaphthylene	208-96-8	0.03	1	25	4%	N/A	0
Anthracene	120-12-7	0.018	1	25	4%	1700	0
Benzo(a)anthracene	56-55-3	0.05	5	25	20%	0.15	0
Benzo(a)pyrene	50-32-8	0.082	5	25	20%	0.015	5
Benzo(b)fluoranthene	205-99-2	0.055	5	25	20%	0.15	0
Benzo(ghi)perylene	191-24-2	0.048	3	25	12%	N/A	0
Benzo(k)fluoranthene	207-08-9	0.058	4	25	16%	1.5	0

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Bis(2-Chloroethoxy)methane	111-91-1	--	0	25	0%	18	0
Bis(2-Chloroethyl)ether	111-44-4	--	0	25	0%	0.23	0
Bis(2-Chloroisopropyl)ether	108-60-1	--	0	16	0%	4.9	0
Bis(2-Ethylhexyl)phthalate	117-81-7	0.74	4	25	16%	38	0
Butylbenzylphthalate	85-68-7	--	0	25	0%	280	0
Carbazole	86-74-8	--	0	25	0%	N/A	0
Chrysene	218-01-9	0.13	8	25	32%	15	0
Dibenz(a,h)anthracene	53-70-3	--	0	25	0%	0.015	0
Dibenzofuran	132-64-9	--	0	25	0%	7.2	0
Diethyl phthalate	84-66-2	--	0	25	0%	4900	0
Dimethylphthalate	N/A	--	0	25	0%	N/A	0
Di-n-butylphthalate	84-74-2	2.6	7	25	28%	620	0
Di-n-octylphthalate	117-84-0	--	0	25	0%	62	0
Fluoranthene	206-44-0	0.066	7	25	28%	230	0
Fluorene	86-73-7	--	0	25	0%	230	0
Hexachlorobenzene	118-74-1	0.11	7	25	28%	0.33	0
Hexachlorobutadiene	87-68-3	--	0	25	0%	6.2	0
Hexachlorocyclopentadiene	77-47-4	--	0	25	0%	37	0
Hexachloroethane	67-72-1	0.021	1	25	4%	4.3	0
Indeno(1,2,3-cd)pyrene	193-39-5	0.052	2	25	8%	0.15	0
Isophorone	78-59-1	--	0	25	0%	560	0
Naphthalene	91-20-3	0.024	2	25	8%	3.8	0
Nitrobenzene	98-95-3	--	0	25	0%	5.1	0
N-Nitrosodiphenylamine	86-30-6	0.32	2	25	8%	110	0
N-Nitrosodipropylamine	621-64-7	0.11	1	25	4%	0.076	1
Pentachlorophenol	87-86-5	--	0	25	0%	0.99	0
Phenanthrene	85-01-8	0.038	6	25	24%	N/A	0
Phenol	108-95-2	--	0	25	0%	1800	0
Pyrene	129-00-0	0.11	7	25	28%	170	0
Herbicides							
2,4,5-T	93-76-5	--	0	25	0%	62	0
2,4,5-TP/Silvex	93-72-1	--	0	25	0%	49	0
2,4-D	94-75-7	--	0	25	0%	69	0
2,4-DB	94-82-6	--	0	25	0%	49	0
Dalapon	75-99-0	--	0	25	0%	180	0
Dicamba	1918-00-9	--	0	25	0%	180	0
Dichloroprop	N/A	--	0	25	0%	N/A	0
Dinoseb	88-85-7	--	0	25	0%	6.2	0
MCPA	94-74-6	--	0	25	0%	3.1	0
MCPP	93-65-2	--	0	25	0%	6.2	0
Explosives							
1,3,5-Trinitrobenzene	99-35-4	0.12	22	37	59%	220	0
1,3-Dinitrobenzene	99-65-0	--	0	37	0%	0.62	0
2,4,6-Trinitrotoluene	118-96-7	0.19	30	37	81%	3.6	0
2,4-Dinitrotoluene	121-14-2	1.1	31	37	84%	1.7	0
2,6-Dinitrotoluene	606-20-2	--	0	37	0%	0.36	0
2-amino-4,6-Dinitrotoluene	35572-78-2	0.59	30	37	81%	15	0
2-Nitrotoluene	88-72-2	--	0	28	0%	3.2	0
3,5-Dinitroaniline	618-87-1	--	0	28	0%	N/A	0
3-Nitrotoluene	99-08-1	--	0	28	0%	0.62	0
4-amino-2,6-Dinitrotoluene	19406-51-0	0.5	26	37	70%	15	0
4-Nitrotoluene	99-99-0	--	0	28	0%	25	0
HMX	2691-41-0	0.19	26	37	70%	380	0
Nitrobenzene	98-95-3	--	0	28	0%	5.1	0
Nitroglycerine	55-63-0	1.5	1	28	4%	0.62	1
Pentaerythritol Tetranitrate	78-11-5	--	0	28	0%	12	0
RDX	121-82-4	1.8	32	37	86%	6	0
Tetryl	479-45-8	0.33	4	37	11%	12	0
Pesticides/PCBs							
Aroclor-1016	12674-11-2	--	0	25	0%	0.4	0
Aroclor-1221	11104-28-2	--	0	25	0%	0.15	0
Aroclor-1232	11141-16-5	--	0	25	0%	0.15	0
Aroclor-1242	53469-21-9	--	0	25	0%	0.24	0
Aroclor-1248	12672-29-6	--	0	25	0%	0.24	0
Aroclor-1254	11097-69-1	2	4	25	16%	0.11	2
Aroclor-1260	11096-82-5	--	0	25	0%	0.24	0
4,4'-DDD	72-54-8	0.0024	2	25	8%	2.2	0
4,4'-DDE	72-55-9	0.012	20	25	80%	1.6	0
4,4'-DDT	50-29-3	0.0034	15	25	60%	1.9	0
Aldrin	309-00-2	0.0022	1	25	4%	0.031	0
Alpha-BHC	319-84-6	--	0	25	0%	0.085	0
Alpha-Chlordane	5103-71-9	0.0057	5	25	20%	N/A	0

Table 1.1
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Open Detonation (OD) Hill
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Beta-BHC	319-85-7	--	0	25	0%	0.30	0
Delta-BHC	N/A	--	0	25	0%	N/A	0
Dieldrin	60-57-1	0.0074	13	25	52%	0.033	0
Endosulfan I	115-29-7	0.032	17	25	68%	37	0
Endosulfan II	33213-65-9	0.00088	1	25	4%	N/A	0
Endosulfan sulfate	1031-07-8	--	0	25	0%	N/A	0
Endrin	72-20-8	0.0036	1	25	4%	1.8	0
Endrin aldehyde	7421-93-4	0.0032	1	25	4%	N/A	0
Endrin ketone	53494-70-5	0.00058	1	25	4%	N/A	0
Gamma-BHC/Lindane	58-89-9	--	0	25	0%	0.56	0
Gamma-Chlordane	5103-74-2	0.0011	3	25	12%	N/A	0
Heptachlor	76-44-8	--	0	25	0%	0.12	0
Heptachlor epoxide	1024-57-3	--	0	25	0%	0.059	0
Methoxychlor	72-43-5	0.045	1	25	4%	31	0
Toxaphene	8001-35-2	--	0	25	0%	0.48	0
Inorganics							
Aluminum	7429-90-5	35000	55	55	100%	7700	54
Antimony	7440-36-0	3.10	20	55	36%	3.10	0
Arsenic	7440-38-2	16.1	55	55	100%	0.67	55
Barium	7440-39-3	308	55	55	100%	1500	0
Beryllium	7440-41-7	1.40	53	55	96%	16	0
Cadmium	7440-43-9	1100	52	55	95%	7.00	31
Calcium	14452-75-6	193000	54	55	98%	N/A	0
Chromium	18540-29-9	446	55	55	100%	0.30	55
Cobalt	7440-48-4	19.7	55	55	100%	2.30	55
Copper	7440-50-8	4180	55	55	100%	310	38
Cyanide	57-12-5	--	0	9	0%	2.10	0
Iron	7439-89-6	118000	55	55	100%	5500	55
Lead	7439-92-1	998	55	55	100%	400	1
Magnesium	7439-95-4	15000	55	55	100%	N/A	0
Manganese	7439-96-5	1080	55	55	100%	180	55
Mercury	7487-94-7	7.00	55	55	100%	2.30	38
Nickel	7440-02-0	67.7	53	53	100%	150	0
Potassium	7440-09-7	4880	34	34	100%	N/A	0
Selenium	7782-49-2	0.73	2	55	4%	39.00	0
Silver	7440-22-4	205	45	55	82%	39.00	1
Sodium	7440-23-5	377	52	55	95%	N/A	0
Thallium	7440-28-0	0.27	4	55	7%	0.08	4
Vanadium	7440-62-2	53.7	55	55	100%	39.00	2
Zinc	7440-66-6	1350	53	53	100%	2300	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.
-- = Not detected in any sample.
N/A = RSL not available.

Table 1.2
Summary of Detections and Preliminary Screening Values
Combined Surface and Subsurface Soil (0 -≤ 15 ft bgs), Open Detonation (OD) Hill
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds							
1,1,1-Trichloroethane	71-55-6	--	0	15	0%	810	0
1,1,2,2-Tetrachloroethane	79-34-5	--	0	15	0%	0.6	0
1,1,2-Trichloroethane	79-00-5	--	0	15	0%	0.15	0
1,1-Dichloroethane	75-34-3	--	0	15	0%	3.6	0
1,1-Dichloroethene	75-35-4	--	0	15	0%	23	0
1,2-Dichloroethane	107-06-2	--	0	15	0%	0.46	0
1,2-Dichloroethene (total)	540-59-0	--	0	15	0%	N/A	0
1,2-Dichloropropane	78-87-5	--	0	15	0%	1	0
Acetone	67-64-1	--	0	15	0%	6100	0
Benzene	71-43-2	--	0	15	0%	1.2	0
Bromodichloromethane	75-27-4	--	0	15	0%	0.29	0
Bromoform	75-25-2	--	0	15	0%	67	0
Carbon disulfide	75-15-0	--	0	15	0%	77	0
Carbon tetrachloride	56-23-5	--	0	15	0%	0.65	0
Chlorobenzene	108-90-7	--	0	15	0%	28	0
Chlorodibromomethane	124-48-1	--	0	15	0%	0.73	0
Chloroethane	75-00-3	--	0	15	0%	1400	0
Chloroform	67-66-3	--	0	15	0%	0.32	0
Cis-1,3-Dichloropropene	10061-01-5	--	0	15	0%	N/A	0
Ethyl benzene	100-41-4	--	0	15	0%	5.8	0
Methyl bromide	74-83-9	--	0	15	0%	0.68	0
Methyl butyl ketone	591-78-6	--	0	15	0%	20	0
Methyl chloride	74-87-3	--	0	15	0%	11	0
Methyl ethyl ketone	78-93-3	--	0	15	0%	2700	0
Methyl isobutyl ketone	108-10-1	--	0	15	0%	530	0
Methylene chloride	75-09-2	--	0	15	0%	35	0
Styrene	100-42-5	--	0	15	0%	600	0
Tetrachloroethene	127-18-4	0.019	6	15	40%	8.1	0
Toluene	108-88-3	--	0	15	0%	490	0
Total Xylenes	1330-20-7	--	0	15	0%	58	0
Trans-1,3-Dichloropropene	10061-02-6	--	0	15	0%	N/A	0
Trichloroethene	79-01-6	--	0	15	0%	0.41	0
Vinyl chloride	75-01-4	--	0	15	0%	0.059	0
Semivolatile Organic Compounds							
1,2,4-Trichlorobenzene	120-82-1	--	0	31	0%	5.8	0
1,2-Dichlorobenzene	95-50-1	--	0	31	0%	180	0
1,3-Dichlorobenzene	541-73-1	--	0	31	0%	N/A	0
1,4-Dichlorobenzene	106-46-7	--	0	31	0%	2.6	0
2,2'-oxybis(1-Chloropropane)	108-60-1	--	0	15	0%	4.9	0
2,4,5-Trichlorophenol	95-95-4	--	0	31	0%	620	0
2,4,6-Trichlorophenol	88-06-2	--	0	31	0%	6.2	0
2,4-Dichlorophenol	120-83-2	--	0	31	0%	18	0
2,4-Dimethylphenol	105-67-9	--	0	31	0%	120	0
2,4-Dinitrophenol	51-28-5	--	0	31	0%	12	0
2,4-Dinitrotoluene	121-14-2	14	13	31	42%	1.7	2
2,6-Dinitrotoluene	606-20-2	0.7	2	31	6%	0.36	1
2-Chloronaphthalene	91-58-7	--	0	31	0%	630	0
2-Chlorophenol	95-57-8	--	0	31	0%	39	0
2-Methylnaphthalene	91-57-6	--	0	31	0%	23	0
2-Methylphenol	95-48-7	--	0	31	0%	310	0
2-Nitroaniline	88-74-4	--	0	31	0%	61	0
2-Nitrophenol	88-75-5	--	0	31	0%	N/A	0
3 or 4-Methylphenol	N/A	--	0	16	0%	N/A	0
3,3'-Dichlorobenzidine	91-94-1	--	0	31	0%	1.2	0
3-Nitroaniline	99-09-2	--	0	31	0%	N/A	0
4,6-Dinitro-2-methylphenol	534-52-1	--	0	31	0%	0.49	0
4-Bromophenyl phenyl ether	101-55-3	--	0	31	0%	N/A	0
4-Chloro-3-methylphenol	59-50-7	--	0	31	0%	620	0
4-Chloroaniline	106-47-8	--	0	31	0%	2.7	0
4-Chlorophenyl phenyl ether	7005-72-3	--	0	31	0%	N/A	0
4-Methylphenol	106-44-5	--	0	15	0%	620	0
4-Nitroaniline	100-01-6	--	0	31	0%	25	0
4-Nitrophenol	100-02-7	--	0	31	0%	N/A	0
Acenaphthene	83-32-9	--	0	31	0%	350	0
Acenaphthylene	208-96-8	0.03	3	31	10%	N/A	0
Anthracene	120-12-7	0.018	2	31	6%	1700	0
Benzo(a)anthracene	56-55-3	0.05	10	31	32%	0.15	0
Benzo(a)pyrene	50-32-8	0.082	10	31	32%	0.015	10
Benzo(b)fluoranthene	205-99-2	0.055	10	31	32%	0.15	0
Benzo(ghi)perylene	191-24-2	0.066	8	31	26%	N/A	0

Table 1.2
Summary of Detections and Preliminary Screening Values
Combined Surface and Subsurface Soil (0 -≤ 15 ft bgs), Open Detonation (OD) Hill
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Benzo(k)fluoranthene	207-08-9	0.058	9	31	29%	1.5	0
Bis(2-Chloroethoxy)methane	111-91-1	--	0	31	0%	18	0
Bis(2-Chloroethyl)ether	111-44-4	--	0	31	0%	0.23	0
Bis(2-Chloroisopropyl)ether	108-60-1	--	0	16	0%	4.9	0
Bis(2-Ethylhexyl)phthalate	117-81-7	0.74	6	31	19%	38	0
Butylbenzylphthalate	85-68-7	--	0	31	0%	280	0
Carbazole	86-74-8	--	0	31	0%	N/A	0
Chrysene	218-01-9	0.13	13	31	42%	15	0
Dibenz(a,h)anthracene	53-70-3	--	0	31	0%	0.015	0
Dibenzofuran	132-64-9	--	0	31	0%	7.2	0
Diethyl phthalate	84-66-2	0.035	1	31	3%	4900	0
Dimethylphthalate	N/A	--	0	31	0%	N/A	0
Di-n-butylphthalate	84-74-2	6.8	13	31	42%	620	0
Di-n-octylphthalate	117-84-0	--	0	31	0%	62	0
Fluoranthene	206-44-0	0.068	12	31	39%	230	0
Fluorene	86-73-7	--	0	31	0%	230	0
Hexachlorobenzene	118-74-1	0.11	12	31	39%	0.33	0
Hexachlorobutadiene	87-68-3	--	0	31	0%	6.2	0
Hexachlorocyclopentadiene	77-47-4	--	0	31	0%	37	0
Hexachloroethane	67-72-1	1.1	6	31	19%	4.3	0
Indeno(1,2,3-cd)pyrene	193-39-5	0.052	5	31	16%	0.15	0
Isophorone	78-59-1	--	0	31	0%	560	0
Naphthalene	91-20-3	0.03	6	31	19%	3.8	0
Nitrobenzene	98-95-3	--	0	31	0%	5.1	0
N-Nitrosodiphenylamine	86-30-6	0.32	2	31	6%	110	0
N-Nitrosodipropylamine	621-64-7	1.6	5	31	16%	0.076	2
Pentachlorophenol	87-86-5	--	0	31	0%	0.99	0
Phenanthrene	85-01-8	0.046	11	31	35%	N/A	0
Phenol	108-95-2	--	0	31	0%	1800	0
Pyrene	129-00-0	0.11	13	31	42%	170	0
Herbicides							
2,4,5-T	93-76-5	--	0	31	0%	62	0
2,4,5-TP/Silvex	93-72-1	--	0	31	0%	49	0
2,4-D	94-75-7	--	0	31	0%	69	0
2,4-DB	94-82-6	--	0	31	0%	49	0
Dalapon	75-99-0	--	0	31	0%	180	0
Dicamba	1918-00-9	--	0	31	0%	180	0
Dichloroprop	N/A	--	0	31	0%	N/A	0
Dinoseb	88-85-7	--	0	31	0%	6.2	0
MCPA	94-74-6	--	0	31	0%	3.1	0
MCPP	93-65-2	--	0	31	0%	6.2	0
Explosives							
1,3,5-Trinitrobenzene	99-35-4	0.19	27	43	63%	220	0
1,3-Dinitrobenzene	99-65-0	--	0	43	0%	0.62	0
2,4,6-Trinitrotoluene	118-96-7	0.6	36	43	84%	3.6	0
2,4-Dinitrotoluene	121-14-2	1.1	36	43	84%	1.7	0
2,6-Dinitrotoluene	606-20-2	--	0	43	0%	0.36	0
2-amino-4,6-Dinitrotoluene	35572-78-2	0.68	36	43	84%	15	0
2-Nitrotoluene	88-72-2	--	0	28	0%	3.2	0
3,5-Dinitroaniline	618-87-1	--	0	28	0%	N/A	0
3-Nitrotoluene	99-08-1	--	0	28	0%	0.62	0
4-amino-2,6-Dinitrotoluene	19406-51-0	0.5	26	43	60%	15	0
4-Nitrotoluene	99-99-0	--	0	28	0%	25	0
HMX	2691-41-0	0.47	32	43	74%	380	0
Nitrobenzene	98-95-3	--	0	28	0%	5.1	0
Nitroglycerine	55-63-0	1.5	1	28	4%	0.62	1
Pentaerythritol Tetranitrate	78-11-5	--	0	28	0%	12	0
RDX	121-82-4	4.3	38	43	88%	6	0
Tetryl	479-45-8	0.33	5	43	12%	12	0
Pesticides/PCBs							
Aroclor-1016	12674-11-2	--	0	31	0%	0.4	0
Aroclor-1221	11104-28-2	--	0	31	0%	0.15	0
Aroclor-1232	11141-16-5	--	0	31	0%	0.15	0
Aroclor-1242	53469-21-9	--	0	31	0%	0.24	0
Aroclor-1248	12672-29-6	--	0	31	0%	0.24	0
Aroclor-1254	11097-69-1	2	4	31	13%	0.11	2
Aroclor-1260	11096-82-5	--	0	31	0%	0.24	0
4,4'-DDD	72-54-8	0.0024	2	31	6%	2.2	0
4,4'-DDE	72-55-9	0.012	22	31	71%	1.6	0
4,4'-DDT	50-29-3	0.0034	17	31	55%	1.9	0
Aldrin	309-00-2	0.0022	1	31	3%	0.031	0

Table 1.2
Summary of Detections and Preliminary Screening Values
Combined Surface and Subsurface Soil (0 -≤ 15 ft bgs), Open Detonation (OD) Hill
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Alpha-BHC	319-84-6	--	0	31	0%	0.085	0
Alpha-Chlordane	5103-71-9	0.0057	5	31	16%	N/A	0
Beta-BHC	319-85-7	--	0	31	0%	0.30	0
Delta-BHC	N/A	--	0	31	0%	N/A	0
Dieldrin	60-57-1	0.0074	14	31	45%	0.033	0
Endosulfan I	115-29-7	0.032	21	31	68%	37	0
Endosulfan II	33213-65-9	0.00088	1	31	3%	N/A	0
Endosulfan sulfate	1031-07-8	--	0	31	0%	N/A	0
Endrin	72-20-8	0.0036	1	31	3%	1.8	0
Endrin aldehyde	7421-93-4	0.0032	1	31	3%	N/A	0
Endrin ketone	53494-70-5	0.00058	1	31	3%	N/A	0
Gamma-BHC/Lindane	58-89-9	--	0	31	0%	0.56	0
Gamma-Chlordane	5103-74-2	0.0011	3	31	10%	N/A	0
Heptachlor	76-44-8	--	0	31	0%	0.12	0
Heptachlor epoxide	1024-57-3	--	0	31	0%	0.059	0
Methoxychlor	72-43-5	0.045	1	31	3%	31	0
Toxaphene	8001-35-2	--	0	31	0%	0.48	0
Inorganics							
Aluminum	7429-90-5	35000	76	76	100%	7700.00	75
Antimony	7440-36-0	5.10	28	76	37%	3.10	1
Arsenic	7440-38-2	16.1	76	76	100%	0.67	76
Barium	7440-39-3	308	76	76	100%	1500.00	0
Beryllium	7440-41-7	1.40	74	76	97%	16.00	0
Cadmium	7440-43-9	1100	70	74	95%	7.00	40
Calcium	14452-75-6	193000	75	76	99%	N/A	0
Chromium	18540-29-9	446	76	76	100%	0.30	76
Cobalt	7440-48-4	19.7	76	76	100%	2.30	76
Copper	7440-50-8	7310	76	76	100%	310.00	51
Cyanide	57-12-5	0.70	2	15	13%	2.10	0
Iron	7439-89-6	118000	76	76	100%	5500.00	76
Lead	7439-92-1	998	76	76	100%	400.00	1
Magnesium	7439-95-4	15000	76	76	100%	N/A	0
Manganese	7439-96-5	1380	76	76	100%	180.00	76
Mercury	7487-94-7	9.10	76	76	100%	2.30	55
Nickel	7440-02-0	67.7	74	74	100%	150.00	0
Potassium	7440-09-7	4880	55	55	100%	N/A	0
Selenium	7782-49-2	0.73	3	76	4%	39.00	0
Silver	7440-22-4	205	64	76	84%	39.00	2
Sodium	7440-23-5	377	73	76	96%	N/A	0
Thallium	7440-28-0	0.27	6	76	8%	0.08	6
Vanadium	7440-62-2	53.7	76	76	100%	39.00	2
Zinc	7440-66-6	1470	74	74	100%	2300.00	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.
-- = Not detected in any sample.
N/A = RSL not available.

Table 1.3
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Kickout Area
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds							
1,1,1-Trichloroethane	71-55-6	--	0	5	0%	810	0
1,1,2,2-Tetrachloroethane	79-34-5	--	0	5	0%	0.6	0
1,1,2-Trichloroethane	79-00-5	--	0	5	0%	0.15	0
1,1-Dichloroethane	75-34-3	--	0	5	0%	3.6	0
1,1-Dichloroethene	75-35-4	--	0	5	0%	23	0
1,2-Dichloroethane	107-06-2	--	0	5	0%	0.46	0
1,2-Dichloroethene (total)	540-59-0	--	0	5	0%	N/A	0
1,2-Dichloropropane	78-87-5	--	0	5	0%	1	0
Acetone	67-64-1	--	0	5	0%	6100	0
Benzene	71-43-2	--	0	5	0%	1.2	0
Bromodichloromethane	75-27-4	--	0	5	0%	0.29	0
Bromoform	75-25-2	--	0	5	0%	67	0
Carbon disulfide	75-15-0	--	0	5	0%	77	0
Carbon tetrachloride	56-23-5	--	0	5	0%	0.65	0
Chlorobenzene	108-90-7	--	0	5	0%	28	0
Chlorodibromomethane	124-48-1	--	0	5	0%	0.73	0
Chloroethane	75-00-3	--	0	5	0%	1400	0
Chloroform	67-66-3	--	0	5	0%	0.32	0
Cis-1,3-Dichloropropene	10061-01-5	--	0	5	0%	N/A	0
Ethyl benzene	100-41-4	--	0	5	0%	5.8	0
Methyl bromide	74-83-9	--	0	5	0%	0.68	0
Methyl butyl ketone	591-78-6	--	0	5	0%	20	0
Methyl chloride	74-87-3	--	0	5	0%	11	0
Methyl ethyl ketone	78-93-3	--	0	5	0%	2700	0
Methyl isobutyl ketone	108-10-1	--	0	5	0%	530	0
Methylene chloride	75-09-2	--	0	5	0%	35	0
Styrene	100-42-5	--	0	5	0%	600	0
Tetrachloroethene	127-18-4	--	0	5	0%	8.1	0
Toluene	108-88-3	--	0	5	0%	490	0
Total Xylenes	1330-20-7	--	0	5	0%	58	0
Trans-1,3-Dichloropropene	10061-02-6	--	0	5	0%	N/A	0
Trichloroethene	79-01-6	--	0	5	0%	0.41	0
Vinyl chloride	75-01-4	--	0	5	0%	0.059	0
Semivolatile Organic Compounds							
1,2,4-Trichlorobenzene	120-82-1	--	0	8	0%	5.8	0
1,2-Dichlorobenzene	95-50-1	--	0	8	0%	180	0
1,3-Dichlorobenzene	541-73-1	--	0	8	0%	N/A	0
1,4-Dichlorobenzene	106-46-7	--	0	8	0%	2.6	0
2,2'-oxybis(1-Chloropropane)	108-60-1	--	0	5	0%	4.9	0
2,4,5-Trichlorophenol	95-95-4	--	0	8	0%	620	0
2,4,6-Trichlorophenol	88-06-2	--	0	8	0%	6.2	0
2,4-Dichlorophenol	120-83-2	--	0	8	0%	18	0
2,4-Dimethylphenol	105-67-9	--	0	8	0%	120	0
2,4-Dinitrophenol	51-28-5	--	0	8	0%	12	0
2,4-Dinitrotoluene	121-14-2	--	0	8	0%	1.7	0
2,6-Dinitrotoluene	606-20-2	--	0	8	0%	0.36	0
2-Chloronaphthalene	91-58-7	--	0	8	0%	630	0
2-Chlorophenol	95-57-8	--	0	8	0%	39	0
2-Methylnaphthalene	91-57-6	--	0	8	0%	23	0
2-Methylphenol	95-48-7	--	0	8	0%	310	0
2-Nitroaniline	88-74-4	--	0	8	0%	61	0
2-Nitrophenol	88-75-5	--	0	8	0%	N/A	0
3 or 4-Methylphenol	na	--	0	3	0%	N/A	0
3,3'-Dichlorobenzidine	91-94-1	--	0	8	0%	1.2	0
3-Nitroaniline	99-09-2	--	0	8	0%	N/A	0
4,6-Dinitro-2-methylphenol	534-52-1	--	0	8	0%	0.49	0
4-Bromophenyl phenyl ether	101-55-3	--	0	8	0%	N/A	0
4-Chloro-3-methylphenol	59-50-7	--	0	8	0%	620	0
4-Chloroaniline	106-47-8	--	0	8	0%	2.7	0
4-Chlorophenyl phenyl ether	7005-72-3	--	0	8	0%	N/A	0
4-Methylphenol	106-44-5	--	0	5	0%	620	0
4-Nitroaniline	100-01-6	--	0	8	0%	25	0
4-Nitrophenol	100-02-7	--	0	8	0%	N/A	0
Acenaphthene	83-32-9	--	0	8	0%	350	0
Acenaphthylene	208-96-8	--	0	8	0%	N/A	0
Anthracene	120-12-7	--	0	8	0%	1700	0
Benzo(a)anthracene	56-55-3	--	0	8	0%	0.15	0
Benzo(a)pyrene	50-32-8	--	0	8	0%	0.015	0
Benzo(b)fluoranthene	205-99-2	0.02	1	8	13%	0.15	0
Benzo(ghi)perylene	191-24-2	--	0	8	0%	N/A	0
Benzo(k)fluoranthene	207-08-9	--	0	8	0%	1.5	0

Table 1.3
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Kickout Area
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds							
Bis(2-Chloroethoxy)methane	111-91-1	--	0	8	0%	18	0
Bis(2-Chloroethyl)ether	111-44-4	--	0	8	0%	0.23	0
Bis(2-Chloroisopropyl)ether	108-60-1	--	0	3	0%	4.9	0
Bis(2-Ethylhexyl)phthalate	117-81-7	0.70	3	8	38%	38	0
Butylbenzylphthalate	85-68-7	--	0	8	0%	280	0
Carbazole	86-74-8	--	0	8	0%	N/A	0
Chrysene	218-01-9	0.027	2	8	25%	15	0
Dibenz(a,h)anthracene	53-70-3	--	0	8	0%	0.015	0
Dibenzofuran	132-64-9	--	0	8	0%	7.2	0
Diethyl phthalate	84-66-2	--	0	8	0%	4900	0
Dimethylphthalate	na	--	0	8	0%	N/A	0
Di-n-butylphthalate	84-74-2	--	0	8	0%	620	0
Di-n-octylphthalate	117-84-0	--	0	8	0%	62	0
Fluoranthene	206-44-0	0.03	2	8	25%	230	0
Fluorene	86-73-7	--	0	8	0%	230	0
Hexachlorobenzene	118-74-1	0.03	1	8	13%	0.33	0
Hexachlorobutadiene	87-68-3	--	0	8	0%	6.2	0
Hexachlorocyclopentadiene	77-47-4	--	0	8	0%	37	0
Hexachloroethane	67-72-1	--	0	8	0%	4.3	0
Indeno(1,2,3-cd)pyrene	193-39-5	--	0	8	0%	0.15	0
Isophorone	78-59-1	--	0	8	0%	560	0
Naphthalene	91-20-3	--	0	8	0%	3.8	0
Nitrobenzene	98-95-3	--	0	8	0%	5.1	0
N-Nitrosodiphenylamine	86-30-6	--	0	8	0%	110	0
N-Nitrosodipropylamine	621-64-7	--	0	8	0%	0.076	0
Pentachlorophenol	87-86-5	--	0	8	0%	0.99	0
Phenanthrene	85-01-8	0.018	1	8	13%	N/A	0
Phenol	108-95-2	--	0	8	0%	1800	0
Pyrene	129-00-0	0.036	2	8	25%	170	0
Herbicides							
2,4,5-T	93-76-5	--	0	8	0%	62	0
2,4,5-TP/Silvex	93-72-1	--	0	8	0%	49	0
2,4-D	94-75-7	--	0	8	0%	69	0
2,4-DB	94-82-6	--	0	8	0%	49	0
Dalapon	75-99-0	--	0	8	0%	180	0
Dicamba	1918-00-9	--	0	8	0%	180	0
Dichloroprop	na	--	0	8	0%	N/A	0
Dinoseb	88-85-7	--	0	8	0%	6.2	0
MCPA	94-74-6	9.40	2	8	25%	3.1	2
MCPP	93-65-2	--	0	8	0%	6.2	0
Explosives							
1,3,5-Trinitrobenzene	99-35-4	0.1	1	8	13%	220	0
1,3-Dinitrobenzene	99-65-0	--	0	8	0%	0.62	0
2,4,6-Trinitrotoluene	118-96-7	1.40	3	8	38%	3.6	0
2,4-Dinitrotoluene	121-14-2	0.84	1	8	13%	1.7	0
2,6-Dinitrotoluene	606-20-2	--	0	8	0%	0.36	0
2-amino-4,6-Dinitrotoluene	35572-78-2	0.099	1	8	13%	15	0
2-Nitrotoluene	88-72-2	--	0	3	0%	3.2	0
3,5-Dinitroaniline	618-87-1	--	0	3	0%	N/A	0
3-Nitrotoluene	99-08-1	--	0	3	0%	0.62	0
4-amino-2,6-Dinitrotoluene	19406-51-0	0.27	1	8	13%	15	0
4-Nitrotoluene	99-99-0	--	0	3	0%	25	0
HMX	2691-41-0	--	0	8	0%	380	0
Nitrobenzene	98-95-3	--	0	3	0%	5.1	0
Nitroglycerine	55-63-0	--	0	3	0%	0.62	0
Pentaerythritol Tetranitrate	78-11-5	--	0	3	0%	12	0
RDX	121-82-4	5.80	2	8	25%	6	0
Tetryl	479-45-8	--	0	8	0%	12	0
Pesticides/PCBs							
Aroclor-1016	12674-11-2	--	0	7	0%	0.4	0
Aroclor-1221	11104-28-2	--	0	7	0%	0.15	0
Aroclor-1232	11141-16-5	--	0	7	0%	0.15	0
Aroclor-1242	53469-21-9	--	0	7	0%	0.24	0
Aroclor-1248	12672-29-6	--	0	7	0%	0.24	0
Aroclor-1254	11097-69-1	--	0	7	0%	0.11	0
Aroclor-1260	11096-82-5	--	0	7	0%	0.24	0
4,4'-DDD	72-54-8	--	0	7	0%	2.2	0
4,4'-DDE	72-55-9	0.0033	2	8	25%	1.6	0
4,4'-DDT	50-29-3	--	0	7	0%	1.9	0
Aldrin	309-00-2	--	0	7	0%	0.031	0
Alpha-BHC	319-84-6	--	0	7	0%	0.085	0

Table 1.3
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Kickout Area
Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds							
Alpha-Chlordane	5103-71-9	–	0	7	0%	N/A	0
Beta-BHC	319-85-7	–	0	7	0%	0.30	0
Delta-BHC	na	–	0	7	0%	N/A	0
Dieldrin	60-57-1	0.00079	1	7	14%	0.033	0
Endosulfan I	115-29-7	0.055	2	8	25%	37	0
Endosulfan II	33213-65-9	–	0	7	0%	N/A	0
Endosulfan sulfate	1031-07-8	–	0	7	0%	N/A	0
Endrin	72-20-8	–	0	7	0%	1.8	0
Endrin aldehyde	7421-93-4	–	0	7	0%	N/A	0
Endrin ketone	53494-70-5	–	0	7	0%	N/A	0
Gamma-BHC/Lindane	58-89-9	–	0	7	0%	0.56	0
Gamma-Chlordane	5103-74-2	–	0	7	0%	N/A	0
Heptachlor	76-44-8	–	0	7	0%	0.12	0
Heptachlor epoxide	1024-57-3	–	0	7	0%	0.059	0
Methoxychlor	72-43-5	–	0	7	0%	31	0
Toxaphene	8001-35-2	–	0	7	0%	0.48	0
Inorganics							
Aluminum	7429-90-5	25000	25	25	100%	7700.00	25
Antimony	7440-36-0	2.40	4	25	16%	3.10	0
Arsenic	7440-38-2	7.60	25	25	100%	0.67	25
Barium	7440-39-3	365	25	25	100%	1500.00	0
Beryllium	7440-41-7	1.00	25	25	100%	16.00	0
Cadmium	7440-43-9	8.30	11	25	44%	7.00	1
Calcium	14452-75-6	41300	25	25	100%	N/A	0
Chromium	18540-29-9	39.3	25	25	100%	0.30	25
Cobalt	7440-48-4	26.8	25	25	100%	2.30	25
Copper	7440-50-8	293	25	25	100%	310.00	0
Cyanide	57-12-5	–	0	5	0%	2.10	0
Iron	7439-89-6	75700	25	25	100%	5500.00	25
Lead	7439-92-1	198	25	25	100%	400.00	0
Magnesium	7439-95-4	8440	25	25	100%	N/A	0
Manganese	7439-96-5	5040	25	25	100%	180.00	25
Nickel	7440-02-0	56.0	22	22	100%	150.00	0
Potassium	7440-09-7	4140	25	25	100%	N/A	0
Selenium	7782-49-2	0.92	1	25	4%	39.00	0
Silver	7440-22-4	2.30	5	25	20%	39.00	0
Sodium	7440-23-5	138	12	25	48%	N/A	0
Thallium	7440-28-0	–	0	25	0%	0.08	0
Vanadium	7440-62-2	41.9	25	25	100%	39.00	1
Zinc	7440-66-6	383	22	22	100%	2300.00	0
Mercury	7487-94-7	1.90	24	25	96%	2.30	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at:
– = Not detected in any sample.
N/A = RSL not available.
na = CAS number not available.

Table 1.4
Summary of Detections and Preliminary Screening Values
Groundwater, All Wells Combined
Seneca Army Depot Activity

Analyte Name	CAS Number	Total Number of Samples	Number of samples with Detected Concentrations	Frequency of Detection	Minimum Detection Limit (µg/L)	Maximum Detection Limit (µg/L)	Minimum Method Detection Limit (µg/L)	Maximum Method Detection Limit (µg/L)	Regional Screening Level [1] (µg/L)	Number of Detected Samples Greater than RSL
Volatile Organic Compounds										
1,1,1-Trichloroethane	71-55-6	8	0	0%	--	--	10	10	--	--
1,1,2,2-Tetrachloroethane	79-34-5	8	0	0%	--	--	10	10	--	--
1,1,2-Trichloroethane	79-00-5	8	0	0%	--	--	10	10	--	--
1,1-Dichloroethane	75-34-3	8	0	0%	--	--	10	10	--	--
1,1-Dichloroethene	75-35-4	8	0	0%	--	--	10	10	--	--
1,2-Dichloroethane	107-06-2	8	0	0%	--	--	10	10	--	--
1,2-Dichloroethene (total)	540-59-0	8	0	0%	--	--	10	10	--	--
1,2-Dichloropropane	78-87-5	8	0	0%	--	--	10	10	--	--
Acetone	67-64-1	8	0	0%	--	--	10	10	--	--
Benzene	71-43-2	8	0	0%	--	--	10	10	--	--
Bromodichloromethane	75-27-4	8	0	0%	--	--	10	10	--	--
Bromoform	75-25-2	8	0	0%	--	--	10	10	--	--
Carbon disulfide	75-15-0	8	0	0%	--	--	10	10	--	--
Carbon tetrachloride	56-23-5	8	0	0%	--	--	10	10	--	--
Chlorobenzene	108-90-7	8	0	0%	--	--	10	10	--	--
Chlorodibromomethane	124-48-1	8	0	0%	--	--	10	10	--	--
Chloroethane	75-00-3	8	0	0%	--	--	10	10	--	--
Chloroform	67-66-3	8	0	0%	--	--	10	10	--	--
Cis-1,3-Dichloropropene	10061-01-5	8	0	0%	--	--	10	10	--	--
Ethyl benzene	100-41-4	8	0	0%	--	--	10	10	--	--
Methyl bromide	74-83-9	8	0	0%	--	--	10	10	--	--
Methyl butyl ketone	591-78-6	8	0	0%	--	--	10	10	--	--
Methyl chloride	74-87-3	8	0	0%	--	--	10	10	--	--
Methyl ethyl ketone	78-93-3	8	0	0%	--	--	10	10	--	--
Methyl isobutyl ketone	108-10-1	8	0	0%	--	--	10	10	--	--
Methylene chloride	75-09-2	8	0	0%	--	--	10	10	--	--
Styrene	100-42-5	8	0	0%	--	--	10	10	--	--
Tetrachloroethene	127-18-4	8	1	13%	1	1	10	10	4.1	0
Toluene	108-88-3	8	0	0%	--	--	10	10	--	--
Total Xylenes	1330-20-7	8	0	0%	--	--	10	10	--	--
Trans-1,3-Dichloropropene	10061-02-6	8	0	0%	--	--	10	10	--	--
Trichloroethene	79-01-6	8	0	0%	--	--	10	10	--	--
Vinyl chloride	75-01-4	8	0	0%	--	--	10	10	--	--
Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	120-82-1	8	0	0%	--	--	10	11	--	--
1,2-Dichlorobenzene	95-50-1	8	0	0%	--	--	10	11	--	--
1,3-Dichlorobenzene	541-73-1	8	0	0%	--	--	10	11	--	--
1,4-Dichlorobenzene	106-46-7	8	0	0%	--	--	10	11	--	--
2,2'-oxybis(1-Chloropropane)	108-60-1	8	0	0%	--	--	10	11	--	--
2,4,5-Trichlorophenol	95-95-4	8	0	0%	--	--	25	28	--	--
2,4,6-Trichlorophenol	88-06-2	8	0	0%	--	--	10	11	--	--
2,4-Dichlorophenol	120-83-2	8	0	0%	--	--	10	11	--	--
2,4-Dimethylphenol	105-67-9	8	0	0%	--	--	10	11	--	--
2,4-Dinitrophenol	51-28-5	8	0	0%	--	--	25	28	--	--
2,4-Dinitrotoluene	121-14-2	8	0	0%	--	--	10	11	--	--
2,6-Dinitrotoluene	606-20-2	8	0	0%	--	--	10	11	--	--
2-Chloronaphthalene	91-58-7	8	0	0%	--	--	10	11	--	--
2-Chlorophenol	95-57-8	8	0	0%	--	--	10	11	--	--
2-Methylnaphthalene	91-57-6	8	0	0%	--	--	10	11	--	--
2-Methylphenol	95-48-7	8	0	0%	--	--	10	11	--	--
2-Nitroaniline	88-74-4	8	0	0%	--	--	25	28	--	--
2-Nitrophenol	88-75-5	8	0	0%	--	--	10	11	--	--
3,3'-Dichlorobenzidine	91-94-1	8	0	0%	--	--	10	11	--	--
3-Nitroaniline	99-09-2	8	0	0%	--	--	25	28	--	--
4,6-Dinitro-2-methylphenol	534-52-1	8	0	0%	--	--	25	28	--	--
4-Bromophenyl phenyl ether	101-55-3	8	0	0%	--	--	10	11	--	--
4-Chloro-3-methylphenol	59-50-7	8	0	0%	--	--	10	11	--	--
4-Chloroaniline	106-47-8	8	0	0%	--	--	10	11	--	--
4-Chlorophenyl phenyl ether	7005-72-3	8	0	0%	--	--	10	11	--	--
4-Methylphenol	106-44-5	8	0	0%	--	--	10	11	--	--
4-Nitroaniline	100-01-6	8	0	0%	--	--	25	28	--	--
4-Nitrophenol	100-02-7	8	0	0%	--	--	25	28	--	--
Acenaphthene	83-32-9	8	0	0%	--	--	10	11	--	--
Acenaphthylene	208-96-8	8	0	0%	--	--	10	11	--	--
Anthracene	120-12-7	8	0	0%	--	--	10	11	--	--
Benzo(a)anthracene	56-55-3	8	0	0%	--	--	10	11	--	--
Benzo(a)pyrene	50-32-8	8	0	0%	--	--	10	11	--	--
Benzo(b)fluoranthene	205-99-2	8	0	0%	--	--	10	11	--	--
Benzo(ghi)perylene	191-24-2	8	0	0%	--	--	10	11	--	--
Benzo(k)fluoranthene	207-08-9	8	0	0%	--	--	10	11	--	--

Table 1.4
Summary of Detections and Preliminary Screening Values
Groundwater, All Wells Combined
Seneca Army Depot Activity

Analyte Name	CAS Number	Total Number of Samples	Number of samples with Detected Concentrations	Frequency of Detection	Minimum Detection Limit (µg/L)	Maximum Detection Limit (µg/L)	Minimum Method Detection Limit (µg/L)	Maximum Method Detection Limit (µg/L)	Regional Screening Level [1] (µg/L)	Number of Detected Samples Greater than RSL
Bis(2-Chloroethoxy)methane	111-91-1	8	0	0%	--	--	10	11	--	--
Bis(2-Chloroethyl)ether	111-44-4	8	0	0%	--	--	10	11	--	--
Bis(2-Ethylhexyl)phthalate	117-81-7	8	4	50%	11	33	10	11	5.6	4
Butylbenzylphthalate	85-68-7	8	0	0%	--	--	10	11	--	--
Carbazole	86-74-8	8	0	0%	--	--	10	11	--	--
Chrysene	218-01-9	8	0	0%	--	--	10	11	--	--
Dibenz(a,h)anthracene	53-70-3	8	0	0%	--	--	10	11	--	--
Dibenzofuran	132-64-9	8	0	0%	--	--	10	11	--	--
Diethyl phthalate	84-66-2	8	0	0%	--	--	10	11	--	--
Dimethylphthalate	na	8	0	0%	--	--	10	11	--	--
Di-n-butylphthalate	84-74-2	8	0	0%	--	--	10	11	--	--
Di-n-octylphthalate	117-84-0	8	0	0%	--	--	10	11	--	--
Fluoranthene	206-44-0	8	0	0%	--	--	10	11	--	--
Fluorene	86-73-7	8	0	0%	--	--	10	11	--	--
Hexachlorobenzene	118-74-1	8	0	0%	--	--	10	11	--	--
Hexachlorobutadiene	87-68-3	8	0	0%	--	--	10	11	--	--
Hexachlorocyclopentadiene	77-47-4	8	0	0%	--	--	10	11	--	--
Hexachloroethane	67-72-1	8	0	0%	--	--	10	11	--	--
Indeno(1,2,3-cd)pyrene	193-39-5	8	0	0%	--	--	10	11	--	--
Isophorone	78-59-1	8	0	0%	--	--	10	11	--	--
Naphthalene	91-20-3	8	0	0%	--	--	10	11	--	--
Nitrobenzene	98-95-3	8	0	0%	--	--	10	11	--	--
N-Nitroso-di-n-propylamine	86-30-6	8	0	0%	--	--	10	11	--	--
N-Nitrosodiphenylamine	621-64-7	8	0	0%	--	--	10	11	--	--
Pentachlorophenol	87-86-5	8	0	0%	--	--	25	28	--	--
Phenanthrene	85-01-8	8	0	0%	--	--	10	11	--	--
Phenol	108-95-2	8	0	0%	--	--	10	11	--	--
Pyrene	129-00-0	8	0	0%	--	--	10	11	--	--
Herbicides										
2,4,5-T	93-76-5	8	0	0%	--	--	0.11	0.12	--	--
2,4,5-TP/Silvex	93-72-1	8	0	0%	--	--	0.11	0.12	--	--
2,4-D	94-75-7	8	0	0%	--	--	1.1	1.2	--	--
2,4-DB	94-82-6	8	0	0%	--	--	1.1	1.2	--	--
Dalapon	75-99-0	8	0	0%	--	--	2.4	2.7	--	--
Dicamba	1918-00-9	8	0	0%	--	--	0.11	0.12	--	--
Dichloroprop	na	8	0	0%	--	--	1.1	1.2	--	--
Dinoseb	88-85-7	8	0	0%	--	--	0.52	0.59	--	--
MCPA	94-74-6	8	0	0%	--	--	110	120	--	--
MCPP	93-65-2	8	0	0%	--	--	110	120	--	--
Explosives										
1,3,5-Trinitrobenzene	99-35-4	8	0	0%	--	--	0.13	0.13	--	--
1,3-Dinitrobenzene	99-65-0	8	1	13%	0.067	0.067	0.067	0.13	0.2	0
2,4,6-Trinitrotoluene	118-96-7	8	0	0%	--	--	0.13	0.13	--	--
2,4-Dinitrotoluene	121-14-2	8	0	0%	--	--	0.13	0.13	--	--
2,6-Dinitrotoluene	606-20-2	8	0	0%	--	--	0.13	0.13	--	--
2-amino-4,6-Dinitrotoluene	35572-78-2	8	0	0%	--	--	0.13	0.13	--	--
4-amino-2,6-Dinitrotoluene	19406-51-0	8	0	0%	--	--	0.13	0.13	--	--
HMX	2691-41-0	8	1	13%	0.5	0.5	0.13	0.13	100	0
RDX	121-82-4	8	0	0%	--	--	0.13	0.13	--	--
Tetryl	479-45-8	8	0	0%	--	--	0.13	0.13	--	--
Pesticides/PCBs										
4,4'-DDD	72-54-8	8	0	0%	--	--	0.1	0.14	--	--
4,4'-DDE	72-55-9	8	0	0%	--	--	0.1	0.14	--	--
4,4'-DDT	50-29-3	8	0	0%	--	--	0.1	0.14	--	--
Aldrin	309-00-2	8	0	0%	--	--	0.052	0.068	--	--
Alpha-BHC	319-84-6	8	0	0%	--	--	0.052	0.068	--	--
Alpha-Chlordane	5103-71-9	8	0	0%	--	--	0.052	0.068	--	--
Aroclor-1016	12674-11-2	8	0	0%	--	--	1	1.4	--	--
Aroclor-1221	11104-28-2	8	0	0%	--	--	2.1	2.7	--	--
Aroclor-1232	11141-16-5	8	0	0%	--	--	1	1.4	--	--
Aroclor-1242	53469-21-9	8	0	0%	--	--	1	1.4	--	--
Aroclor-1248	12672-29-6	8	0	0%	--	--	1	1.4	--	--
Aroclor-1254	11097-69-1	8	0	0%	--	--	1	1.4	--	--
Aroclor-1260	11096-82-5	8	0	0%	--	--	1	1.4	--	--
Beta-BHC	319-85-7	8	0	0%	--	--	0.052	0.068	--	--
Delta-BHC	na	8	0	0%	--	--	0.052	0.068	--	--
Dieldrin	60-57-1	8	0	0%	--	--	0.1	0.14	--	--
Endosulfan I	115-29-7	8	0	0%	--	--	0.052	0.068	--	--
Endosulfan II	33213-65-9	8	0	0%	--	--	0.1	0.14	--	--
Endosulfan sulfate	1031-07-8	8	0	0%	--	--	0.1	0.14	--	--
Endrin	72-20-8	8	0	0%	--	--	0.1	0.14	--	--

Table 1.4
Summary of Detections and Preliminary Screening Values
Groundwater, All Wells Combined
Seneca Army Depot Activity

Analyte Name	CAS Number	Total Number of Samples	Number of samples with Detected Concentrations	Frequency of Detection	Minimum Detection Limit (µg/L)	Maximum Detection Limit (µg/L)	Minimum Method Detection Limit (µg/L)	Maximum Method Detection Limit (µg/L)	Regional Screening Level [1] (µg/L)	Number of Detected Samples Greater than RSL
Endrin aldehyde	7421-93-4	8	0	0%	--	--	0.1	0.14	--	--
Endrin ketone	53494-70-5	8	0	0%	--	--	0.1	0.14	--	--
Gamma-BHC/Lindane	58-89-9	8	0	0%	--	--	0.052	0.068	--	--
Gamma-Chlordane	5103-74-2	8	0	0%	--	--	0.052	0.068	--	--
Heptachlor	76-44-8	8	0	0%	--	--	0.052	0.068	--	--
Heptachlor epoxide	1024-57-3	8	0	0%	--	--	0.052	0.068	--	--
Methoxychlor	72-43-5	8	0	0%	--	--	0.52	0.68	--	--
Toxaphene	8001-35-2	8	0	0%	--	--	5.2	6.8	--	--
Inorganics										
Aluminum	7429-90-5	12	9	75%	36.8	63300	14.3	42	2000	3
Antimony	7440-36-0	12	7	58%	23.1	52.1	2.2	21.6	0.78	7
Arsenic	7440-38-2	12	3	25%	1.7	9.5	1.4	3.6	0.052	3
Barium	7440-39-3	12	12	100%	23.4	751	--	--	380	1
Beryllium	7440-41-7	12	3	25%	0.52	5	0.1	2	2.5	1
Cadmium	7440-43-9	12	4	33%	2.2	3.8	0.3	4	0.92	4
Calcium	14452-75-6	12	12	100%	91700	660000	0	0	N/A	0
Chromium	18540-29-9	12	5	42%	2.6	106	0.7	2.6	0.035	5
Cobalt	7440-48-4	12	4	33%	5.3	94.4	1.4	4.4	0.6	4
Copper	7440-50-8	68	7	10%	1.5	123	0.63	25	80	1
Cyanide	57-12-5	11	0	0%	--	--	5	10	--	--
Iron	7439-89-6	12	10	83%	48.5	113000	25.4	25.4	1400	3
Iron+Manganese	N/A	12	12	100%	13.7	117640	--	--	N/A	0
Lead	7439-92-1	68	8	22%	0.66	75.6	0.9	5	15	2
Magnesium	7439-95-4	12	12	100%	15700	77900	--	--	N/A	0
Manganese	7439-96-5	12	12	100%	1	4640	--	--	43	5
Mercury	7487-94-7	12	3	25%	0.08	1.8	0.04	0.2	0.57	1
Nickel	7440-02-0	12	5	42%	2.2	209	1.4	4	39	2
Potassium	7440-09-7	12	9	75%	1050	18700	904	910	N/A	0
Selenium	7782-49-2	12	5	42%	0.99	2.5	0.7	3.1	10	0
Silver	7440-22-4	12	2	17%	0.98	4.6	0.9	4.2	9.4	0
Sodium	7440-23-5	12	12	100%	3400	40000	--	--	N/A	0
Thallium	7440-28-0	12	1	8%	3.4	3.4	1.2	4	0.02	1
Vanadium	7440-62-2	12	3	25%	11.7	93.1	1.2	3.7	8.6	3
Zinc	7440-66-6	12	12	100%	5.1	321	--	--	600	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.
-- = Not detected in any sample.
N/A = RSL not available.
na = CAS number not available.

Table 1.5
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Upstream of OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
Volatile Organic Compounds						
1,1,1-Trichloroethane	0	0	0%	0	--	0
1,1,2,2-Tetrachloroethane	0	0	0%	0	--	0
1,1,2-Trichloroethane	0	0	0%	0	--	0
1,1-Dichloroethane	0	0	0%	0	--	0
1,1-Dichloroethene	0	0	0%	0	--	0
1,2-Dibromo-3-chloropropane	0	0	0%	0	--	0
1,2-Dibromoethane	0	0	0%	0	--	0
1,2-Dichlorobenzene	0	0	0%	0	--	0
1,2-Dichloroethane	1	0	0%	0	--	0
1,2-Dichloroethene (total)	0	0	0%	0	--	0
1,2-Dichloropropane	0	0	0%	0	--	0
1,3-Dichlorobenzene	0	0	0%	0	--	0
1,4-Dichlorobenzene	0	0	0%	0	--	0
Acetone	1	0	0%	0	--	0
Benzene	0	0	0%	0	--	0
Bromochloromethane	0	0	0%	0	--	0
Bromodichloromethane	0	0	0%	0	--	0
Bromoform	0	0	0%	0	--	0
Carbon disulfide	1	0	0%	0	--	0
Carbon tetrachloride	0	0	0%	0	--	0
Chlorobenzene	0	0	0%	0	--	0
Chlorodibromomethane	0	0	0%	0	--	0
Chloroethane	0	0	0%	0	--	0
Chloroform	0	0	0%	0	--	0
Cis-1,2-Dichloroethene	0	0	0%	0	--	0
Cis-1,3-Dichloropropene	0	0	0%	0	--	0
Ethyl benzene	0	0	0%	0	--	0
Methyl bromide	0	0	0%	0	--	0
Methyl butyl ketone	0	0	0%	0	--	0
Methyl chloride	1	0	0%	0	--	0
Methyl ethyl ketone	0	0	0%	0	--	0
Methyl isobutyl ketone	0	0	0%	0	--	0
Methylene chloride	0	0	0%	0	--	0
Styrene	0	0	0%	0	--	0
Tetrachloroethene	0	0	0%	0	--	0
Toluene	0	0	0%	0	--	0
Total Xylenes	0	0	0%	0	--	0
Trans-1,2-Dichloroethene	0	0	0%	0	--	0
Trans-1,3-Dichloropropene	0	0	0%	0	--	0
Trichloroethene	1	0	0%	0	--	0
Vinyl chloride	0	0	0%	0	--	0
Semi Volatile Organic Compounds						
1,2,4-Trichlorobenzene	0	0	0%	0	--	0
1,2-Dichlorobenzene	0	0	0%	0	--	0
1,3-Dichlorobenzene	0	0	0%	0	--	0
1,4-Dichlorobenzene	0	0	0%	0	--	0
2,2'-oxybis(1-Chloropropane)	0	0	0%	0	--	0
2,4,5-Trichlorophenol	0	0	0%	0	--	0
2,4,6-Trichlorophenol	0	0	0%	0	--	0
2,4-Dichlorophenol	0	0	0%	0	--	0
2,4-Dimethylphenol	0	0	0%	0	--	0
2,4-Dinitrophenol	0	0	0%	0	--	0
2,4-Dinitrotoluene	0	0	0%	0	--	0
2,6-Dinitrotoluene	0	0	0%	0	--	0
2-Chloronaphthalene	0	0	0%	0	--	0
2-Chlorophenol	0	0	0%	0	--	0
2-Methylnaphthalene	0	0	0%	0	--	0
2-Methylphenol	0	0	0%	0	--	0
2-Nitroaniline	0	0	0%	0	--	0
2-Nitrophenol	0	0	0%	0	--	0
3,3'-Dichlorobenzidine	0	0	0%	0	--	0
3-Nitroaniline	0	0	0%	0	--	0
4,6-Dinitro-2-methylphenol	0	0	0%	0	--	0
4-Bromophenyl phenyl ether	0	0	0%	0	--	0
4-Chloro-3-methylphenol	0	0	0%	0	--	0
4-Chloroaniline	0	0	0%	0	--	0
4-Chlorophenyl phenyl ether	0	0	0%	0	--	0
4-Methylphenol	0	0	0%	0	--	0
4-Nitroaniline	0	0	0%	0	--	0

Table 1.5
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Upstream of OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
4-Nitrophenol	0	0	0%	0	--	0
Acenaphthene	0	0	0%	0	--	0
Acenaphthylene	0	0	0%	0	--	0
Anthracene	0	0	0%	0	--	0
Benzo(a)anthracene	0	0	0%	0	--	0
Benzo(a)pyrene	0	0	0%	0	--	0
Benzo(b)fluoranthene	0	0	0%	0	--	0
Benzo(ghi)perylene	0	0	0%	0	--	0
Benzo(k)fluoranthene	0	0	0%	0	--	0
Bis(2-Chloroethoxy)methane	0	0	0%	0	--	0
Bis(2-Chloroethyl)ether	0	0	0%	0	--	0
Bis(2-Chloroisopropyl)ether	0	0	0%	0	--	0
Bis(2-Ethylhexyl)phthalate	1	0	0%	0	--	0
Butylbenzylphthalate	0	0	0%	0	--	0
Carbazole	0	0	0%	0	--	0
Chrysene	0	0	0%	0	--	0
Di-n-butylphthalate	0	0	0%	0	--	0
Di-n-octylphthalate	0	0	0%	0	--	0
Dibenz(a,h)anthracene	0	0	0%	0	--	0
Dibenzofuran	0	0	0%	0	--	0
Diethyl phthalate	0	0	0%	0	--	0
Dimethylphthalate	0	0	0%	0	--	0
Fluoranthene	0	0	0%	0	--	0
Fluorene	0	0	0%	0	--	0
Hexachlorobenzene	0	0	0%	0	--	0
Hexachlorobutadiene	0	0	0%	0	--	0
Hexachlorocyclopentadiene	0	0	0%	0	--	0
Hexachloroethane	0	0	0%	0	--	0
Indeno(1,2,3-cd)pyrene	0	0	0%	0	--	0
Isophorone	0	0	0%	0	--	0
N-Nitrosodiphenylamine	0	0	0%	0	--	0
N-Nitrosodipropylamine	0	0	0%	0	--	0
Naphthalene	0	0	0%	0	--	0
Nitrobenzene	0	0	0%	0	--	0
Pentachlorophenol	0	0	0%	0	--	0
Phenanthrene	0	0	0%	0	--	0
Phenol	0	0	0%	0	--	0
Pyrene	0	0	0%	0	--	0
Herbicides						
2,4,5-T	0	0	0%	0	--	0
2,4,5-TP/Silvex	0	0	0%	0	--	0
2,4-D	0	0	0%	0	--	0
2,4-DB	0	0	0%	0	--	0
Dalapon	0	0	0%	0	--	0
Dicamba	0	0	0%	0	--	0
Dichloroprop	0	0	0%	0	--	0
Dinoseb	0	0	0%	0	--	0
MCPA	0	0	0%	0	--	0
MCPP	0	0	0%	0	--	0
Explosives						
1,3,5-Trinitrobenzene	0	0	0%	0	--	0
1,3-Dinitrobenzene	0	0	0%	0	--	0
2,4,6-Trinitrotoluene	0	0	0%	0	--	0
2,4-Dinitrotoluene	0	0	0%	0	--	0
2,6-Dinitrotoluene	0	0	0%	0	--	0
2-amino-4,6-Dinitrotoluene	0	0	0%	0	--	0
4-amino-2,6-Dinitrotoluene	0	0	0%	0	--	0
HMX	0	0	0%	0	--	0
RDX	1	0	0%	0	--	0
Tetryl	1	0	0%	0	--	0
PESTICIDES/PCBS						
4,4'-DDD	0	0	0%	0	--	0
4,4'-DDE	0	0	0%	0	--	0
4,4'-DDT	0	0	0%	0	--	0
Aldrin	0	0	0%	0	--	0
Alpha-BHC	0	0	0%	0	--	0
Alpha-Chlordane	0	0	0%	0	--	0
Aroclor-1016	0	0	0%	0	--	0
Aroclor-1221	0	0	0%	0	--	0
Aroclor-1232	0	0	0%	0	--	0

Table 1.5
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Upstream of OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
Aroclor-1242	0	0	0%	0	--	0
Aroclor-1248	0	0	0%	0	--	0
Aroclor-1254	0	0	0%	0	--	0
Aroclor-1260	0	0	0%	0	--	0
Beta-BHC	0	0	0%	0	--	0
Delta-BHC	0	0	0%	0	--	0
Dieldrin	0	0	0%	0	--	0
Endosulfan I	0	0	0%	0	--	0
Endosulfan II	0	0	0%	0	--	0
Endosulfan sulfate	0	0	0%	0	--	0
Endrin	0	0	0%	0	--	0
Endrin aldehyde	0	0	0%	0	--	0
Endrin ketone	0	0	0%	0	--	0
Gamma-BHC/Lindane	0	0	0%	0	--	0
Gamma-Chlordane	0	0	0%	0	--	0
Heptachlor	0	0	0%	0	--	0
Heptachlor epoxide	0	0	0%	0	--	0
Hexachlorobenzene	0	0	0%	0	--	0
Methoxychlor	0	0	0%	0	--	0
Toxaphene	0	0	0%	0	--	0
Inorganics						
Aluminum	10	9	90%	140	2000	0
Antimony	9	0	0%	0	--	0
Arsenic	10	0	0%	0	0.052	0
Barium	10	9	90%	48.3	380	0
Beryllium	10	0	0%	0	2.5	0
Cadmium	9	2	22%	0.88	0.92	0
Calcium	10	10	100%	85500	NA	0
Chromium	10	0	0%	0	0.035	0
Cobalt	9	0	0%	0	0.6	0
Copper	10	1	10%	3	80	0
Cyanide	10	1	10%	10	0.15	0
Iron	10	10	100%	184	1400	0
Lead	10	0	0%	0	--	0
Magnesium	10	10	100%	12900	NA	0
Manganese	9	9	100%	69.4	43	0
Mercury	10	0	0%	0	0.57	0
Nickel	10	0	0%	0	39	0
Potassium	10	10	100%	3710	NA	0
Selenium	10	0	0%	0	10	0
Silver	9	0	0%	0	--	0
Sodium	10	10	100%	59100	NA	2
Thallium	9	0	0%	0	--	0
Vanadium	10	1	10%	39.2	8.6	1
Zinc	10	10	100%	14.3	600	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.
-- = Not detected in any sample.
NA = RSL not available.

Table 1.6
Summary of Detections and Preliminary Screening Values
Surface Water, Drainage Ditches from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
Volatile Organic Compounds						
1,1,1-Trichloroethane	4	0	0%	0	--	0
1,1,2,2-Tetrachloroethane	4	0	0%	0	--	0
1,1,2-Trichloroethane	4	0	0%	0	--	0
1,1-Dichloroethane	4	0	0%	0	--	0
1,1-Dichloroethene	4	0	0%	0	--	0
1,2-Dibromo-3-chloropropane	0	0	0%	0	--	0
1,2-Dibromoethane	0	0	0%	0	--	0
1,2-Dichlorobenzene	0	0	0%	0	--	0
1,2-Dichloroethane	4	0	0%	0	--	0
1,2-Dichloroethene (total)	4	0	0%	0	--	0
1,2-Dichloropropane	4	0	0%	0	--	0
1,3-Dichlorobenzene	0	0	0%	0	--	0
1,4-Dichlorobenzene	0	0	0%	0	--	0
Acetone	4	0	0%	0	--	0
Benzene	4	0	0%	0	--	0
Bromochloromethane	0	0	0%	0	--	0
Bromodichloromethane	4	0	0%	0	--	0
Bromoform	4	0	0%	0	--	0
Carbon disulfide	4	0	0%	0	--	0
Carbon tetrachloride	4	0	0%	0	--	0
Chlorobenzene	4	0	0%	0	--	0
Chlorodibromomethane	4	0	0%	0	--	0
Chloroethane	4	0	0%	0	--	0
Chloroform	4	0	0%	0	--	0
Cis-1,2-Dichloroethene	0	0	0%	0	--	0
Cis-1,3-Dichloropropene	4	0	0%	0	--	0
Ethyl benzene	4	0	0%	0	--	0
Methyl bromide	4	0	0%	0	--	0
Methyl butyl ketone	4	0	0%	0	--	0
Methyl chloride	4	0	0%	0	--	0
Methyl ethyl ketone	4	0	0%	0	--	0
Methyl isobutyl ketone	4	0	0%	0	--	0
Methylene chloride	4	0	0%	0	--	0
Styrene	4	0	0%	0	--	0
Tetrachloroethene	4	0	0%	0	--	0
Toluene	4	0	0%	0	--	0
Total Xylenes	4	0	0%	0	--	0
Trans-1,2-Dichloroethene	0	0	0%	0	--	0
Trans-1,3-Dichloropropene	4	0	0%	0	--	0
Trichloroethene	4	0	0%	0	--	0
Vinyl chloride	4	0	0%	0	--	0
Semi Volatile Organic Compounds						
1,2,4-Trichlorobenzene	4	0	0%	0	--	0
1,2-Dichlorobenzene	4	0	0%	0	--	0
1,3-Dichlorobenzene	4	0	0%	0	--	0
1,4-Dichlorobenzene	4	0	0%	0	--	0
2,2'-oxybis(1-Chloropropane)	4	0	0%	0	--	0
2,4,5-Trichlorophenol	4	0	0%	0	--	0
2,4,6-Trichlorophenol	4	0	0%	0	--	0
2,4-Dichlorophenol	4	0	0%	0	--	0
2,4-Dimethylphenol	4	0	0%	0	--	0
2,4-Dinitrophenol	4	0	0%	0	--	0
2,4-Dinitrotoluene	4	0	0%	0	--	0
2,6-Dinitrotoluene	4	0	0%	0	--	0
2-Chloronaphthalene	4	0	0%	0	--	0
2-Chlorophenol	4	0	0%	0	--	0
2-Methylnaphthalene	4	0	0%	0	--	0
2-Methylphenol	4	0	0%	0	--	0
2-Nitroaniline	4	0	0%	0	--	0
2-Nitrophenol	4	0	0%	0	--	0
3,3'-Dichlorobenzidine	4	0	0%	0	--	0
3-Nitroaniline	4	0	0%	0	--	0
4,6-Dinitro-2-methylphenol	4	0	0%	0	--	0
4-Bromophenyl phenyl ether	4	0	0%	0	--	0
4-Chloro-3-methylphenol	4	0	0%	0	--	0
4-Chloroaniline	4	0	0%	0	--	0
4-Chlorophenyl phenyl ether	4	0	0%	0	--	0
4-Methylphenol	4	0	0%	0	--	0

Table 1.6
Summary of Detections and Preliminary Screening Values
Surface Water, Drainage Ditches from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
4-Nitroaniline	4	0	0%	0	--	0
4-Nitrophenol	4	0	0%	0	--	0
Acenaphthene	4	0	0%	0	--	0
Acenaphthylene	4	0	0%	0	--	0
Anthracene	4	0	0%	0	--	0
Benzo(a)anthracene	4	0	0%	0	--	0
Benzo(a)pyrene	4	0	0%	0	--	0
Benzo(b)fluoranthene	4	0	0%	0	--	0
Benzo(ghi)perylene	4	0	0%	0	--	0
Benzo(k)fluoranthene	4	0	0%	0	--	0
Bis(2-Chloroethoxy)methane	4	0	0%	0	--	0
Bis(2-Chloroethyl)ether	4	0	0%	0	--	0
Bis(2-Chloroisopropyl)ether	4	0	0%	0	--	0
Bis(2-Ethylhexyl)phthalate	0	0	0%	0	--	0
Butylbenzylphthalate	4	0	0%	0	--	0
Carbazole	4	0	0%	0	--	0
Chrysene	4	0	0%	0	--	0
Di-n-butylphthalate	4	0	0%	0	--	0
Di-n-octylphthalate	4	0	0%	0	--	0
Dibenz(a,h)anthracene	4	0	0%	0	--	0
Dibenzofuran	4	0	0%	0	--	0
Diethyl phthalate	4	0	0%	0	--	0
Dimethylphthalate	4	0	0%	0	--	0
Fluoranthene	4	0	0%	0	--	0
Fluorene	4	0	0%	0	--	0
Hexachlorobenzene	4	0	0%	0	--	0
Hexachlorobutadiene	4	0	0%	0	--	0
Hexachlorocyclopentadiene	4	0	0%	0	--	0
Hexachloroethane	4	0	0%	0	--	0
Indeno(1,2,3-cd)pyrene	4	0	0%	0	--	0
Isophorone	4	0	0%	0	--	0
N-Nitrosodiphenylamine	4	0	0%	0	--	0
N-Nitrosodipropylamine	4	0	0%	0	--	0
Naphthalene	4	0	0%	0	--	0
Nitrobenzene	4	0	0%	0	--	0
Pentachlorophenol	4	0	0%	0	--	0
Phenanthrene	4	0	0%	0	--	0
Phenol	4	0	0%	0	--	0
Pyrene	4	0	0%	0	--	0
Herbicides						
2,4,5-T	4	0	0%	0	--	0
2,4,5-TP/Silvex	4	0	0%	0	--	0
2,4-D	4	0	0%	0	--	0
2,4-DB	4	0	0%	0	--	0
Dalapon	4	0	0%	0	--	0
Dicamba	4	0	0%	0	--	0
Dichloroprop	4	0	0%	0	--	0
Dinoseb	4	0	0%	0	--	0
MCPA	4	0	0%	0	--	0
MCPP	4	0	0%	0	--	0
Explosives						
1,3,5-Trinitrobenzene	4	0	0%	0	--	0
1,3-Dinitrobenzene	4	0	0%	0	--	0
2,4,6-Trinitrotoluene	4	0	0%	0	--	0
2,4-Dinitrotoluene	4	0	0%	0	--	0
2,6-Dinitrotoluene	4	0	0%	0	--	0
2-amino-4,6-Dinitrotoluene	4	0	0%	0	--	0

Table 1.6
Summary of Detections and Preliminary Screening Values
Surface Water, Drainage Ditches from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
4-amino-2,6-Dinitrotoluene	4	0	0%	0	--	0
HMX	4	2	50%	0.49	100	0
RDX	4	2	50%	2	0.7	1
Tetryl	4	0	0%	0	--	0
PESTICIDES/PCBS						
4,4'-DDD	4	0	0%	0	--	0
4,4'-DDE	4	0	0%	0	--	0
4,4'-DDT	4	0	0%	0	--	0
Aldrin	4	0	0%	0	--	0
Alpha-BHC	4	0	0%	0	--	0
Alpha-Chlordane	4	0	0%	0	--	0
Aroclor-1016	4	0	0%	0	--	0
Aroclor-1221	4	0	0%	0	--	0
Aroclor-1232	4	0	0%	0	--	0
Aroclor-1242	4	0	0%	0	--	0
Aroclor-1248	4	0	0%	0	--	0
Aroclor-1254	4	0	0%	0	--	0
Aroclor-1260	4	0	0%	0	--	0
Beta-BHC	4	0	0%	0	--	0
Delta-BHC	4	0	0%	0	--	0
Dieldrin	4	0	0%	0	--	0
Endosulfan I	4	0	0%	0	--	0
Endosulfan II	4	0	0%	0	--	0
Endosulfan sulfate	4	0	0%	0	--	0
Endrin	4	0	0%	0	--	0
Endrin aldehyde	4	0	0%	0	--	0
Endrin ketone	4	0	0%	0	--	0
Gamma-BHC/Lindane	4	0	0%	0	--	0
Gamma-Chlordane	4	0	0%	0	--	0
Heptachlor	4	0	0%	0	--	0
Heptachlor epoxide	4	0	0%	0	--	0
Hexachlorobenzene	0	0	0%	0	--	0
Methoxychlor	4	0	0%	0	--	0
Toxaphene	4	0	0%	0	--	0
Inorganics						
Aluminum	4	4	100%	37500	2000	3
Antimony	4	0	0%	0	--	0
Arsenic	4	1	25%	2.3	0.052	0
Barium	4	4	100%	439	380	0
Beryllium	4	2	50%	1.5	2.5	0
Cadmium	4	1	25%	11.2	0.92	1
Calcium	4	4	100%	194000	NA	0
Chromium	4	3	75%	50.8	0.035	1
Cobalt	4	2	50%	18.2	0.6	2
Copper	4	4	100%	612	80	2
Cyanide	4	1	25%	47.7	0.15	0
Iron	4	4	100%	60400	1400	4
Lead	4	4	100%	68.7	15 [2]	2
Magnesium	4	4	100%	24300	NA	0
Manganese	4	4	100%	1250	43	2
Mercury	4	4	100%	3	0.57	1
Nickel	4	4	100%	74.2	39	0
Potassium	4	4	100%	9670	NA	0
Selenium	4	0	0%	0	--	0
Silver	4	0	0%	0	--	0
Sodium	4	4	100%	4340	NA	0
Thallium	4	0	0%	0	--	0
Vanadium	4	3	75%	54.9	8.6	2
Zinc	4	4	100%	883	600	1

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[2] RSL not available. Used the Maximum Contaminant Level for lead.
-- = Not detected in any sample.
NA = RSL not available.

Table 1.7
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Onsite and Downstream from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
Volatile Organic Compounds						
1,1,1-Trichloroethane	6	0	0%	0	–	0
1,1,2,2-Tetrachloroethane	6	0	0%	0	–	0
1,1,2-Trichloroethane	6	0	0%	0	–	0
1,1-Dichloroethane	6	0	0%	0	–	0
1,1-Dichloroethene	6	0	0%	0	–	0
1,2-Dibromo-3-chloropropane	6	0	0%	0	–	0
1,2-Dibromoethane	6	0	0%	0	–	0
1,2-Dichlorobenzene	6	0	0%	0	–	0
1,2-Dichloroethane	16	1	6%	2	0.17	1
1,2-Dichloroethene (total)	0	0	0%	0	–	0
1,2-Dichloropropane	6	0	0%	0	–	0
1,3-Dichlorobenzene	6	0	0%	0	–	0
1,4-Dichlorobenzene	6	0	0%	0	–	0
Acetone	16	1	6%	10	1400	0
Benzene	6	0	0%	0	–	0
Bromochloromethane	6	0	0%	0	–	0
Bromodichloromethane	6	0	0%	0	–	0
Bromoform	6	0	0%	0	–	0
Carbon disulfide	16	0	0%	0	–	0
Carbon tetrachloride	6	0	0%	0	–	0
Chlorobenzene	6	0	0%	0	–	0
Chlorodibromomethane	6	0	0%	0	–	0
Chloroethane	6	0	0%	0	–	0
Chloroform	6	0	0%	0	–	0
Cis-1,2-Dichloroethene	6	0	0%	0	–	0
Cis-1,3-Dichloropropene	6	0	0%	0	–	0
Ethyl benzene	6	0	0%	0	–	0
Methyl bromide	6	0	0%	0	–	0
Methyl butyl ketone	6	0	0%	0	–	0
Methyl chloride	16	1	6%	8	19	0
Methyl ethyl ketone	6	0	0%	0	–	0
Methyl isobutyl ketone	6	0	0%	0	–	0
Methylene chloride	6	0	0%	0	–	0
Styrene	6	0	0%	0	–	0
Tetrachloroethene	6	0	0%	0	–	0
Toluene	6	0	0%	0	–	0
Total Xylenes	6	0	0%	0	–	0
Trans-1,2-Dichloroethene	6	0	0%	0	–	0
Trans-1,3-Dichloropropene	6	0	0%	0	–	0
Trichloroethene	16	0	0%	0	–	0
Vinyl chloride	6	0	0%	0	–	0
Semi Volatile Organic Compounds						
1,2,4-Trichlorobenzene	6	0	0%	0	–	0
1,2-Dichlorobenzene	6	0	0%	0	–	0
1,3-Dichlorobenzene	6	0	0%	0	–	0
1,4-Dichlorobenzene	6	0	0%	0	–	0
2,2'-oxybis(1-Chloropropane)	0	0	0%	0	–	0
2,4,5-Trichlorophenol	6	0	0%	0	–	0
2,4,6-Trichlorophenol	6	0	0%	0	–	0
2,4-Dichlorophenol	6	0	0%	0	–	0
2,4-Dimethylphenol	6	0	0%	0	–	0
2,4-Dinitrophenol	6	0	0%	0	–	0
2,4-Dinitrotoluene	6	0	0%	0	–	0
2,6-Dinitrotoluene	6	0	0%	0	–	0

Table 1.7
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Onsite and Downstream from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
2-Chloronaphthalene	6	0	0%	0	–	0
2-Chlorophenol	6	0	0%	0	–	0
2-Methylnaphthalene	6	0	0%	0	–	0
2-Methylphenol	6	0	0%	0	–	0
2-Nitroaniline	6	0	0%	0	–	0
2-Nitrophenol	6	0	0%	0	–	0
3,3'-Dichlorobenzidine	6	0	0%	0	–	0
3-Nitroaniline	6	0	0%	0	–	0
4,6-Dinitro-2-methylphenol	6	0	0%	0	–	0
4-Bromophenyl phenyl ether	6	0	0%	0	–	0
4-Chloro-3-methylphenol	6	0	0%	0	–	0
4-Chloroaniline	6	0	0%	0	–	0
4-Chlorophenyl phenyl ether	6	0	0%	0	–	0
4-Methylphenol	6	0	0%	0	–	0
4-Nitroaniline	6	0	0%	0	–	0
4-Nitrophenol	6	0	0%	0	–	0
Acenaphthene	6	0	0%	0	–	0
Acenaphthylene	6	0	0%	0	–	0
Anthracene	6	0	0%	0	–	0
Benzo(a)anthracene	6	0	0%	0	–	0
Benzo(a)pyrene	6	0	0%	0	–	0
Benzo(b)fluoranthene	6	0	0%	0	–	0
Benzo(ghi)perylene	6	0	0%	0	–	0
Benzo(k)fluoranthene	6	0	0%	0	–	0
Bis(2-Chloroethoxy)methane	6	0	0%	0	–	0
Bis(2-Chloroethyl)ether	6	0	0%	0	–	0
Bis(2-Chloroisopropyl)ether	6	0	0%	0	–	0
Bis(2-Ethylhexyl)phthalate	17	0	0%	0	–	0
Butylbenzylphthalate	6	2	33%	0.12	16	0
Carbazole	6	0	0%	0	–	0
Chrysene	6	0	0%	0	–	0
Di-n-butylphthalate	6	0	0%	0	–	0
Di-n-octylphthalate	6	0	0%	0	–	0
Dibenz(a,h)anthracene	6	0	0%	0	–	0
Dibenzofuran	6	0	0%	0	–	0
Diethyl phthalate	6	2	33%	0.072	1500	0
Dimethylphthalate	6	0	0%	0	–	0
Fluoranthene	6	0	0%	0	–	0
Fluorene	6	0	0%	0	–	0
Hexachlorobenzene	6	0	0%	0	–	0
Hexachlorobutadiene	6	0	0%	0	–	0
Hexachlorocyclopentadiene	6	0	0%	0	–	0
Hexachloroethane	6	0	0%	0	–	0
Indeno(1,2,3-cd)pyrene	6	0	0%	0	–	0
Isophorone	6	0	0%	0	–	0
N-Nitrosodiphenylamine	6	0	0%	0	–	0
N-Nitrosodipropylamine	6	0	0%	0	–	0
Naphthalene	6	0	0%	0	–	0
Nitrobenzene	6	0	0%	0	–	0
Pentachlorophenol	6	0	0%	0	–	0
Phenanthrene	6	0	0%	0	–	0
Phenol	6	0	0%	0	–	0
Pyrene	6	0	0%	0	–	0
Herbicides						
2,4,5-T	0	0	0%	0	–	0

Table 1.7
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Onsite and Downstream from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
2,4,5-TP/Silvex	0	0	0%	0	–	0
2,4-D	0	0	0%	0	–	0
2,4-DB	0	0	0%	0	–	0
Dalapon	0	0	0%	0	–	0
Dicamba	0	0	0%	0	–	0
Dichloroprop	0	0	0%	0	–	0
Dinoseb	0	0	0%	0	–	0
MCPA	0	0	0%	0	–	0
MCPP	0	0	0%	0	–	0
Explosives						
1,3,5-Trinitrobenzene	0	0	0%	0	–	0
1,3-Dinitrobenzene	0	0	0%	0	–	0
2,4,6-Trinitrotoluene	0	0	0%	0	–	0
2,4-Dinitrotoluene	0	0	0%	0	–	0
2,6-Dinitrotoluene	0	0	0%	0	–	0
2-amino-4,6-Dinitrotoluene	0	0	0%	0	–	0
4-amino-2,6-Dinitrotoluene	0	0	0%	0	–	0
HMX	0	0	0%	0	100	0
RDX	11	1	9%	0.67	0.7	0
Tetryl	11	0	0%	0	–	0
PESTICIDES/PCBS						
4,4'-DDD	6	0	0%	0	–	0
4,4'-DDE	6	0	0%	0	0.2	0
4,4'-DDT	6	0	0%	0	0.2	0
Aldrin	6	0	0%	0	0.0046	0
Alpha-BHC	6	0	0%	0	–	0
Alpha-Chlordane	6	0	0%	0	0.22	0
Aroclor-1016	6	0	0%	0	–	0
Aroclor-1221	6	0	0%	0	–	0
Aroclor-1232	6	0	0%	0	–	0
Aroclor-1242	6	0	0%	0	–	0
Aroclor-1248	6	0	0%	0	–	0
Aroclor-1254	6	0	0%	0	–	0
Aroclor-1260	6	0	0%	0	–	0
Beta-BHC	6	0	0%	0	0.04	0
Delta-BHC	6	0	0%	0	0.04	0
Dieldrin	6	0	0%	0	–	0
Endosulfan I	6	0	0%	0	–	0
Endosulfan II	6	0	0%	0	–	0
Endosulfan sulfate	6	0	0%	0	–	0
Endrin	6	0	0%	0	–	0
Endrin aldehyde	6	0	0%	0	5	0
Endrin ketone	6	0	0%	0	5	0
Gamma-BHC/Lindane	6	0	0%	0	–	0
Gamma-Chlordane	6	0	0%	0	–	0
Heptachlor	6	0	0%	0	0.04	0
Heptachlor epoxide	6	0	0%	0	0.03	0
Hexachlorobenzene	6	0	0%	0	–	0
Methoxychlor	6	0	0%	0	–	0
Toxaphene	6	0	0%	0	–	0
Inorganics						
Aluminum	14	4	29%	300	2000	0
Antimony	6	0	0%	0	–	0
Arsenic	16	0	0%	0	0.052	0
Barium	16	16	100%	66.6	380	0

Table 1.7
Summary of Detections and Preliminary Screening Values
Surface Water, Reeder Creek Onsite and Downstream from OD Grounds
Seneca Army Depot Activity

Analyte Name	Number of Samples	Number of samples with Detected Concentrations	Frequency of Samples with Detected Concentrations	Maximum Detected Concentration (µg/L)	Regional Screening Levels (RSL) [1] (µg/L)	Number of Samples with Detected Concentrations Exceeding Screening Criteria
Beryllium	16	4	25%	1.4	2.5	0
Cadmium	6	2	33%	0.45	0.92	0
Calcium	16	16	100%	121000	NA	0
Chromium	16	0	0%	0	0.035	0
Cobalt	6	0	0%	0	0.6	0
Copper	16	0	0%	0	80	0
Cyanide	16	1	6%	14.9	0.15	0
Iron	13	12	92%	737	1400	4
Lead	16	3	19%	2.2	15 [2]	0
Magnesium	16	16	100%	18700	NA	0
Manganese	16	16	100%	236	43	0
Mercury	16	1	6%	0.11	0.57	0
Nickel	16	0	0%	0	39	0
Potassium	13	13	100%	3800	NA	0
Selenium	16	3	19%	1.6	10	0
Silver	6	0	0%	0	--	0
Sodium	16	15	94%	26500	NA	6
Thallium	6	0	0%	0	--	0
Vanadium	16	0	0%	0	8.6	0
Zinc	11	5	45%	15.4	600	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[2] RSL not available. Used the Maximum Contaminant Level for lead.

-- = Not detected in any sample.

NA = RSL not available.

Section 2 Tables

Table 2.1
Human Health Risk Assessment Constituents of Potential Concern OD Hill Area
Surface Soil (0 - ≤2 feet bgs)
Seneca Army Depot Activity

Detected Analytes [1]	Units	Maximum Detected Concentration of Analytes	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Semivolatile Organic Compounds					
2,4-Dinitrotoluene	mg/kg	2.5	1.70	Yes	Yes
2,6-Dinitrotoluene	mg/kg	0.041	0.36	No	No
Acenaphthylene	mg/kg	0.03	350	No	No
Anthracene	mg/kg	0.018	1700	No	No
Benzo(a)anthracene	mg/kg	0.05	0.15	No	No
Benzo(a)pyrene	mg/kg	0.082	0.02	Yes	Yes
Benzo(b)fluoranthene	mg/kg	0.055	0.15	No	No
Benzo(ghi)perylene	mg/kg	0.048	NA [3]	NA	Yes
Benzo(k)fluoranthene	mg/kg	0.058	1.50	No	No
Bis(2-Ethylhexyl)phthalate	mg/kg	0.74	38.0	No	No
Chrysene	mg/kg	0.13	15.0	No	No
Di-n-butylphthalate	mg/kg	2.6	620	No	No
Fluoranthene	mg/kg	0.066	230	No	No
Hexachlorobenzene	mg/kg	0.11	0.33	No	No
Hexachloroethane	mg/kg	0.021	4.30	No	No
Indeno(1,2,3-cd)pyrene	mg/kg	0.052	0.15	No	No
Naphthalene	mg/kg	0.024	3.80	No	No
N-Nitrosodiphenylamine	mg/kg	0.32	110	No	No
N-Nitrosodipropylamine	mg/kg	0.11	0.08	Yes	Yes
Phenanthrene	mg/kg	0.038	NA [3]	NA	Yes
Pyrene	mg/kg	0.11	170	No	No
Explosives					
1,3,5-Trinitrobenzene	mg/kg	0.12	220	No	No
2,4,6-Trinitrotoluene	mg/kg	0.19	3.60	No	No
2,4-Dinitrotoluene	mg/kg	1.1	1.70	No	No
2-amino-4,6-Dinitrotoluene	mg/kg	0.59	15.0	No	No
4-amino-2,6-Dinitrotoluene	mg/kg	0.5	15.0	No	No
HMX	mg/kg	0.19	380.0	No	No
Nitroglycerine	mg/kg	1.5	0.62	Yes	Yes
RDX	mg/kg	1.8	6.0	No	No
Tetryl	mg/kg	0.33	12.0	No	No
Pesticides/PCBs					
Aroclor-1254	mg/kg	2	0.11	Yes	Yes
4,4'-DDD	mg/kg	0.0024	2.20	No	No
4,4'-DDE	mg/kg	0.012	1.60	No	No
4,4'-DDT	mg/kg	0.0034	1.90	No	No
Aldrin	mg/kg	0.0022	0.03	No	No
Alpha-Chlordane	mg/kg	0.0057	1.80 [4]	No	No
Dieldrin	mg/kg	0.0074	0.03	No	No
Endosulfan I	mg/kg	0.032	37.0	No	No
Endosulfan II	mg/kg	0.00088	37.0 [5]	No	No
Endrin	mg/kg	0.0036	1.80	No	No
Endrin aldehyde	mg/kg	0.0032	1.80 [6]	No	No
Endrin ketone	mg/kg	0.00058	1.80 [6]	No	No
Gamma-Chlordane	mg/kg	0.0011	1.80 [4]	No	No
Methoxychlor	mg/kg	0.045	31.0	No	No
Inorganics					
Aluminum	mg/kg	35000	7700	Yes	Yes
Antimony	mg/kg	3.10	3.10	No	No
Arsenic	mg/kg	16.1	0.67	Yes	Yes
Barium	mg/kg	308	1500	No	No
Beryllium	mg/kg	1.40	16.0	No	No
Cadmium	mg/kg	1100	7.0	Yes	Yes
Calcium	mg/kg	193000	NA [7]	NA	NA
Chromium	mg/kg	446	0.30 [8]	Yes	Yes
Cobalt	mg/kg	19.7	2.3	Yes	Yes
Copper	mg/kg	4180	310	Yes	Yes

Table 2.1
Human Health Risk Assessment Constituents of Potential Concern OD Hill Area
Surface Soil (0 - ≤2 feet bgs)
Seneca Army Depot Activity

Detected Analytes [1]	Units	Maximum Detected Concentration of Analytes	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Iron	mg/kg	118000	NA [7]	NA	NA
Lead	mg/kg	998	400	Yes	**Yes**
Magnesium	mg/kg	15000	NA [7]	NA	NA
Manganese	mg/kg	1080	180	Yes	**Yes**
Mercury	mg/kg	7.00	2.3	Yes	**Yes**
Nickel	mg/kg	67.7	150	No	No
Potassium	mg/kg	4880	NA [7]	NA	NA
Selenium	mg/kg	0.73	39.0	No	No
Silver	mg/kg	205	39.0	Yes	**Yes**
Sodium	mg/kg	377	NA [7]	NA	NA
Thallium	mg/kg	0.27	0.078	Yes	**Yes**
Vanadium	mg/kg	53.7	39.0	Yes	**Yes**
Zinc	mg/kg	1350	2300	No	No

[1] Analytes shown are those that are detected in any sample, from surface soil (0 - ≤ 2 feet bgs) from the exposure area.

[2] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] No RSL available, so the analyte is considered a COPC.

[4] No RSL exists for alpha-chlordane or gamma-chlordane, therefore the RSL for chlordane was used as a surrogate.

[5] No RSL exists for endosulfan II, therefore the RSL for endosulfan used as a surrogate.

[6] No RSL exists for endrin aldehyde or endrin ketone, therefore the RSL for endrin used as a surrogate.

[7] Calcium, Iron, Magnesium, Potassium, and Sodium are essential nutrients and are not expected to pose an unacceptable risk to human receptors

[8] No RSL exists for total chromium, therefore the more conservative RSL for chromium(VI) used.

NA = Not applicaple because essential nutrient.

Table 2.2
Human Health Risk Assessment Constituents of Potential Concern OD Hill Area
Combined Surface and Subsurface Soil (≤15 feet bgs)
Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration of Detected Analytes	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Volatile Organic Compounds					
Tetrachloroethene	mg/kg	0.019	8.10	No	No
Semivolatile Organic Compounds					
2,4-Dinitrotoluene	mg/kg	14	1.70	Yes	**Yes**
2,6-Dinitrotoluene	mg/kg	0.7	0.36	Yes	**Yes**
Acenaphthylene	mg/kg	0.03	350	No	No
Anthracene	mg/kg	0.018	1700	No	No
Benzo(a)anthracene	mg/kg	0.05	0.15	No	No
Benzo(a)pyrene	mg/kg	0.082	0.02	Yes	**Yes**
Benzo(b)fluoranthene	mg/kg	0.055	0.15	No	No
Benzo(ghi)perylene	mg/kg	0.066	NA [3]	Yes	**Yes**
Benzo(k)fluoranthene	mg/kg	0.058	1.50	No	No
Bis(2-Ethylhexyl)phthalate	mg/kg	0.74	38.0	No	No
Chrysene	mg/kg	0.13	15.0	No	No
Diethyl phthalate	mg/kg	0.035	4900	No	No
Di-n-butylphthalate	mg/kg	6.8	620	No	No
Fluoranthene	mg/kg	0.068	230	No	No
Hexachlorobenzene	mg/kg	0.11	0.33	No	No
Hexachloroethane	mg/kg	1.1	4.30	No	No
Indeno(1,2,3-cd)pyrene	mg/kg	0.052	0.15	No	No
Naphthalene	mg/kg	0.03	3.80	No	No
N-Nitrosodiphenylamine	mg/kg	0.32	110	No	No
N-Nitrosodipropylamine	mg/kg	1.6	0.08	Yes	**Yes**
Phenanthrene	mg/kg	0.046	NA [3]	Yes	**Yes**
Pyrene	mg/kg	0.11	170	No	No
Explosives					
1,3,5-Trinitrobenzene	mg/kg	0.19	220	No	No
2,4,6-Trinitrotoluene	mg/kg	0.6	3.60	No	No
2,4-Dinitrotoluene	mg/kg	1.1	1.70	No	No
2-amino-4,6-Dinitrotoluene	mg/kg	0.68	15.0	No	No
4-amino-2,6-Dinitrotoluene	mg/kg	0.5	15.0	No	No
HMX	mg/kg	0.47	380.0	No	No
Nitroglycerine	mg/kg	1.5	0.62	Yes	**Yes**
RDX	mg/kg	4.3	6.0	No	No
Tetryl	mg/kg	0.33	12.0	No	No
Pesticides/PCBs					
Aroclor-1254	mg/kg	2	0.11	Yes	**Yes**
4,4'-DDD	mg/kg	0.0024	2.20	No	No
4,4'-DDE	mg/kg	0.012	1.60	No	No
4,4'-DDT	mg/kg	0.0034	1.90	No	No
Aldrin	mg/kg	0.0022	0.03	No	No
Alpha-Chlordane	mg/kg	0.0057	1.80 [4]	No	No
Dieldrin	mg/kg	0.0074	0.03	No	No
Endosulfan I	mg/kg	0.032	37.0	No	No
Endosulfan II	mg/kg	0.00088	37.0 [5]	No	No
Endrin	mg/kg	0.0036	1.80	No	No
Endrin aldehyde	mg/kg	0.0032	1.80 [6]	No	No
Endrin ketone	mg/kg	0.00058	1.80 [6]	No	No
Gamma-Chlordane	mg/kg	0.0011	1.80 [4]	No	No
Methoxychlor	mg/kg	0.045	31.0	No	No
Inorganics					
Aluminum	mg/kg	35000	7700	Yes	**Yes**
Antimony	mg/kg	5.10	3.10	Yes	**Yes**
Arsenic	mg/kg	16.1	0.67	Yes	**Yes**
Barium	mg/kg	308	1500	No	No
Beryllium	mg/kg	1.40	16.0	No	No
Cadmium	mg/kg	1100	7.0	Yes	**Yes**
Calcium	mg/kg	193000	NA [7]	NA	No

Table 2.2
Human Health Risk Assessment Constituents of Potential Concern OD Hill Area
Combined Surface and Subsurface Soil (≤15 feet bgs)
Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration of Detected Analytes	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Chromium	mg/kg	446	0.30 [8]	Yes	Yes
Cobalt	mg/kg	19.7	2.3	Yes	Yes
Copper	mg/kg	7310	310	Yes	Yes
Cyanide	mg/kg	0.70	2.10	No	No
Iron	mg/kg	118000	NA [7]	NA	No
Lead	mg/kg	998	400	Yes	Yes
Magnesium	mg/kg	15000	NA [7]	NA	No
Manganese	mg/kg	1380	180	Yes	Yes
Mercury	mg/kg	9.10	2.3	Yes	Yes
Nickel	mg/kg	67.7	150	No	No
Potassium	mg/kg	4880	NA [7]	NA	No
Selenium	mg/kg	0.73	39.0	No	No
Silver	mg/kg	205	39.0	Yes	Yes
Sodium	mg/kg	377	NA [7]	NA	No
Thallium	mg/kg	0.27	0.078	Yes	Yes
Vanadium	mg/kg	53.7	39.0	Yes	Yes
Zinc	mg/kg	1470	2300	No	No

[1] Analytes shown are those that are detected in any sample, from surface soil (0 - ≤ 15 feet bgs) from the exposure area.

[2] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] No RSL available, so the analyte is considered a COPC.

[4] No RSL exists for alpha-chlordane or gamma-chlordane, therefore the RSL for chlordane was used as a surrogate.

[5] No RSL exists for endosulfan II, therefore the RSL for endosulfan used as a surrogate.

[6] No RSL exists for endrin aldehyde or endrin ketone, therefore the RSL for endrin used as a surrogate.

[7] Calcium, Iron, Magnesium, Potassium, and Sodium are essential nutrients and are not expected to pose an unacceptable risk to human receptors

[8] No RSL exists for total chromium, therefore the more conservative RSL for chromium(VI) used.

NA = Not applicaple because essential nutrient.

Table 2.3
Human Health Risk Assessment Constituents of Potential Concern Kickout Area
Surface Soil (≤2 feet bgs)
Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Semivolatile Organic Compounds					
Benzo(b)fluoranthene	mg/kg	0.02	0.15	No	No
Bis(2-Ethylhexyl)phthalate	mg/kg	0.70	38.0	No	No
Chrysene	mg/kg	0.027	15.0	No	No
Fluoranthene	mg/kg	0.03	230	No	No
Hexachlorobenzene	mg/kg	0.03	0.33	No	No
Phenanthrene	mg/kg	0.018	NA [3]	Yes	**Yes**
Pyrene	mg/kg	0.036	170	No	No
Herbicides					
MCPA	mg/kg	9.40	3.10	Yes	**Yes**
Explosives					
1,3,5-Trinitrobenzene	mg/kg	0.10	220	No	No
2,4,6-Trinitrotoluene	mg/kg	1.40	3.60	No	No
2,4-Dinitrotoluene	mg/kg	0.84	1.70	No	No
2-amino-4,6-Dinitrotoluene	mg/kg	0.099	15.0	No	No
4-amino-2,6-Dinitrotoluene	mg/kg	0.27	15.0	No	No
RDX	mg/kg	5.80	6.0	No	No
Pesticides/PCBs					
4,4'-DDD	mg/kg	0.0033	2.20	No	No
Dieldrin	mg/kg	0.00079	0.03	No	No
Endosulfan I	mg/kg	0.055	37.0	No	No
Endrin	mg/kg	0.0036	1.80	No	No
Endrin aldehyde	mg/kg	0.0032	1.80 [4]	No	No
Endrin ketone	mg/kg	0.00058	1.80 [4]	No	No
Gamma-Chlordane	mg/kg	0.0011	1.80 [5]	No	No
Methoxychlor	mg/kg	0.045	31.0	No	No
Inorganics					
Aluminum	mg/kg	25000	7700	Yes	**Yes**
Antimony	mg/kg	2.40	3.10	No	No
Arsenic	mg/kg	7.60	0.67	Yes	**Yes**
Barium	mg/kg	365	1500	No	No
Beryllium	mg/kg	1.00	16.0	No	No
Cadmium	mg/kg	8.30	7.0	Yes	**Yes**
Calcium	mg/kg	41300	NA [6]	NA	No
Chromium	mg/kg	39.3	0.30 [7]	Yes	**Yes**
Cobalt	mg/kg	26.8	2.3	Yes	**Yes**
Copper	mg/kg	293	310	No	No
Iron	mg/kg	75700	NA [6]	NA	No
Lead	mg/kg	198	400	No	No
Magnesium	mg/kg	8440	NA [6]	NA	No
Manganese	mg/kg	5040	180	Yes	**Yes**
Mercury	mg/kg	1.90	2.3	No	No
Nickel	mg/kg	56.0	150	No	No
Potassium	mg/kg	4140	NA [6]	NA	No
Selenium	mg/kg	0.92	39.0	No	No
Silver	mg/kg	2.30	39.0	No	No
Sodium	mg/kg	138	NA [6]	NA	No
Vanadium	mg/kg	41.9	39.0	Yes	**Yes**
Zinc	mg/kg	383	2300	No	No

Table 2.3
Human Health Risk Assessment Constituents of Potential Concern Kickout Area
Surface Soil (≤2 feet bgs)
Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?

[1] Analytes shown are those that are detected in any sample, from surface soil (0 - ≤ 2 feet bgs) from the exposure area.

[2] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] No RSL available, so the analyte is considered a COPC.

[4] No RSL exists for endrin aldehyde or endrin ketone, therefore the RSL for endrin used as a surrogate.

[5] No RSL exists for gamma-chlordane, therefore the RSL for chlordane was used as a surrogate.

[5] No RSL exists for endosulfan II, therefore the RSL for endosulfan used as a surrogate.

[6] Calcium, Iron, Magnesium, Potassium, and Sodium are essential nutrients and are not expected to pose an unacceptable risk to human receptors

[7] No RSL exists for total chromium, therefore the more conservative RSL for chromium(VI) used.

Table 2.4
Human Health Risk Assessment Constituents of Potential Concern
Groundwater
Open Detonation Grounds - Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration	Regional Screening Level (RSL) [2]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Volatile Organic Compounds					
Tetrachloroethene	µg/L	1.0	4.1	No	No
Semivolatile Organic Compounds					
Bis(2-Ethylhexyl)phthalate	µg/L	33	5.6	Yes	**Yes**
Explosives					
1,3-Dinitrobenzene	µg/L	0.067	0.20	No	No
HMX	µg/L	0.5	100	No	No
Inorganics					
Aluminum	µg/L	63300	2000	Yes	**Yes**
Antimony	µg/L	52.1	0.78	Yes	**Yes**
Arsenic	µg/L	9.5	0.052	Yes	**Yes**
Barium	µg/L	751	380	Yes	**Yes**
Beryllium	µg/L	5	2.5	Yes	**Yes**
Cadmium	µg/L	3.8	0.92	Yes	**Yes**
Calcium	µg/L	660000	NA [4]	No	No
Chromium	µg/L	106	0.035	Yes	**Yes**
Cobalt	µg/L	94.4	0.60	Yes	**Yes**
Copper	µg/L	123	80	Yes	**Yes**
Iron	µg/L	113000	NA [4]	No	No
Lead	µg/L	75.6	15 [3]	Yes	**Yes**
Magnesium	µg/L	77900	NA [4]	No	No
Manganese	µg/L	4640	43	Yes	**Yes**
Mercury	µg/L	1.8	0.57	Yes	**Yes**
Nickel	µg/L	209	39	Yes	**Yes**
Potassium	µg/L	18700	NA [4]	No	No
Selenium	µg/L	2.5	10	No	No
Silver	µg/L	4.6	9.4	No	No
Sodium	µg/L	40000	NA [4]	No	No
Thallium	µg/L	3.4	0.020	Yes	**Yes**
Vanadium	µg/L	93.1	8.6	Yes	**Yes**
Zinc	µg/L	321	600	No	No

Notes:

[1] Analytes shown are those that are detected in any sample, from any well within the exposure area.

[2] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] No RSL available for Lead. The USEPA MCL action level was used in its place. (http://www.epa.gov/safewater/contaminants/index.html)

[4] Calcium, Iron, Magnesium, Potassium, and Sodium are essential nutrients and are not expected to pose an unacceptable risk to human receptors

[5] NA = Not applicable because screening value was not available.

Table 2.5
Human Health Risk Assessment Constituents of Potential Concern
Surface Water
Open Detonation Grounds - Seneca Army Depot Activity

Analyte [1]	Units	Maximum Detected Concentration	Regional Screening Level [2] (RSL)	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potentional Concern ? (COPC)
Volatile Organic Compounds					
1,2-Dichloroethane	µg/L	2	0.17	Yes	**Yes**
Acetone	µg/L	10	1400	No	No
Methyl chloride	µg/L	8	19	No	No
Semivolatile Organic Compounds					
Butylbenzylphthalate	µg/L	0.12	16	No	No
Diethyl phthalate	µg/L	0.072	1500	No	No
Explosives					
HMX	µg/L	0.49	100	No	No
RDX	µg/L	2	0.7	Yes	**Yes**
Inorganics					
Aluminum	µg/L	37500	2000	Yes	**Yes**
Arsenic	µg/L	2.3	0.052	Yes	**Yes**
Barium	µg/L	439	380	Yes	**Yes**
Beryllium	µg/L	1.5	2.5	No	No
Cadmium	µg/L	11.2	0.92	Yes	**Yes**
Calcium	µg/L	194000	NA [4]	No	No
Chromium	µg/L	50.8	0.035	Yes	**Yes**
Cobalt	µg/L	18.2	0.6	Yes	**Yes**
Copper	µg/L	612	80	Yes	**Yes**
Cyanide	µg/L	47.7	0.15	Yes	**Yes**
Iron	µg/L	60400	NA [4]	No	No
Lead	µg/L	68.7	15 [3]	Yes	**Yes**
Magnesium	µg/L	24300	NA [4]	No	No
Manganese	µg/L	1250	43	Yes	**Yes**
Mercury	µg/L	3	0.57	Yes	**Yes**
Nickel	µg/L	74.2	39	Yes	**Yes**
Potassium	µg/L	9670	NA [4]	No	No
Selenium	µg/L	1.6	10	No	No
Sodium	µg/L	59100	NA [4]	No	No
Vanadium	µg/L	54.9	8.6	Yes	**Yes**
Zinc	µg/L	883	600	Yes	**Yes**

Notes:
[1] Analytes shown are those that are detected in any sample, from any sample location within the exposure area.
[2] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.
[3] No RSL available for Lead. The USEPA MCL action level was used in its place.
[4] Calcium, Iron, Magnesium, Potassium, and Sodium are essential nutrients and are not expected to pose an unacceptable risk to human receptors
[5] NA = Not applicable because screening value was not available.

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
IRS = Ingestion Rate, soil (mg/day)	Construction/ excavation worker	330	USEPA 1991 (pg. 15), recommended value for outdoor worker, same as adult resident; USEPA 2011a value not provided.	USEPA 2014a
	Park worker	100	USEPA 1991 (pg. 15), recommended value for outdoor worker, same as adult resident; USEPA 2011a value not provided.	USEPA 2014a
	Recreational adult (6 - 26 years)	100	Same as adult resident. USEPA 1991 (pp. 6 and 15); USEPA 2011a only provides a central tendency exposure (CTE) value.	USEPA 2014a
	Recreational child (0 - <6 years)	200	Same as child resident. USEPA 2011a (Table 5-1); "upper-bound values" accounting for both soil and dust ingestion.	USEPA 2014a
	Adult resident (6-26 years)	100	USEPA 1991 (pp. 6 and 15); USEPA 2011a only provides a CTE value.	USEPA 2014a
	Child resident (0-<6 years)	200	USEPA 2011a (Table 5-1); "upper-bound values" accounting for both soil and dust ingestion.	USEPA 2014a
EV = Event Frequency	All receptors	1	Assumes one event per day.	USEPA 2004
FC = Fraction Contacted	All receptors	1	Assumes entire exposure time spent at one exposure area.	
AF = Dermal Adherence Factor, soil (mg/cm^2)	Construction/ excavation worker	0.12	USEPA 2011a, Table 7-20 and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, and face) mean adherence factors for adult commercial/industrial activities	USEPA 2014a

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Park worker	0.12	USEPA 2011a, Table 7-20 and Section 7.2.2; arithmetic mean of weighted average of body part-specific (hands, forearms, and face) mean adherence factors for adult commercial/industrial activities	USEPA 2014a
	Recreational adult (6 - 26 years)	0.07	Same as adult resident. USEPA 2004 (Exhibit 3-5), RAGS Part E	USEPA 2014a
	Recreational child (0-<6 years)	0.2	Same as child resident. USEPA 2004 (Exhibit 3-5), RAGS Part E	USEPA 2014a
	Adult resident (6-26 years)	0.07	USEPA 2004 (Exhibit 3-5), RAGS Part E	USEPA 2014a
	Child resident (0-<6 years)	0.2	USEPA 2004 (Exhibit 3-5), RAGS Part E	USEPA 2014a
GIABS = Gastro Intestinal Absorption Factor (unitless) (also OAF = Oral Absorption Factor)	All receptors	Chemical-specific	Chemical-specific dermal absorption fraction obtained from USEPA RSL Tables.	USEPA 2014b, or most current version at time of draft report
ABS = Dermal Absorption Fraction (unitless)	All receptors	Chemical-specific	Chemical-specific dermal absorption fraction obtained from USEPA RSL Tables.	USEPA 2014b, or most current version at time of draft report
SA = Skin Surface Area (cm^2)	Construction/ excavation worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Park worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Recreational adult (6-26 years)	6,032	Same as adult resident. USEPA 2011a, Tables 7-2 and 7-12; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, 21+ years) (forearm and lower leg-specific data used for males and female lower leg; ratio of male forearm to arm applied to female arm data).	USEPA 2014a
	Recreational child (0-<6 years)	2,690	Same as child resident. USEPA 2011a, Tables 7-2 and 7-8; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, birth to < 6 years) (forearm and lower leg-specific data used when available, ratios for nearest available age group used elsewhere (per USEPA 2011b))	USEPA 2014a
	Adult resident (6-26 years)	6,032	USEPA 2011a, Tables 7-2 and 7-12; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, 21+ years) (forearm and lower leg-specific data used for males and female lower leg; ratio of male forearm to arm applied to female arm data).	USEPA 2014a

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Child resident (0-<6 years)	2,690	USEPA 2011a, Tables 7-2 and 7-8; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, birth to < 6 years) (forearm and lower leg-specific data used when available, ratios for nearest available age group used elsewhere (per USEPA 2011b))	USEPA 2014a
ET = Exposure Time, fraction of day breathing air at site (unitless)	Construction/ excavation worker	0.333	An 8 hour work day divided by 24 hours/day	USEPA 2014a
	Park worker	0.333	An 8 hour work day divided by 24 hours per day.	USEPA 2014a
	Recreational user (adult and child)	0.167	Professional judgment that receptor would be onsite 4 hours per day divided by 24 hours per day.	N/A
	Resident (adult and child)	1	The whole 24 hour day.	USEPA 2014a
EF = Exposure Frequency (days/year)	Construction/ excavation worker	30	Professional judgment. Assumes project of one month duration.	N/A
	Park worker	225	Outdoor worker. USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
	Recreational user (adult and child)	24	Professional judgment. Assumes a recreational user may visit the site twice per month per year.	N/A
	Resident (adult and child)	350	USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
ED = Exposure Duration (years)	Construction/ excavation worker	1	USEPA default value for construction workers.	USEPA 2002a

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Park worker	25	USEPA 1991 (pg. 15); USEPA 2011a only provides a CTE value	USEPA 2014a
	Recreational adult (6-26 years)	20	Same as adult resident. Represents the number of years returning to the same location. Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Recreational child (0-<6 years)	6	Same as child resident. Represents the number of years returning to the same location. USEPA 1991, Pages 6 and 15	USEPA 2014a
	Adult resident (6-26 years)	20	Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Child resident (0-<6 years)	6	USEPA 1991, Pages 6 and 15	USEPA 2014a
CF_s= Conversion Factor, soil (kg/mg)	All receptors	1E-06		
BW = Body Weight (kg)	Construction/ excavation worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Park worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational adult (6-26 years)	80	Same as adult resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a

Table 2.6 Exposure Parameters for Soil Pathways: Ingestion, Dermal Absorption, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Recreational child (0-<6 years)	15	Same as child resident. USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	80	Resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Child resident (0-<6 years)	15	USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
AT_{nc} = Averaging Time (days), noncarcinogens	Construction/ excavation worker	365	ED expressed in days (1 years x 365 days).	
	Park worker	9,125	ED expressed in days (25 years x 365 days).	
	Recreational adult (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Recreational child (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
	Adult resident (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Child resident (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
AT_c = Averaging Time (days), carcinogens	All receptors	25,550	70-year lifetime expressed in days (70 years x 365 days).	USEPA 2014a
VF = Volatilization Factor, soil (m^3/kg)	All receptors	Chemical-specific	The process and equations are described in USEPA 2011a; values obtained from USEPA RSL Calculator	USEPA, 2014b, or most current version at time of draft report
PEF= Particulate Emission Factor (m^3/kg)	All receptors	1.32E+09	USEPA default value PEF used for non-volatile compounds.	USEPA 1996

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
IRW = Groundwater Ingestion Rate (L/day)	Construction/ excavation worker	0.08	Based on ingestion rate of 10mL/hour, assuming an 8-hour work day.	USEPA 2000
	Park worker	2.5	Same as adult resident. USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Recreational adult (6-26 years)	2.5	Same as adult resident. USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Recreational child (0-<6 years)	0.78	Same as child resident. USEPA 2011a, Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	2.5	USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Child resident (0-<6 years)	0.78	USEPA 2011a, Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth to <6 years)	USEPA 2014a
FI = Fraction Ingested (unitless)	All receptors	1	Professional judgment. Assumes entire exposure time spent at one exposure area.	N/A
K_p = Permeability Constant (cm/hour)	All receptors	Chemical-specific	Assume all drinking water comes from one well	N/A

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
SA = Skin Surface Area (cm^2)	Construction/ excavation worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Park worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Recreational adult (6-26 years)	2,230	USEPA 2011a, Table 7-2; average of mean values for head and hands (male and female, 21+ years).	USEPA 2011a
	Recreational child (0-<6 years)	970	USEPA 2011a, Table 7-2; weighted average of mean values for head and hands for children <6 years.	USEPA 2011a
	Adult resident (6-26 years)	20,900	USEPA 2011a, Table 7-10; weighted average of mean values for adults, male and female 21+.	USEPA 2014a
	Child resident (0-<6 years)	6,378	USEPA 2011a, Table 7-10; weighted average of mean values for children <6 years.	USEPA 2014a
EV = Event frequency (events/day)	Construction/ excavation worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during excavation activities, for one event per day.	N/A
	Park worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day.	N/A
	Recreational user (adult and child)	1	Professional judgment. Assumes a recreational user may come into contact with groundwater, for one event per day.	N/A

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Resident (adult and child)	1	Professional judgment. Assumes a resident may come into contact with groundwater, for one event per day.	N/A
t_{event} = Event Duration (hours/event)	Construction/ excavation worker	2	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day, 2 hours per event.	N/A
	Park worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day, 1 hour per event.	N/A
	Recreational adult (6-26 years)	0.71	Same as adult resident, used as a conservative estimate. USEPA 2011a, Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/ showering in a day, divided by mean number of baths/showers taken in a day.	USEPA 2014a
	Recreational child (0-<6 years)	0.54	Same as child resident, used as a conservative estimate. USEPA 2011a, Table 16-28; weighted average of 90th percentile time spent bathing (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	0.71	USEPA 2011a, Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/ showering in a day, divided by mean number of baths/showers taken in a day.	USEPA 2014a
	Child resident (0-<6 years)	0.54	USEPA 2011a, Table 16-28; weighted average of 90th percentile time spent bathing (birth to <6 years)	USEPA 2014a

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
EF = Exposure Frequency (days/year)	Construction/ excavation worker	30	Professional judgment. Assumes project of one month duration.	N/A
	Park worker	225	Outdoor worker. USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
	Recreational user (adult and child)	24	Professional judgment. Assumes a recreational user may visit the site twice per month per year.	N/A
	Resident (adult and child)	350	USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
ED = Exposure Duration (years)	Construction/ excavation worker	1	USEPA default value for construction workers.	USEPA 2002
	Park worker	25	USEPA 1991 (pg. 15); USEPA 2011a only provides a CTE value	USEPA 2014a
	Recreational adult (6-26 years)	20	Same as adult resident. Represents the number of years returning to the same location. Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Recreational child (0-<6 years)	6	Same as child resident. Represents the number of years returning to the same location. USEPA 1991, Pages 6 and 15	USEPA 2014a
	Adult resident (6-26 years)	20	Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Child resident (0-<6 years)	6	USEPA 1991, Pages 6 and 15	USEPA 2014a
CF_w = Conversion Factor, water (µg/m)	All receptors	1,000		
BW = Body Weight (kg)	Construction/ excavation worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Park worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational adult (6-26 years)	80	Same as adult resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational child (0-<6 years)	15	Same as child resident. USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	80	Resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Child resident (0-<6 years)	15	USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
AT_{nc} = Averaging Time (days), noncarcinogens	Construction/ excavation worker	365	ED expressed in days (1 year x 365 days).	
	Park worker	9,125	ED expressed in days (25 years x 365 days).	
	Recreational adult (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Recreational child (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	

Table 2.7 Exposure Parameters for Groundwater Pathways: Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Adult resident (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Child resident (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
AT_c = Averaging Time (days), carcinogens	All receptors	25,550	70-year lifetime expressed in days (70 years x 365 days).	USEPA 2014a
VF_w = Volatilization Factor, water (L/m^3)	All receptors	0.5		USEPA 2014c
FA = Fraction absorbed (unitless)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
B = Relative contribution of permeability coefficient (unitless)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
t^* = Time it takes to reach steady state (hours)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
τ_{event} = Lag Time per Event (hr/event)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
IRW = Surface Water Ingestion Rate (L/day)	All receptors	0.02	A 10-mL/hour ingestion rate will be estimated for the RME and is consistent with USEPA Region IV default values for wading activities, assuming a a 2-hour exposure.	USEPA 2000
FI = Fraction Ingested (unitless)	All receptors	1	Professional judgment. Assumes entire exposure time spent at one exposure area.	N/A
K_p = Permeability Constant (cm/hour)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
SA = Skin Surface Area (cm^2)	Construction/ excavation worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Park worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Recreational adult (6-26 years)	6,032	Same as adult resident. USEPA 2011a, Tables 7-2 and 7-12; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, 21+ years) (forearm and lower leg-specific data used for males and female lower leg; ratio of male forearm to arm applied to female arm data).	USEPA 2014a

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Recreational child (0-<6 years)	2,690	Same as child resident. USEPA 2011a, Tables 7-2 and 7-8; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, birth to < 6 years) (forearm and lower leg-specific data used when available, ratios for nearest available age group used elsewhere (per USEPA 2011b))	USEPA 2014a
	Adult resident (6-26 years)	6,032	USEPA 2011a, Tables 7-2 and 7-12; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, 21+ years) (forearm and lower leg-specific data used for males and female lower leg; ratio of male forearm to arm applied to female arm data).	USEPA 2014a
	Child resident (0-<6 years)	2,690	USEPA 2011a, Tables 7-2 and 7-8; weighted average of mean values for head, hands, forearms, lower legs, and feet (male and female, birth to < 6 years) (forearm and lower leg-specific data used when available, ratios for nearest available age group used elsewhere (per USEPA 2011b))	USEPA 2014a
EV = Event frequency (events/day)	Construction/ excavation worker	1	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day.	N/A
	Park worker	1	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day.	N/A

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Recreational user (adult and child)	1	Professional judgment. Assumes a /recreational user may come into contact with surface water, for one event per day.	N/A
	Resident (adult and child)	1	Professional judgment. Assumes a resident may come into contact with surface water, for one event per day.	N/A
t_{event} = Event Duration (hours/event)	Construction/ excavation worker	2	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	N/A
	Park worker	2	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	N/A
	Recreational user (adult and child)	2	Professional judgment. Assumes a resident may come into contact with surface water, for one event per day, 2 hours per event.	
	Resident (adult and child)	2	Professional judgment. Assumes a resident may come into contact with surface water, for one event per day, 2 hours per event.	N/A
ET = Exposure Time (hours/day)	Construction/ excavation worker	2	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	N/A
	Park worker	2	Professional judgment. Assumes a worker may come into contact with surface water during work activities, for one event per day, 2 hours per event.	N/A

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Recreational user (adult and child)	2	Professional judgment. Assumes a visitor/recreational user may come into contact with surface water, for one event per day, 2 hours per event.	N/A
	Resident (adult and child)	2	Professional judgment. Assumes a resident may come into contact with surface water, for one event per day, 2 hours per event.	N/A
EF = Exposure Frequency (days/year)	Construction/ excavation worker	30	Professional judgment. Assumes project of one month duration.	N/A
	Park worker	113	Outdoor worker value of 225 days/year, and assumes that winter weather would preclude use of the creek for half of the year. USEPA 1991 (pg. 15); value not provided in USEPA 2011a.	USEPA 2014a
	Recreational user (adult and child)	24	Professional judgment. Assumes a recreational user may visit the site twice per month per year.	N/A
	Resident (adult and child)	175	USEPA 1991 (pg. 15) value of 350 days/year, and assumes that winter weather would preclude use of the creek for half of the year.; value not provided in USEPA 2011a.	USEPA 2014a
ED = Exposure Duration (years)	Construction/ excavation worker	1	USEPA default value for construction workers.	USEPA 2002
	Park worker	25	USEPA 1991 (pg. 15); USEPA 2011a only provides a CTE value	USEPA 2014a

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Recreational adult (6-26 years)	20	Same as adult resident. Represents the number of years returning to the same location. Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Recreational child (0-<6 years)	6	Same as child resident. Represents the number of years returning to the same location. USEPA 1991, Pages 6 and 15	USEPA 2014a
	Adult resident (6-26 years)	20	Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Child resident (0-<6 years)	6	USEPA 1991, Pages 6 and 15	USEPA 2014a
CF_w = Conversion Factor, water (L/ml or L/cm^2)	All receptors	1E-03		
BW = Body Weight (kg)	Construction/ excavation worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Park worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational adult (6-26 years)	80	Same as adult resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational child (0-<6 years)	15	Same as child resident. USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a

Table 2.8 Exposure Parameters for Surface Water Pathways: Incidental Ingestion and Dermal Contact

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Adult resident (6-26 years)	80	Resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Child resident (0-<6 years)	15	USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
AT_{nc} = Averaging Time (days), noncarcinogens	Construction/ excavation worker	365	ED expressed in days (1 year x 365 days).	
	Park worker	9,125	ED expressed in days (25 years x 365 days).	
	Recreational adult (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Recreational child (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
	Adult resident (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Child resident (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
AT_c = Averaging Time (days), carcinogens	All receptors	25,550	70-year lifetime expressed in days (70 years x 365 days).	USEPA 2014a

Table 2.9
Surface Soil (0 - ≤ 2 ft bgs) Summary Statistics for UCL Calculation
Open Detonation (OD) Hill,
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Variable	Number Samples Detected	Total Number Samples [1]	Percent Detected	Minimum	Maximum	Mean	Standard Deviation	Shapiro Wilk Test Statistic [2]	Shapiro Wilk Critical Value	Distribution [3]	UCL test	UCL [4] (mg/kg)	Selected EPC [5] (mg/kg)	UCL or Max
Semivolatile Organic Compounds														
2,4-Dinitrotoluene	7	22	32%	0.083	2.5	0.642	0.854	0.681	0.803	Approx. Normal	95% KM (t)	**0.47**	**0.47**	UCL
Benzo(a)pyrene	4	22	18%	0.028	0.082	0.048	0.0237	N/A	N/A	N/A	N/A	N/A	**0.082**	Max
Benzo(ghi)perylene	2	22	9%	0.039	0.048	0.0435	0.00636	N/A	N/A	N/A	N/A	N/A	**0.048**	Max
N-Nitrosodipropylamine	1	22	5%	0.11	0.11	0.11	N/A	N/A	N/A	N/A	N/A	N/A	**0.11**	Max
Phenanthrene	5	22	23%	0.024	0.038	0.0292	0.00638	N/A	N/A	N/A	N/A	N/A	**0.038**	Max
Explosives														
Nitroglycerine	1	26	4%	1.5	1.5	1.5	N/A	N/A	N/A	N/A	N/A	N/A	**1.5**	Max
Pesticides/PCBs														
Aroclor-1254	4	22	18%	0.074	2	0.691	0.903	N/A	N/A	N/A	N/A	N/A	**2.0**	Max
Inorganics														
Aluminum	51	51	100%	5910	35000	18463	3902	0.844	5.49E-7 [6]	Nonparametric	95 %Student's-t	**19000**	**19000**	UCL
Arsenic	51	51	100%	4	16.1	5.994	2.308	0.641	5.88E-15 [6]	Nonparametric	95% Student's-t	**6.5**	**6.5**	UCL
Cadmium	48	51	94%	0.76	1100	30.43	157.7	0.163	0.947	Nonparametric	95% KM (Chebyshev)	**120**	**120**	UCL
Chromium	51	51	100%	10.6	446	37.04	58.64	0.204	0.0 [6]	Nonparametric	95% Student's-t	**51**	**51**	UCL
Cobalt	51	51	100%	9	19.7	12.12	1.613	0.865	5.11E-6 [6]	Gamma	95% Approx Gamma	**12**	**12**	UCL
Copper	51	51	100%	38.9	4180	491.5	599.7	0.508	0.0 [6]	Nonparametric	95% Chebyshev (Mean, SD)	**860**	**860**	UCL
Lead	51	51	100%	19.8	998	83.57	139.7	0.321	0.0 [6]	Nonparametric	95% Chebyshev (Mean, SD)	**170**	**170**	UCL
Manganese	51	51	100%	361	1080	610.9	134.9	0.864	4.66E-6 [6]	Nonparametric	95% Student's-t	**640**	**640**	UCL
Mercury	51	51	100%	0.15	7	3.2	1.734	0.964	0.223 [6]	Normal	95% Student's-t	**3.6**	**3.6**	UCL
Silver	41	51	80%	0.23	205	8.137	31.55	0.192	0.941	Nonparametric	95% KM (Chebyshev)	**24**	**24**	UCL
Thallium	4	51	8%	0.1	0.27	0.2	0.0726	N/A	N/A	N/A	N/A	N/A	**0.27**	Max
Vanadium	51	51	100%	16.6	53.7	29.64	5.129	0.832	1.62E-7 [6]	Nonparametric	95% Student's-t	**31**	**31**	UCL

[1] Total number of samples does not include field duplicates. If a field duplicate was collected, the best value between the duplicates was used to calculate the UCL.

[2] The null hypothesis is that the data are normally distributed. The test statistic is compared the Shapiro-Wilk Critical value, which is based on the number of samples. If Shaprio-Willk test statistic is greater than the critical value, do not reject the null hypothesis.
[3] The distribution of the data is estimated using the Shapiro-Wilk Test.
[4] The Upper Confidence Limit (UCL) is the 95% UCL using the distribution of the data. All data distributions and UCLs calculated in ProUCL (v. 5.0) (EPA 2013a).
[5] If enough samples were not available to calculate a 95% or greater UCL, the maximum detected concentration was selected as the EPC. If the maximum detected value is greater than the calculated UCL, the maximum detected value was used.
[6] 5% Shapiro Wilk P Value. For sample sizes >50, only approximate p-values are displayed in ProUCL.
N/A - Not available, because not enough detected samples in dataset.

Table 2.10
Combined Surface and Subsurface Soil (0 -≤ 15 ft bgs) Summary Statistics for UCL Calculation
Open Detonation (OD) Hill,
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Variable	Number Samples Detected	Total Number Samples [1]	Percent Detected	Minimum (mg/kg)	Maximum (mg/kg)	Mean	Standard Deviation	Shapiro Wilk Test Statistic [2]	Shapiro Wilk Critical Value	Distribution [3]	UCL test	UCL [4] (mg/kg)	Selected EPC [5] (mg/kg)	UCL or Max
Semivolatile Organic Compounds														
2,4-Dinitrotoluene	12	27	44%	0.059	14	1.588	3.967	0.43	0.86	Lognormal	97.5% KM Chebyshev	**4.1**	**4.1**	UCL
2,6-Dinitrotoluene	2	27	7%	0.041	0.7	0.371	0.466	N/A	N/A	N/A	N/A	N/A	**0.70**	Max
Benzo(a)pyrene	8	27	30%	0.028	0.082	0.0441	0.017	0.79	0.82	Gamma	95% Adjusted Gamma KM	**0.050**	**0.050**	UCL
Benzo(ghi)perylene	6	27	22%	0.034	0.066	0.0475	0.0113	0.97	0.79	Normal	95% KM (t)	**0.055**	**0.055**	UCL
N-Nitrosodipropylamine	5	27	19%	0.02	1.6	0.357	0.696	N/A	N/A	N/A	N/A	N/A	**1.6**	Max
Phenanthrene	9	27	33%	0.024	0.046	0.0342	0.0082	0.91	0.83	Normal	95% KM (t)	**0.039**	**0.039**	UCL
Explosives														
Nitroglycerine	1	26	4%	1.5	1.5	1.5	N/A	N/A	N/A	N/A	N/A	N/A	**1.5**	Max
Pesticides/PCBs														
Aroclor-1254	4	27	15%	0.074	2	0.691	0.903	N/A	N/A	N/A	N/A	N/A	**2.0**	Max
Inorganics														
Aluminum	71	71	100%	5910	35000	17810	3969	0.93	6.35E-4 [6]	Nonparametric	95% Student's-t	**19000**	**19000**	UCL
Antimony	27	71	38%	0.14	5.1	0.974	1.134	0.69	0.92	Lognormal	95% KM (t)	**0.72**	**0.72**	UCL
Arsenic	71	71	100%	3.3	16.1	5.876	2.107	0.71	0.0 [6]	Nonparametric	95% Student's-t	**6.3**	**6.3**	UCL
Cadmium	65	69	94%	0.04	1100	24.24	135.6	0.14	0.0 [6]	Nonparametric	95% KM (Chebyshev)	**92**	**92**	UCL
Chromium	71	71	100%	10.6	446	34.11	49.89	0.20	0.0 [6]	Nonparametric	95% Student's-t	**44**	**44**	UCL
Cobalt	71	71	100%	6.4	19.7	11.99	1.842	0.94	.00229 [6]	Gamma	95% Approx Gamma	**12**	**12**	UCL
Copper	71	71	100%	24.7	7310	598.5	997.4	0.45	0.0 [6]	Nonparametric	95% Chebyshev (Mean, Sd)	**1000**	**1000**	UCL
Lead	71	71	100%	11.2	998	76.78	119.7	0.33	0.0 [6]	Nonparametric	95% Chebyshev (Mean, Sd)	**140**	**140**	UCL
Manganese	71	71	100%	361	1380	604.5	164.2	0.84	1.74E-10 [6]	Nonparametric	95% Student's-t	**630**	**630**	UCL
Mercury	71	71	100%	0.02	9.1	3.548	2.096	0.954	.0276 [6]	Nonparametric	95% Chebyshev (Mean, Sd)	**4.6**	**4.6**	UCL
Silver	59	71	83%	0.12	205	7.703	27.16	0.24	0.0 [6]	Nonparametric	95% KM (Chebyshev)	**19**	**19**	UCL
Thallium	6	71	8%	0.1	0.27	0.2	0.0645	0.94	0.79	Normal	95% KM (t)	**0.11**	**0.11**	UCL
Vanadium	71	71	100%	16.6	53.7	28.67	5.431	0.92	6.25E-5 [6]	Nonparametric	95% Student's-t	**30**	**30**	UCL

[1] Total number of samples does not include field duplicates. If a field duplicate was collected, the best value between the duplicates was used to calculate the UCL.
[2] The null hypothesis is that the data are normally distributed. The test statistic is compared the Shapiro-Wilk Critical value, which is based on the number of samples. If Shaprio-Willk test statistic is greater than the critical value, do not reject the null hypothesis.
[3] The distribution of the data is estimated using the Shapiro-Wilk Test.
[4] The Upper Confidence Limit (UCL) is the 95% UCL using the distribution of the data. All data distributions and UCLs calculated in ProUCL (v. 4.1) (EPA 2010).
[5] If enough samples were not available to calculate a 95% or greater UCL, the maximum detected concentration was selected as the EPC. If the maximum detected value is greater than the calculated UCL, the maximum detected value was used.
N/A - Not available, because not enough detected samples in dataset.
[6] 5% Shapiro Wilk P Value. For sample sizes >50, only approximate p-values are displayed in ProUCL.

Table 2.11
Surface Soil (0 - ≤ 2 ft bgs) Summary Statistics for UCL Calculation
Kickout Area
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Variable	Number Samples Detected	Total Number Samples [1]	Percent Detected	Minimum	Maximum	Mean	Standard Deviation	Shapiro Wilk Test Statistic [2]	Shapiro Wilk Critical Value	Distribution [3]	UCL test	UCL [4] (mg/kg)	Selected EPC [5] (mg/kg)	UCL or Max
Semivolatile Organic Compounds														
Phenanthrene	1	7	14%	0.018	0.018	0.018	N/A	N/A	N/A	N/A	N/A	N/A	**0.018**	Max
Herbicides														
MCPA	2	7	29%	6.3	9.4	7.85	2.192	N/A	N/A	N/A	N/A	N/A	**9.4**	Max
Inorganics														
Aluminum	23	23	100%	14200	25000	18935	2232	0.965	0.914	Normal	95% Student's-t	**20000**	**20000**	UCL
Arsenic	23	23	100%	3.9	7.6	5.278	0.852	0.899	0.914	Gamma	95% Adjusted Gamma	**5.6**	**5.6**	UCL
Cadmium	11	23	48%	0.46	8.3	3.08	2.52	0.894	0.85	Normal	95% KM (t)	**2.6**	**2.6**	UCL
Chromium	23	23	100%	22.4	39.3	27.22	3.579	0.866	0.914	Approx. Normal	95% Student's-t	**29**	**29**	UCL
Cobalt	23	23	100%	7.7	26.8	12.47	4.623	0.894	0.850	Normal	95% KM (t)	**2.6**	**2.6**	UCL
Manganese	23	23	100%	256	5040	803.1	953.9	0.433	0.91	Approx. Lognormal	95% Chebyshev (Mean, Sd)	**1700**	**1700**	UCL
Mercury	23	23	100%	0.03	1.9	0.566	0.578	0.815	0.914	Gamma	95% Adjusted Gamma	**0.87**	**0.87**	UCL
Vanadium	23	23	100%	22.5	41.9	31.1	4.506	0.984	0.914	Normal	95% Student's-t	**33**	**33**	UCL

[1] Total number of samples does not include field duplicates. If a field duplicate was collected, the best value between the duplicates was used to calculate the UCL.
[2] The null hypothesis is that the data are normally distributed. The test statistic is compared the Shapiro-Wilk Critical value, which is based on the number of samples. If Shaprio-Willk test statistic is greater than the critical value, do not reject the null hypothesis.
[3] The distribution of the data is estimated using the Shapiro-Wilk Test.
[4] The Upper Confidence Limit (UCL) is the 95% UCL using the distribution of the data. All data distributions and UCLs calculated in ProUCL (v. 4.1) (EPA 2010).
[5] If enough samples were not available to calculate a 95% or greater UCL, the maximum detected concentration was selected as the EPC. If the maximum detected value is greater than the calculated UCL, the maximum detected value was used.
N/A - Not available, because not enough detected samples in dataset.

Table 2.12
Groundwater Exposure Point Concentrations by Well
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Analyte	Units	Exposure Point Concentration all wells combined [1]	Exposure Point Concentration for each well [2]													
			MW1	MW2	MW3	MW4	MW5	MW45-2	MW45-3	MW45-4	MW23-1	MW23-2	MW23-3	MW23-4	MW23-5	MW23-6
Semivolatile Organic Compounds																
Bis(2-Ethylhexyl)phthalate	µg/L	33	33	11 U	12	11	10 U	23	11 U	11 U	--	--	--	--	--	--
Inorganics																
Aluminum	µg/L	63,300	124 J	828	83.5 J	17,700	821	42 U	7,510	63300	--	--	--	--	--	--
Antimony	µg/L	52	24.3 J	23.1 J	52.1 J	49.6 J	28.1 J	26.8 J	36.7 J	21.6 UJ	--	--	--	--	--	--
Arsenic	µg/L	9.5 J	1.4 U	1.4 U	1.4 U	1.7 J	1.4 U	1.4 U	1.8 J	9.5 J	--	--	--	--	--	--
Barium	µg/L	751	56.5 J	50.8 J	25.5 J	195 J	82.8 J	27.2 J	62.1 J	751	--	--	--	--	--	--
Beryllium	µg/L	5	0.4 U	0.4 U	0.4 U	0.87 J	0.4 U	0.4 U	0.52 J	5	--	--	--	--	--	--
Cadmium	µg/L	3.8	2.2 J	2.1 U	2.1 U	3.8 J	2.1 U	2.9 J	3.2 J	4 U	--	--	--	--	--	--
Chromium	µg/L	106	2.6 U	4.1 J	2.6 U	28.9	2.6 J	2.6 U	16.1	106	--	--	--	--	--	--
Cobalt	µg/L	94.4	4.4 U	5.3 J	4.4 U	11 J	4.4 U	4.4 U	14.6 J	94.4	--	--	--	--	--	--
Copper	µg/L	123	3.1 U	7.2 J	3.9 J	79.2	3.1 U	3.1 U	11.9 J	123	25 U	25 U	25 U	20 U	25 U	25 U
Lead	µg/L	75.6	0.71 J	0.66 J	0.73 J	15.7	1.1 J	0.71 J	9.5	75.6	5 U	5 U	5 U	5.4	2.4 J	3.6 J
Manganese	µg/L	4,640	4.4 J	23.7	2.9 J	384	55	1,400	625	4640	--	--	--	--	--	--
Mercury	µg/L	1.8	0.04 U	0.04 U	0.04 U	1.8	0.04 U	0.04 U	0.08 J	0.29	--	--	--	--	--	--
Nickel	µg/L	209	4 U	4 U	4 U	43.9	4 U	10.2 J	30.7 J	209	--	--	--	--	--	--
Thallium	µg/L	3.4	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	3.4 J	--	--	--	--	--	--
Vanadium	µg/L	93.1	3.7 U	3.7 U	3.7 U	29.7 J	3.7 U	3.7 U	11.7 J	93.1	--	--	--	--	--	--

[1] Exposure point concentration is the maximum detected concentration from any well.
[2] Exposure point concentration for individual wells is the maximum detected concentration from that well.
U= Analyte not detected.
UJ = Analyte not detected, reported LOD may be inaccurate or imprecise
J = Analyte detected between MDL and practical quantitation limit (PQL).
-- = Analyte not sampled.

Table 2.13
Surface Water Exposure Point Concentrations
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Analyte	Units	Exposure Point Concentration [1] for each surface water exposure area					
		Reeder Creek Onsite and Downstream Samples		Drainage Ditch Samples		Reeder Creek Upstream of OD Grounds	
Volatile Organic Compounds							
1,2-Dichloroethane	µg/L	8	J	10	U	5	U
Methylene chloride	µg/L	2	J	10	U	5	U
Explosives							
RDX	µg/L	0.67		2		0.12	U
Inorganics							
Aluminum	µg/L	300		37500		140	
Cadmium	µg/L	11.2		11.2		0.88	
Chromium	µg/L	50.8		50.8		6.1	UJ
Cobalt	µg/L	18.2	J	18.2	J	1.7	U
Copper	µg/L	612.0		612		3	
Lead	µg/L	2.2		68.7		1.8	U
Manganese	µg/L	236.0		1250		69.4	
Mercury	µg/L	0.11		3		0.1	U
Vanadium	µg/L	30.9	U	54.9		39.2	J
Zinc	µg/L	15.4	J	883		14.3	

[1] Exposure point concentration is the maximum detected concentration of samples associated with that exposure area.

U= Analyte not detected.

J = Analyte detected between MDL and practical quantitation limit (PQL).

Table 2.14
Human Health Risk Assessment Toxicity Values
Soil
OD Grounds at Seneca Army Depot Activity, Romulus, New York

				Ingestion			Dermal Contact		Inhalation	
Analyte	CAS #	Volatile Organic Compound (Yes/No)	ABS [1] (unitless)	RfD_o (mg/kg-day)	SF_o ((mg/kg-day)$^{-1}$)	OAF [2] (unitless)	RfD_d [3] (mg/kg-day)	SF_d [4] ((mg/kg-day)$^{-1}$)	RfC_i (mg/m^3)	IUR ((µg/m^3)$^{-1}$)
Semivolatile Organic Compounds										
2,4-Dinitrotoluene	121-14-2	No	0.102	2.0E-03 I	3.1E-01 C	1	2.0E-03	3.1E-01		8.9E-05 C
2,6-Dinitrotoluene	606-20-2	No	0.099	3.0E-04 X	1.5E+00 P	1	3.0E-04	1.5E+00	--	--
Benzo(a)pyrene	50-32-8	No	0.13	--	7.3E+00 I	1	--	7.3E+00		1.1E-03 C
Benzo(ghi)perylene	191-24-2	No	--	--	--	--	--	--	--	--
N-Nitrosodipropylamine	621-64-7	No	0.1	--	7.0E+00 I	1	--	7.0E+01		2.0E-03 C
Phenanthrene	85-01-8	No	--	--	--	--	--	--	--	--
Herbicides										
MCPA		No	0.1	5.0E-04 I		1	5.0E-04	0.0E+00		
Explosives										
Nitroglycerine	55-63-0	No	0.1	1.0E-04 P	1.7E-02 P	1	1.0E-04	1.7E-02		
Pesticides/PCB										
Aroclor-1254	11097-69-1	No	0.14	2.0E-05 I	2.0E+00 S	1	2.0E-05	2.0E+00		5.7E-04 S
Inorganics										
Aluminum	7429-90-5	No	--	1.0E+00 P	--	1	1.0E+00	--	5.0E-03 P	--
Antimony	7440-36-0	No	--	4.0E-04 I	--	0.15	6.0E-05	--	--	--
Arsenic	7440-38-2	No	0.03	3.0E-04 I	1.5E+00 I	1	3.0E-04	1.5E+00	1.5E-05 C	4.3E-03 I
Cadmium (diet)	7440-43-9	No	0.001	1.0E-03 I	--	0.025	2.5E-05	--	1.0E-05 A	1.8E-03 I
Chromium (III)	16065-83-1	No	--	1.5E+00 I	--	0.013	2.0E-02	--	--	--
Chromium (VI)	18540-29-9	No	--	3.0E-03 I	5.0E-01 J	0.025	7.5E-05	2.0E+01	1.0E-04 I	8.4E-02 S
Cobalt	7440-48-4	No	--	3.0E-04 P	--	1	3.0E-04	--	6.0E-06 P	9.0E-03 P
Copper	7440-50-8	No	--	4.0E-02 H	--	1	4.0E-02	--	--	--
Manganese (diet)	7439-96-5	No	--	1.4E-01 I	--	1	1.4E-01	--	5.0E-05 I	--
Mercury	7487-94-7	No	--	3.0E-04 I	--	0.07	2.1E-05	--	3.0E-04 S	--
Silver	7440-22-4	No	--	5.0E-03 I	--	0.04	2.0E-04	--	--	--
Thallium	7440-28-0	No	--	1.0E-05 X	--	1	1.0E-05	--	--	--
Vanadium	7440-62-2	No	--	5.0E-03 S	--	0.026	1.3E-04	--	1.0E-04 A	--

[1] ABS is the recommended dermal absorption fraction of contaminants in soil. ABS values are obtained from Exhibit 3-4, Risk Assessment Guidance for Superfund, Volume I: Human
[2] OAF is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the OAF is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally
[3] RfD_d is the dermal reference dose and is based on the absorbed dose. The RFD_d is calculated as RfD_o*OAF.
[4] SF_d is the dermal slope factor and is based on absorbed dose. The SF_d is calculated as SF_o / OAF.
-- = toxicity data not available.

Sources:
A = ATSDR
C = Cal EPA
I = IRIS
J = New Jersey Department of Environmental Protection. See Section 5.6 of the RSL User Guide
P= PPRTV
S = RSL User Guide, Section 5.3
X= PPRTV Appendix

Table 2.15
Human Health Risk Assessment Toxicity Values
Groundwater
OD Grounds at Seneca Army Depot Activity, Romulus, New York

				Ingestion			Dermal Contact		Inhalation	
Analyte	CAS #	Volatile Organic Compound (Yes/No)	ABS [1] (unitless)	RfD_o (mg/kg-day)	SF_o $((mg/kg\text{-}day)^{-1})$	OAF [2] (unitless)	RfD_d [3] (mg/kg-day)	SF_d [4] $((mg/kg\text{-}day)^{-1})$	RfC_i (mg/m^3)	IUR $((\mu g/m^3)^{-1})$
Semivolatile Organic Compounds										
Bis(2-Etheylhexyl)phthalate	117-81-7	No	0.1	2.0E-02 I	1.4E-02 I	1	2.0E-02	1.4E-02	--	2.4E-06 C
Metals										
Aluminum	7429-90-5	No	--	1.0E+00 P	--	1	1.0E+00	--	5.0E-03 P	--
Antimony	7440-36-0	No	--	4.0E-04 I	--	0.15	6.0E-05	--	--	--
Arsenic	7440-38-2	No	0.03	3.0E-04 I	1.5E+00 I	1	3.0E-04	1.5E+00	1.5E-05 C	4.3E-03 I
Barium	7440-39-3	No	--	2.0E-01 I	--	0.07	1.4E-02	--	5.0E-04 H	--
Beryllium	7440-41-7	No	--	2.0E-03 I	--	0.007	1.4E-05	--	2.0E-05 I	2.4E-03 I
Cadmium (Water)	7440-43-9	No	0.001	5.0E-04 I	--	0.05	2.5E-05	--	1.0E-05 A	1.8E-03 I
Chromium (III)	16065-83-1	No	--	1.5E+00 I	--	0.013	2.0E-02	--	--	--
Chromium (VI)	18540-29-9	No	--	3.0E-03 I	5.0E-01 J	0.025	7.5E-05	2.0E+01	1.0E-04 I	8.4E-02 S
Cobalt	7440-48-4	No	--	3.0E-04 P	--	1	3.0E-04	--	6.0E-06 P	9.0E-03 P
Copper	7440-50-8	No	--	4.0E-02 H	--	1	4.0E-02	--	--	--
Manganese (non-diet)	7439-96-5	No	--	2.4E-02 S		0.04	9.6E-04		5.0E-05 I	
Mercury (Mercury Salts)	7487-94-7	No	--	3.0E-04 I	--	0.07	2.1E-05	--	3.0E-04 S	--
Nickel (Nickel Soluable Salts)	7440-02-0	No	--	2.0E-02 I	--	0.04	8.0E-04	--	9.0E-05 A	2.6E-04 C
Thallium	7440-28-0	No	--	1.0E-05 X	--	1	1.0E-05	--	--	--
Vanadium	7440-62-2	No	--	5.0E-03 S	--	0.026	1.3E-04	--	1.0E-04 A	--

[1] ABS is the recommended dermal absorption fraction of contaminants in soil. ABS values are obtained from Exhibit 3-4, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). USEPA 2004.

[2] OAF is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the OAF is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. OAF values obtained from USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] RfD_d is the dermal reference dose and is based on the absorbed dose. The RFD_d is calculated as RfD_o*OAF.

[4] SF_d is the dermal slope factor and is based on absorbed dose. The SF_d is calculated as SF_o / OAF.

-- = toxicity data not available.

Sources:
A = ATSDR
C = Cal EPA
I = IRIS
J = New Jersey Department of Environmental Protection. See Section 5.6 of the RSL User Guide
P= PPRTV
S = RSL User Guide, Section 5.3
X= PPRTV Appendix

Table 2.16
Human Health Risk Assessment Toxicity Values
Surface Water
OD Grounds at Seneca Army Depot Activity, Romulus, New York

				Ingestion			Dermal Contact			Inhalation		
Analyte	CAS #	Volatile Organic Compound (Yes/No)	ABS [1] (unitless)	RfD_o (mg/kg-day)		SF_o ((mg/kg-day)$^{-1}$)	OAF [2] (unitless)	RfD_d [3] (mg/kg-day)	SF_d [4] ((mg/kg-day)$^{-1}$)	RfC_i (mg/m^3)		IUR ((µg/m^3)$^{-1}$)
Volatile Organic Compounds												
1,2-Dichloroethane	107-06-2	Yes	--	6.0E-03	X	9.1E-02 I	1	6.0E-03	9.1E-02	7.0E-03	P	2.6E-05 I
Explosives												
RDX	121-82-4	No	0.015	3.0E-03	I	1.1E-01 I	1	3.0E-03	1.1E-01			
Inorganics												
Aluminum	7429-90-5	No	--	1.0E+00	P	--	1	1.0E+00	--	5.0E-03	P	--
Antimony	7440-36-0	No	--	4.0E-04	I	--	0.15	6.0E-05	--	--		--
Arsenic	7440-38-2	No	0.03	3.0E-04	I	1.5E+00 I	1	3.0E-04	1.5E+00	1.5E-05	C	4.3E-03 I
Barium	7440-39-3	No	--	2.0E-01	I	--	0.07	1.4E-02	--	5.0E-04	H	--
Cadmium (Water)	7440-43-9	No	0.001	5.0E-04	I	--	0.05	2.5E-05	--	1.0E-05	A	1.8E-03 I
Chromium (III)	16065-83-1	No	--	1.5E+00	I	--	0.013	2.0E-02	--	--		--
Chromium (VI)	18540-29-9	No	--	3.0E-03	I	5.0E-01 J	0.025	7.5E-05	2.0E+01	1.0E-04	I	8.4E-02 S
Cobalt	7440-48-4	No	--	3.0E-04	P	--	1	3.0E-04	--	6.0E-06	P	9.0E-03 P
Copper	7440-50-8	No	--	4.0E-02	H	--	1	4.0E-02	--	--		--
Cyanide	57-12-5	Yes	--	6.0E-04	I	--	1	6.0E-04	--	8.0E-04	S	
Manganese (non-diet)	7439-96-5	No	--	2.4E-02	S	--	0.04	9.6E-04	--	5.0E-05	I	
Mercury (Mercury Salts)	7487-94-7	No	--	3.0E-04	I	--	0.07	2.1E-05	--	3.0E-04	S	--
Nickel (Nickel Soluable Salts)	7440-02-0	No	--	2.0E-02	I	--	0.04	8.0E-04	--	9.0E-05	A	2.6E-04 C
Vanadium	7440-62-2	No	--	5.0E-03	S	--	0.026	1.3E-04	--	1.0E-04	A	--
Zinc	7440-66-6	No		3.0E-01	I		1	3.0E-01	--	--		--

[1] ABS is the recommended dermal absorption fraction of contaminants in soil. ABS values are obtained from Exhibit 3-4, Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). USEPA 2004.

[2] OAF is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the OAF is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. OAF values obtained from USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2014 . Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2014.pdf.

[3] RfD_d is the dermal reference dose and is based on the absorbed dose. The RFD_d is calculated as RfD_o*OAF.

[4] SF_d is the dermal slope factor and is based on absorbed dose. The SF_d is calculated as SF_o / OAF.

-- = toxicity data not available.

Sources:
A = ATSDR
C = Cal EPA
I = IRIS
J = New Jersey Department of Environmental Protection. See Section 5.6 of the RSL User Guide
P= PPRTV
S = RSL User Guide, Section 5.3
X= PPRTV Appendix

Table 2.17
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Hypothetical Future Resident
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
2,4-Dinitrotoluene	0.47	2.1E-07	6.5E-08	3.2E-08	**3.1E-07**	0.0030	0.00028	0.00082	0.00012	--	**0.0038**	**0.00040**
Benzo(a)pyrene	0.082	8.6E-07	3.4E-07	1.0E-09	**1.2E-06**	--	--	--	--	--	--	--
Benzo(ghi)perylene	0.048	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodipropylamine	0.11	1.1E-06	3.4E-07	5.4E-07	**2.0E-06**	--	--	--	--	--	--	--
Phenanthrene	0.038	--	--	--	--	--	--	--	--	--	--	--
Explosives		--										
Nitroglycerine	1.5	3.7E-08	1.1E-08	--	**4.8E-08**	0.19	0.018	0.052	0.0076	--	**0.24**	**0.026**
Pesticides/PCB												
Aroclor-1254	2.0	5.8E-06	2.5E-06	4.4E-07	**8.7E-06**	1.3	0.12	0.48	0.071	--	**1.8**	**0.19**
Metals												
Aluminum	20000	--	--	--	--	0.26	0.024	--	--	0.0029	**0.26**	**0.027**
Arsenic	6.5	1.4E-05	1.3E-06	7.6E-09	**1.5E-05**	0.28	0.026	0.022	0.0033	0.00032	**0.30**	**0.030**
Cadmium	120	--	--	5.8E-08	**5.8E-08**	1.5	0.14	0.17	0.024	0.0087	**1.7**	**0.18**
Cobalt	12	--	--	2.9E-08	**2.9E-08**	0.51	0.048	--	--	0.0015	**0.51**	**0.049**
Copper	850	--	--	--	--	0.27	0.025	--	--	--	**0.27**	**0.025**
Manganese	640	--	--	--	--	0.058	0.0055	--	--	0.0093	**0.068**	**0.015**
Mercury	3.600	--	--	--	--	0.15	0.014	--	--	0.0000087	**0.15**	**0.014**
Silver	24	--	--	--	--	0.061	0.0058	--	--	--	**0.061**	**0.0058**
Thallium	0.27	--	--	--	--	0.35	0.032	--	--	--	**0.35**	**0.032**
Vanadium	31	--	--	--	--	0.079	0.0074	--	--	0.00023	**0.079**	**0.0077**
	Pathway Risk	**2.2E-05**	**4.5E-06**	**1.1E-06**		**5.0**	**0.47**	**0.72**	**0.11**	**0.023**		
				Total Risk	2.8E-05					**Hazard Index**	5.8	0.60
Chromium [2]												
Chromium (III)	51	--	--	--	--	0.00043	0.000041	--	--	--	**0.00043**	**0.000041**
Chromium (VI)	51	3.7E-05	--	1.2E-06	**3.8E-05**	0.22	0.020	--	--	0.0004	**0.22**	**0.021**
Pathway Risk (including Chromium (III))		**2.2E-05**	**4.5E-06**	**1.1E-06**	**2.8E-05**	**5.0**	**0.47**	**0.72**	**0.11**	**0.023**	**5.8**	**0.60**
				Total Risk (including Chromium(III))	**2.8E-05**					**Total Hazard (including Chromium(III))**	**5.8**	**0.60**
Pathway Risk (including Chromium (VI))		**5.9E-05**	**4.5E-06**	**2.3E-06**	**6.5E-05**	**5.2**	**0.49**	**0.72**	**0.11**	**0.023**	**6.0**	**0.62**
				Total Risk (including Chromium(VI))	**6.5E-05**					**Total Hazard (including Chromium(VI))**	**6.0**	**0.62**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.9.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.18
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Hypothetical Future Excavation/Construction Worker
Open Detonation Hill Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
2,4-Dinitrotoluene	0.47	7.0E-10	9.0E-11	3.5E-11	**8.3E-10**	0.000079	0.000010	--	**0.000090**
Benzo(a)pyrene	0.082	2.9E-09	4.8E-10	1.1E-12	**3.4E-09**	--	--	--	--
Benzo(ghi)perylene	0.048	--	--	--	--	--	--	--	--
N-Nitrosodipropylamine	0.11	3.7E-09	4.7E-10	6.0E-10	**4.8E-09**	--	--	--	--
Phenanthrene	0.038	--	--	--	--	--	--	--	--
Explosives									
Nitroglycerine	1.5	1.2E-10	1.6E-11	--	**1.4E-10**	0.0051	0.00064	--	**0.0057**
Pesticides/PCB									
Aroclor-1254	2.0	1.9E-08	3.4E-09	4.8E-10	**2.3E-08**	0.034	0.0060	--	**0.040**
Metals									
Aluminum	20000	--	--	--	--	0.0068	--	0.000083	**0.0069**
Arsenic	6.5	4.7E-08	1.8E-09	8.3E-12	**4.9E-08**	0.0073	0.00028	0.0000090	**0.0076**
Cadmium	120	--	--	6.4E-11	**6.4E-11**	0.041	0.0021	0.00025	**0.043**
Cobalt	12	--	--	3.2E-11	**3.2E-11**	0.014	--	0.000042	**0.014**
Copper	850	--	--	--	--	0.0072	--	--	**0.0072**
Manganese	640	--	--	--	--	0.0015	--	0.00027	**0.0018**
Mercury	3.600	--	--	--	--	0.0041	--	0.00000025	**0.0041**
Silver	24	--	--	--	--	0.0016	--	--	**0.0016**
Thallium	0.27	--	--	--	--	0.0092	--	--	**0.0092**
Vanadium	31	--	--	--	--	0.0021	--	0.0000064	**0.0021**
	Pathway Risk	**7.4E-08**	**6.3E-09**	**1.2E-09**		**0.13**	**0.0090**	**0.00066**	
				Total Risk	**8.2E-08**			**Hazard Index**	**0.14**
Chromium [2]									
Chromium (III)	51	--	--	--	--	0.000012	--	--	**0.000012**
Chromium (VI)	51	1.2E-07	--	1.3E-09	**1.2E-07**	0.0058	--	0.000011	**0.0058**
Pathway Risk (including Chromium (III))		**7.4E-08**	**6.3E-09**	**1.2E-09**	**8.2E-08**	**0.13**	**0.0090**	**0.001**	**0.14**
				Total Risk (including Chromium(III))	**8.2E-08**			**Total Hazard (including Chromium(III))**	**0.14**
Pathway Risk (including Chromium (VI))		**2.0E-07**	**6.3E-09**	**2.5E-09**	**2.1E-07**	**0.14**	**0.0090**	**0.001**	**0.15**
				Total Risk (including Chromium(VI))	**2.1E-07**			**Total Hazard (including Chromium(VI))**	**0.15**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.9.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.19
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Future Park Worker
Open Detonation Hill Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
2,4-Dinitrotoluene	0.47	4.0E-08	1.7E-08	6.6E-09	**6.4E-08**	0.00018	0.000077	--	**0.00026**
Benzo(a)pyrene	0.082	1.6E-07	8.9E-08	2.1E-10	**2.5E-07**	--	--	--	--
Benzo(ghi)perylene	0.048		--	--	--		--	--	--
N-Nitrosodipropylamine	0.11	2.1E-07	8.8E-08	1.1E-07	**4.1E-07**	--	--	--	--
Phenanthrene	0.038	--	--	--	--	--		--	--
Explosives									
Nitroglycerine	1.5	7.0E-09	2.9E-09	--	**9.9E-09**	0.012	0.0048	--	**0.016**
Pesticides/PCB									
Aroclor-1254	2.0	1.1E-06	6.4E-07	9.0E-08	**1.8E-06**	0.077	0.045	--	**0.12**
Metals									
Aluminum	20000	--		--	--	0.015		0.00062	**0.016**
Arsenic	6.5	2.7E-06	3.4E-07	1.6E-09	**3.0E-06**	0.017	0.0021	0.000068	**0.019**
Cadmium	120	--	--	1.2E-08	**1.2E-08**	0.092	0.015	0.0019	**0.11**
Cobalt	12	--	--	6.0E-09	**6.0E-09**	0.031	--	0.00031	**0.031**
Copper	850	--	--	--	--	0.016	--	--	**0.016**
Manganese	640	--	--	--	--	0.0035	--	0.0020	**0.0055**
Mercury	3.600	--	--	--	--	0.0092	--	0.0000019	**0.0092**
Silver	24	--	--	--	--	0.0037	--	--	**0.0037**
Thallium	0.27	--	--	--	--	0.021	--	--	**0.0208**
Vanadium	31	--	--	--	--	0.0048	--	0.000048	**0.0048**
	Pathway Risk	**4.2E-06**	**1.2E-06**	**2.3E-07**		**0.30**	**0.067**	**0.0049**	
				Total Risk	**5.6E-06**			**Hazard Index**	**0.37**
Chromium [2]									
Chromium (III)	51	--	--	--	--	0.000026	--	--	**0.000026**
Chromium (VI)	51	7.0E-06	--	2.4E-07	**7.3E-06**	0.013	--	0.000080	**0.013**
Pathway Risk (including Chromium (III))		**4.2E-06**	**1.2E-06**	**2.3E-07**	**5.6E-06**	**0.30**	**0.067**	**0.0049**	**0.37**
				Total Risk (including Chromium(III))	**5.6E-06**			**Total Hazard (including Chromium(III))**	**0.37**
Pathway Risk (including Chromium (VI))		**1.1E-05**	**1.2E-06**	**4.7E-07**	**1.3E-05**	**0.32**	**0.067**	**0.0050**	**0.39**
				Total Risk (including Chromium(VI))	**1.3E-05**			**Total Hazard (including Chromium(VI))**	**0.39**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.9.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.20
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Current and Future Recreational User
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
2,4-Dinitrotoluene	0.47	1.4E-08	4.5E-09	3.8E-10	1.9E-08	0.00021	0.000019	0.000056	0.0000083	--	0.00026	0.000028
Benzo(a)pyrene	0.082	5.9E-08	2.3E-08	1.2E-11	8.2E-08	--	--	--	--	--	--	--
Benzo(ghi)perylene	0.048	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodipropylamine	0.11	7.6E-08	2.3E-08	6.3E-09	1.1E-07	--	--	--	--	--	--	--
Phenanthrene	0.038	--	--	--	--	--	--	--	--	--	--	--
Explosives												
Nitroglycerine	1.5	2.5E-09	7.7E-10	--	3.3E-09	0.013	0.0012	0.0035	0.00052	--	0.017	0.0018
Pesticides/PCB												
Aroclor-1254	2.0	3.9E-07	1.7E-07	5.1E-09	5.7E-07	0.088	0.0082	0.033	0.0049	--	0.12	0.013
Metals												
Aluminum	20000	--	--	--	--	0.018	0.0016	--	--	0.000034	0.018	0.0016
Arsenic	6.5	9.6E-07	8.8E-08	8.8E-11	1.0E-06	0.019	0.0018	0.0015	0.0002	0.0000037	0.021	0.0020
Cadmium	120	--	--	--	--	0.11	0.010	0.011	0.0017	0.00010	0.12	0.012
Cobalt	12	--	--	--	--	0.035	0.0030	--	--	0.000017	0.035	0.0030
Copper	850	--	--	--	--	0.019	0.0017	--	--	--	0.019	0.0017
Manganese	640	--	--	--	--	0.0040	0.00038	--	--	--	0.0040	0.00038
Mercury	3.600	--	--	--	--	0.011	0.0010	--	--	0.00000010	0.011	0.0010
Silver	24	--	--	--	--	0.0042	0.00039	--	--	--	0.0042	0.00039
Thallium	0.27	--	--	--	--	0.024	0.0020	--	--	--	0.024	0.0020
Vanadium	31	--	--	--	--	0.0054	0.00051	--	--	0.0000026	0.0054	0.00051
	Pathway Risk	**1.5E-06**	**3.1E-07**	**1.2E-08**		**0.34**	**0.032**	**0.049**	**0.0073**	**0.00016**		
				Total Risk	**1.8E-06**						**0.39**	**0.039**
Chromium [2]												
Chromium (III)	51	--	--	--	--	0.000030	0.0000028	--	--	--	0.000030	0.0000028
Chromium (VI)	51	2.5E-06	--	1.4E-08	2.5E-06	0.015	0.0014	--	--	0.0000043	0.015	0.0014
Pathway Risk (including Chromium (III))		**1.5E-06**	**3.1E-07**	**1.2E-08**	**1.8E-06**	**0.34**	**0.032**	**0.049**	**0.0073**	**0.00016**	**0.39**	**0.039**
				Total Risk (including Chromium(III))	**1.8E-06**					**Total Hazard (including Chromium(III))**	**0.39**	**0.039**
Pathway Risk (including Chromium (VI))		**4.0E-06**	**3.1E-07**	**2.5E-08**	**4.4E-06**	**0.36**	**0.033**	**0.049**	**0.0073**	**0.00016**	**0.41**	**0.041**
				Total Risk (including Chromium(VI))	**4.4E-06**					**Total Hazard (including Chromium(VI))**	**0.41**	**0.041**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.9.
[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.21
Human Health Risk Evaluation Summary
Combined Surface and Subsurface Soil (0 - ≤ 15 feet bgs)
Hypothetical Future Resident
OD Grounds at Seneca Army Depot Activity, Romulus, New York

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
2,4-Dinitrotoluene	4.1	1.8E-06	5.6E-07	2.8E-07	**2.7E-06**	0.026	0.0024	0.0071	0.00105	--	**0.033**	**0.0035**
2,6-Dinitrotoluene	0.70	1.5E-06	4.6E-07	--	**2.0E-06**	0.030	0.0028	0.0079	0.00117	--	**0.038**	**0.0040**
Benzo(a)pyrene	0.050	5.3E-07	2.1E-07	6.3E-10	**7.3E-07**	--	--	--	--	--	**--**	**--**
Benzo(ghi)perylene	0.055	--	--	--	**--**	--	--	--	--	--	**--**	**--**
N-Nitrosodipropylamine	1.6	1.6E-05	4.9E-06	7.9E-06	**2.9E-05**	--	--	--	--	--	**--**	**--**
Phenanthrene	0.039	--	--	--	**--**	--	--	--	--	--	**--**	**--**
Explosives		--										
Nitroglycerine	1.5	3.7E-08	1.1E-08	--	**4.8E-08**	0.19	0.018	0.052	0.0076	--	**0.24**	**0.026**
Pesticides/PCB					--							
Aroclor-1254	2.0	5.8E-06	2.5E-06	4.4E-07	**8.7E-06**	1.3	0.12	0.48	0.071	--	**1.76**	**0.19**
Metals												
Aluminum	19000	--	--	--	**--**	0.24	0.023	--	--	0.003	**0.25**	**0.026**
Antimony	0.72		--	--	**--**	0.023	0.0022	--	--	--	**0.023**	**0.0022**
Arsenic	6.3	1.4E-05	1.2E-06	--	**1.5E-05**	0.27	0.025	0.022	0.003	--	**0.29**	**0.028**
Cadmium	92	--	--	4.5E-08	**4.5E-08**	1.2	0.11	0.13	0.019	0.007	**1.3**	**0.14**
Cobalt	12	--	--	2.9E-08	**2.9E-08**	0.5	0.05	--	--	0.001	**0.5**	**0.05**
Copper	1000	--	--	--	**--**	0.3196	0.02997	--	--	--	**0.3196**	**0.02997**
Manganese	630	--	--	--	**--**	0.058	0.0054	--	--	0.009	**0.067**	**0.015**
Mercury	4.6	--	--	--	**--**	0.20	0.018	--	--	0.00001	**0.20**	**0.018**
Silver	19	--	--	--	**--**	0.049	0.0046	--	--	--	**0.049**	**0.0046**
Thallium	0.11		--	--	**--**	0.14	0.013	--	--	--	**0.14**	**0.013**
Vanadium	30	--	--	--	**--**	0.077	0.0072	--	--	0.0002	**0.077**	**0.0074**
	Pathway Risk	**3.9E-05**	**9.9E-06**	**8.7E-06**		**4.6**	**0.43**	**0.70**	**0.10**	**0.020**		
				Total Risk	**5.8E-05**					**Total Hazard**	**5.3**	**0.55**
Chromium [2]												
Chromium (III)	44	--	--	--	**--**	0.00037	0.000035	--	--	--	**0.00037**	**0.000035**
Chromium (VI)	44	3.2E-05	--	1.0E-06	**3.3E-05**	0.19	0.018	--	--	0.0003	**0.19**	**0.018**
Pathway Risk (including Chromium (III))		**3.9E-05**	**9.9E-06**	**8.7E-06**	**5.8E-05**	**4.6**	**0.43**	**0.70**	**0.10**	**0.020**	**5.3039**	**0.55**
				Total Risk (including Chromium(III))	**5.8E-05**					**Total Hazard (including Chromium(III))**	**5.3**	**0.55**
Pathway Risk (including Chromium (VI))		**7.1E-05**	**9.9E-06**	**9.7E-06**	**3.3E-05**	**4.8**	**0.45**	**0.70**	**0.10**	**0.021**	**0.19**	**0.02**
				Total Risk (including Chromium(VI))	**9.1E-05**					**Total Hazard (including Chromium(VI))**	**5.5**	**0.57**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.10.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.22
Human Health Risk Evaluation Summary
Combined Surface and Subsurface Soil (0 - ≤ 15 feet bgs)
Hypothetical Future Excavation/Construction Worker
Open Detonation Hill Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Exposure Point Concentration [1] (mg/kg)	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
2,4-Dinitrotoluene	4.1	1.8E-09	7.9E-10	3.1E-10	**2.9E-09**	0.00021	0.000089	--	**0.00030**
2,6-Dinitrotoluene	0.70	1.5E-09	6.4E-10	--	**2.2E-09**	0.00024	0.000099	--	**0.00034**
Benzo(a)pyrene	0.050	5.4E-10	2.9E-10	6.9E-13	**8.3E-10**	--	--	--	--
Benzo(ghi)perylene	0.055	--	--	--	--	--	--	--	--
N-Nitrosodipropylamine	1.6	1.6E-08	6.8E-09	8.7E-09	**3.2E-08**	--	--	--	--
Phenanthrene	0.039	--	--	--	--	--	--	--	--
Explosives									
Nitroglycerine	1.5	3.7E-11	1.6E-11	--	**5.3E-11**	0.0015	0.00064	--	**0.0022**
Pesticides/PCB									
Aroclor-1254	2.0	5.9E-09	3.4E-09	4.8E-10	**9.8E-09**	0.010	0.0060	--	**0.016**
Metals									
Aluminum	19000	--	--	--	--	0.0020	--	0.000079	**0.0020**
Antimony	0.72	--	--	--	--	0.00018	--	--	**0.00018**
Arsenic	6.3	1.4E-08	1.7E-09	--	**1.6E-08**	0.0022	0.00027	--	**0.0024**
Cadmium	92	--	--	4.9E-11	**4.9E-11**	0.0094	0.0016	0.00019	**0.011**
Cobalt	12	--	--	--	--	0.004	--	0.00004	**0.004**
Copper	1000	--	--	--	--	0.002568	--	--	**0.002568**
Manganese	630	--	--	--	--	0.00046	--	0.00026	**0.00072**
Mercury	4.6	--	--	--	--	0.0016	--	0.00000032	**0.0016**
Silver	19	--	--	--	--	0.00039	--	--	**0.00039**
Thallium	0.11	--	--	--	--	0.0011	--	--	**0.0011**
Vanadium	30	--	--	--	--	0.00062	--	0.0000062	**0.00062**
	Pathway Risk	**4.0E-08**	**1.4E-08**	**9.5E-09**		**0.037**	**0.0087**	**0.00058**	
				Total Risk	**6.3E-08**			**Hazard Index**	**0.046**
Chromium [2]									
Chromium (III)	44	--	--	--	--	0.0000030	--	--	**0.0000030**
Chromium (VI)	44	3.2E-08	--	1.1E-09	**3.3E-08**	0.0015	--	0.0000091	**0.0015**
Pathway Risk (including Chromium (III))		**4.0E-08**	**1.4E-08**	**9.5E-09**	**6.3E-08**	**0.037**	**0.0087**	**0.00058**	**0.046**
				Total Risk (including Chromium(III))	**6.3E-08**			**Total Hazard (including Chromium(III))**	**0.046**
Pathway Risk (including Chromium (VI))		**7.2E-08**	**1.4E-08**	**1.1E-08**	**9.7E-08**	**0.038**	**0.0087**	**0.00059**	**0.0015**
				Total Risk (including Chromium(VI))	**9.7E-08**			**Total Hazard (including Chromium(VI))**	**0.048**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.10.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.23
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
All Wells
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
Bis(2-Ethylhexyl)phthalate	33	5.9E-06	--	NC	**5.9E-06**	0.082	0.049	--	--	NC	**0.082**	**0.049**
Metals												
Aluminum	63300	--	--	NC	--	3.2	1.9	0.017	0.011	NC	**3.2**	**1.9**
Antimony	52.1 J	--	--	NC	--	6.5	3.9	0.24	0.15	NC	**6.7**	**4.0**
Arsenic	9.5 J	1.8E-04	1.0E-06	NC	**1.8E-04**	1.6	0.95	0.0087	0.0053	NC	**1.6**	**0.95**
Barium	751	--	--	NC	--	0.19	0.11	0.015	0.0090	NC	**0.20**	**0.12**
Beryllium	5	--	--	NC	--	0.12	0.075	0.098	0.060	NC	**0.22**	**0.13**
Cadmium	3.8 J	--	--	NC	--	0.38	0.23	0.042	0.026	NC	**0.42**	**0.25**
Cobalt	94.4	--	--	NC	--	16	9.4	0.034	0.021	NC	**16**	**9.5**
Copper	123	--	--	NC	--	0.15	0.092	0.001	0.00052	NC	**0.15**	**0.093**
Manganese (non-diet)	4640	--	--	NC	--	9.6	5.8	1.3	0.81	NC	**11**	**6.6**
Mercury	1.8	--	--	NC	--	0.30	0.18	0.023	0.014	NC	**0.32**	**0.19**
Nickel	209	--	--	NC	--	0.52	0.313	0.014	0.0088	NC	**0.54**	**0.32**
Thallium	3.4 J	--	--	NC	--	17	10	0.093	0.057	NC	**17.0**	**10**
Vanadium	93.1	--	--	NC	--	0.93	0.56	0.20	0.12	NC	**1.1**	**0.68**
	Pathway Risk	**1.9E-04**	**1.0E-06**	**NC**	**1.9E-04**	**56**	**34**	**2.1**	**1.3**	**NC**	**58**	**35**
				Total Risk	**1.9E-04**					**Hazard Index**	**58**	**35**
Chromium [2]												
Chromium (III)	106	--	--	NC	--	0.0035	0.0021	0.0015	0.00091	NC	**0.0050**	**0.0030**
Chromium (VI)	106	6.8E-04	3.0E-04	NC	**9.8E-04**	1.8	1.1	0.77	0.47	NC	**2.5**	**1.5**
Pathway Risk (including Chromium (III))		**1.9E-04**	**1.0E-06**	NC	**1.9E-04**	**56**	**34**	**2.1**	**1.3**	NC	**58**	**35**
				Total Risk (including Chromium(III))	**1.9E-04**					**Total Hazard (including Chromium(III))**	**58**	**35**
Pathway Risk (including Chromium (VI))		**8.7E-04**	**3.0E-04**	NC	**1.2E-03**	**58**	**35**	**2.9**	**1.8**	NC	**61**	**37**
				Total Risk (including Chromium(VI))	**1.2E-03**					**Total Hazard (including Chromium(VI))**	**61**	**37**

[1] Exposure point concentration is the maximum detected concentration from all groundwater wells onsite. See Table 2.12.
[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.24
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
All Wells
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	33		5.4E-10	--	NC	**5.4E-10**	0.00014	--	NC	**0.00014**
Metals										
Aluminum	63300		--	--	NC	--	0.0052	0.00045	NC	**0.0057**
Antimony	52.1	J	--	--	NC	--	0.011	0.0062	NC	**0.017**
Arsenic	9.5	J	1.7E-08	1.5E-09	NC	**1.8E-08**	0.0026	0.00023	NC	**0.0028**
Barium	751		--	--	NC	--	0.00031	0.00038	NC	**0.00069**
Beryllium	5		--	--	NC	--	0.00021	0.0025	NC	**0.0028**
Cadmium	3.8	J	--	--	NC	--	0.00062	0.0011	NC	**0.0017**
Cobalt	94.4		--	--	NC	--	0.026	0.00090	NC	**0.027**
Copper	123		--	--	NC	--	0.00025	0.000022	NC	**0.00027**
Manganese (non-diet)	4640		--	--	NC	--	0.016	0.034	NC	**0.050**
Mercury	1.8		--	--	NC	--	0.00049	0.00061	NC	**0.0011**
Nickel	209		--	--	NC	--	0.00086	0.00037	NC	**0.0012**
Thallium	3.4	J	--	--	NC	--	0.028	0.0024	NC	**0.030**
Vanadium	93.1		--	--	NC	--	0.0015	0.0051	NC	**0.0066**
	Pathway Risk		**1.7E-08**	**1.5E-09**	**NC**		**0.093**	**0.055**	**NC**	
					Total Risk	**1.9E-08**			**Hazard Index**	**0.15**
Chromium [2]										
Chromium (III)	106		--	--	NC	--	0.0000058	0.000039	NC	**0.0000**
Chromium (VI)	106		6.2E-08	4.3E-07	NC	**4.9E-07**	0.0029	0.020	NC	**0.0**
Pathway Risk (including Chromium (III))			**1.7E-08**	**1.5E-09**	NC	**1.9E-08**	**0.093**	**0.05**	NC	**0**
					Total Risk (including Chromium(III))	**1.9E-08**			**Total Hazard (including Chromium(III))**	**0.15**
Pathway Risk (including Chromium (VI))			**8.0E-08**	**4.3E-07**	NC	**4.9E-07**	**0.10**	**0.075**	NC	**0.023**
					Total Risk (including Chromium(VI))	**5.1E-07**			**Total Hazard (including Chromium(VI))**	**0.17**

[1] Exposure point concentration is the maximum detected concentration from all groundwater wells onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.25
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
All Wells
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
Bis(2-Ethylhexyl)phthalate	33	3.2E-06	--	NC	**3.2E-06**	0.032	--	NC	**0.032**
Metals									
Aluminum	63300	--	--	NC	--	1.2	0.0017	NC	**1.2**
Antimony	52.1 J	--	--	NC	--	2.5	0.023	NC	**2.5**
Arsenic	9.5 J	9.8E-05	1.4E-07	NC	**9.8E-05**	0.61	0.00085	NC	**0.61**
Barium	751	--	--	NC	--	0.072	0.0014	NC	**0.07**
Beryllium	5	--	--	NC	--	0.048	0.0095	NC	**0.06**
Cadmium	3.8 J	--	--	NC	--	0.15	0.0041	NC	**0.15**
Cobalt	94.4	--	--	NC	--	6.1	0.0034	NC	**6.1**
Copper	123	--	--	NC	--	0.059	0.000082	NC	**0.059**
Manganese (non-diet)	4640	--	--	NC	--	3.7	0.13	NC	**3.9**
Mercury	1.8	--	--	NC	--	0.12	0.0023	NC	**0.12**
Nickel	209	--	--	NC	--	0.20	0.0014	NC	**0.20**
Thallium	3.4 J	--	--	NC	--	6.5	0.0091	NC	**7**
Vanadium	93.1	--	--	NC	--	0.36	0.019	NC	**0.38**
	Pathway Risk	**1.0E-04**	**1.4E-07**	**NC**		**21.71**	**0.205**	**NC**	
				Total Risk	**1.0E-04**			**Hazard Index**	**22**
Chromium [2]									
Chromium (III)	106	--	--	NC	--	0.0014	0.00015	NC	**0.0015**
Chromium (VI)	106	3.6E-04	4.0E-05	NC	**4.1E-04**	0.68	0.076	NC	**0.8**
Pathway Risk (including Chromium (III))		**1.0E-04**	**1.4E-07**	NC	**1.0E-04**	**21.71**	**0.21**	NC	**22**
				Total Risk (including Chromium(III))	**1.0E-04**			**Total Hazard (including Chromium(III))**	**21.91**
Pathway Risk (including Chromium (VI))		**4.7E-04**	**1.4E-07**	NC	**4.7E-04**	**22.39**	**0.28**	NC	**23**
				Total Risk (including Chromium(VI))	**5.1E-04**			**Total Hazard (including Chromium(VI))**	**22.67**

[1] Exposure point concentration is the maximum detected concentration from all groundwater wells onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.26
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
All Wells
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	33		4.1E-07	--	NC	**4.1E-07**	0.0056	0.0034	--	--	NC	**0.0056**	**0.0034**
Metals													
Aluminum	63300		--	--	NC	--	0.22	0.13	0.00018	0.000078	NC	**0.22**	**0.13**
Antimony	52.1	J	--	--	NC	--	0.45	0.27	0.0025	0.0011	NC	**0.45**	**0.27**
Arsenic	9.5	J	1.3E-05	8.5E-09	NC	**1.3E-05**	0.11	0.065	0.000090	0.000039	NC	**0.11**	**0.065**
Barium	751		--	--	NC	--	0.013	0.0077	0.00015	0.000066	NC	**0.013**	**0.0078**
Beryllium	5		--	--	NC	--	0.0085	0.0051	0.0010	0.00044	NC	**0.010**	**0.0055**
Cadmium	3.8	J	--	--	NC	--	0.026	0.016	0.00043	0.00019	NC	**0.026**	**0.016**
Cobalt	94.4		--	--	NC	--	1.1	0.65	0.00036	0.00015	NC	**1.1**	**0.65**
Copper	123		--	--	NC	--	0.011	0.0063	0.0000088	0.0000038	NC	**0.011**	**0.0063**
Manganese (non-diet)	4640		--	--	NC	--	0.66	0.40	0.014	0.0059	NC	**0.67**	**0.41**
Mercury	1.8		--	--	NC	--	0.021	0.012	0.00024	0.00011	NC	**0.021**	**0.012**
Nickel	209		--	--	NC	--	0.036	0.021	0.00015	0.000064	NC	**0.036**	**0.021**
Thallium	3.4	J	--	--	NC	--	1.2	0.70	0.0010	0.00042	NC	**1.2**	**0.70**
Vanadium	93.1		--	--	NC	--	0.064	0.038	0.0020	0.00088	NC	**0.066**	**0.039**
	Pathway Risk		**1.3E-05**	**8.5E-09**	**NC**		**3.9**	**2.3**	**0.022**	**0.0094**	**NC**		
					Total Risk	1.3E-05					**Hazard Index**	3.9	2.3
Chromium [2]													
Chromium (III)	106		--	--	NC	--	0.00024	0.00015	0.000016	0.0000067	NC	**0.00026**	**0.00016**
Chromium (VI)	106		4.7E-05	2.5E-06	NC	**5.0E-05**	0.12	0.073	0.0081	0.0035	NC	**0.13**	**0.077**
Pathway Risk (including Chromium (III))			**1.3E-05**	**8.5E-09**	NC		**3.9**	**2.3**	**0.022**	**0.0094**	NC		
					Total Risk (including Chromium(III))	1.3E-05					**Total Hazard (including Chromium(III))**	3.9	2.3
Pathway Risk (including Chromium (VI))			**6.0E-05**	**8.5E-09**	NC	**6.0E-05**	**4.0**	**2.4**	**0.030**	**0.013**	NC		
					Total Risk (including Chromium(VI))	6.3E-05					**Total Hazard (including Chromium(VI))**	4.1	2.4

[1] Exposure point concentration is the maximum detected concentration from all groundwater wells onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.27
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 1
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	33		5.9E-06	--	NC	**5.9E-06**	0.082	0.049	--	--	NC	**0.082**	**0.049**
Metals													
Aluminum	124	J	--	--	NC	--	0.0062	0.0037	0.000034	0.000021	NC	**0.0062**	**0.0037**
Antimony	24.3	J	--	--	NC	--	3.0	1.8	0.11	0.068	NC	**3.1**	**1.9**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	56.5	J	--	--	NC	--	0.014	0.0085	0.0011	0.00068	NC	**0.015**	**0.0091**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.2	J	--	--	NC	--	0.22	0.13	0.024	0.015	NC	**0.24**	**0.15**
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	4.4	J	--	--	NC	--	0.0091	0.0055	0.0013	0.00077	NC	**0.010**	**0.0063**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			5.9E-06	**--**	**NC**	**5.9E-06**	**3.4**	**2.0**	**0.14**	**0.084**	**NC**	**3.5**	**2.1**
					Total Risk	5.9E-06					**Hazard Index**	**3.5**	**2.1**
Chromium [2]													
Chromium (III)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**5.9E-06**	**0.0E+00**	NC	**5.9E-06**	**3.4**	**2.0**	**0.14**	**0.084**	NC	**3.5**	**2.1**
					Total Risk (including Chromium(III))	5.9E-06					**Total Hazard (including Chromium(III))**	**3.5**	**2.1**
Pathway Risk (including Chromium (VI))			**5.9E-06**	**0.0E+00**	NC	**5.9E-06**	**3.4**	**2.0**	**0.14**	**0.084**	NC	**3.5**	**2.1**
					Total Risk (including Chromium(VI))	5.9E-06					**Total Hazard (including Chromium(VI))**	**3.5**	**2.1**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.28
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 1
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
Bis(2-Ethylhexyl)phthalate	33	5.4E-10	--	NC	**5.4E-10**	0.00014	--	NC	**0.00014**
Metals									
Aluminum	124 J	--	--	NC	--	0.000010	0.00000088	NC	**0.000011**
Antimony	24.3 J	--	--	NC	--	0.0050	0.0029	NC	**0.0079**
Arsenic	1.4 U	--	--	NC	--	--	--	NC	--
Barium	56.5 J	--	--	NC	--	0.000023	0.000029	NC	**0.000052**
Beryllium	0.4 U	--	--	NC	--	--	--	NC	--
Cadmium	2.2 J	--	--	NC	--	0.00036	0.00063	NC	**0.0010**
Cobalt	4.4 U	--	--	NC	--	--	--	NC	--
Copper	3.1 U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	4.4 J	--	--	NC	--	0.000015	0.000033	NC	**0.000048**
Mercury	0.04 U	--	--	NC	--	--	--	NC	--
Nickel	4 U	--	--	NC	--	--	--	NC	--
Thallium	1.2 U	--	--	NC	--	--	--	NC	--
Vanadium	3.7 U	--	--	NC	--	--	--	NC	--
		5.4E-10	**--**	**NC**		**0.0055**	**0.0036**	**NC**	
				Total Risk	**5.4E-10**			**Hazard Index**	**0.0091**
Chromium [2]									
Chromium (III)	2.6 U	--	--	NC	--	--	--	NC	--
Chromium (VI)	2.6 U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))		**5.4E-10**	**0.0E+00**	NC	**5.4E-10**	**0.0055**	**0.0036**	NC	**0.0091**
				Total Risk (including Chromium(III))	**5.4E-10**			**Total Hazard (including Chromium(III))**	**0.0091**
Pathway Risk (including Chromium (VI))		**5.4E-10**	**0.0E+00**	NC	**5.4E-10**	**0.0055**	**0.0036**	NC	**0.0091**
				Total Risk (including Chromium(VI))	**5.4E-10**			**Total Hazard (including Chromium(VI))**	**0.0091**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.29
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 1
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	33		3.2E-06	--	NC	**3.2E-06**	0.032	--	NC	**0.032**
Metals										
Aluminum	124	J	--	--	NC	--	0.0024	0.0000033	NC	**0.0024**
Antimony	24.3	J	--	--	NC	--	1.2	0.011	NC	**1.2**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	56.5	J	--	--	NC	--	0.0054	0.00011	NC	**0.0055**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.2	J	--	--	NC	--	0.085	0.0024	NC	**0.087**
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.1	U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	4.4	J	--	--	NC	--	0.0035	0.00012	NC	**0.0037**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			3.2E-06	**--**	**NC**		**1.3**	**0.013**	**NC**	
					Total Risk	**3.2E-06**			**Hazard Index**	**1.3**
Chromium [2]										
Chromium (III)	2.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**3.2E-06**	**0.0E+00**	NC	**3.2E-06**	**1.3**	**0.013**	NC	**1.3**
					Total Risk (including Chromium(III))	**3.2E-06**			**Total Hazard (including Chromium(III))**	**1.3**
Pathway Risk (including Chromium (VI))			**3.2E-06**	**0.0E+00**	NC	**3.2E-06**	**1.3**	**0.013**	NC	**1.3**
					Total Risk (including Chromium(VI))	**3.2E-06**			**Total Hazard (including Chromium(VI))**	**1.3**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.30
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 1
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	33		4.1E-07	--	NC	**4.1E-07**	0.0056	0.0034	--	--	NC	**0.0056**	**0.0034**
Metals													
Aluminum	124	J	--	--	NC	--	0.00042	0.00025	0.00000035	0.00000015	NC	**0.00042**	**0.00025**
Antimony	24.3	J	--	--	NC	--	0.21	0.12	0.0012	0.00050	NC	**0.21**	**0.13**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	56.5	J	--	--	NC	--	0.0010	0.00058	0.000012	0.0000050	NC	**0.001**	**0.0006**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.2	J	--	--	NC	--	0.015	0.0090	0.00025	0.00011	NC	**0.015**	**0.009**
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	4.4	J	--	--	NC	--	0.00063	0.00038	0.000013	0.0000056	NC	**0.00064**	**0.00038**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			4.1E-07	**--**	**NC**		**0.23**	**0.14**	**0.0014**	**0.00062**	**NC**		
					Total Risk	**4.1E-07**					**Hazard Index**	**0.23**	**0.14**
Chromium [2]													
Chromium (III)	2.6	U	--		NC	--	--	--	--	--	NC	--	--
Chromium (VI)	2.6	U	--		NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**4.1E-07**	**0.0E+00**	NC	**4.1E-07**	**0.23**	**0.14**	**0.0014**	**0.00062**	NC	**0.23**	**0.14**
					Total Risk (including Chromium(III))	**4.1E-07**					**Total Hazard (including Chromium(III))**	**0.23**	**0.14**
Pathway Risk (including Chromium (VI))			**4.1E-07**	**0.0E+00**	NC	**4.1E-07**	**0.23**	**0.14**	**0.0014**	**0.00062**	NC		
					Total Risk (including Chromium(VI))	**4.1E-07**					**Total Hazard (including Chromium(VI))**	**0.23**	**0.14**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.31
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
Bis(2-Ethylhexyl)phthalate	11 U	--	--	NC	--	--	--	--	--	NC	--	--
Metals												
Aluminum	828	--	--	NC	--	0.041	0.025	0.00023	0.000	NC	0.042	0.025
Antimony	23.1 J	--	--	NC	--	2.9	1.7	0.11	0.07	NC	3.0	1.8
Arsenic	1.4 U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	50.8 J	--	--	NC	--	0.013	0.0076	0.0010	0.0006	NC	0.014	0.0082
Beryllium	0.4 U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.1 U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	5.3 J	--	--	NC	--	0.88	0.53	0.0019	0.001	NC	0.88	0.53
Copper	7.2 J	--	--	NC	--	0.0090	0.0054	0.000049	0.00003	NC	0.0090	0.0054
Manganese (non-diet)	23.7	--	--	NC	--	0.049	0.030	0.0068	0.00	NC	0.056	0.034
Mercury	0.04 U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4 U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2 U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7 U	--	--	NC	--	--	--	--	--	NC	--	--
		--	--	NC	--	3.9	2.3	0.12	0.071	NC	4.0	2.4
				Total Risk	0.0E+00					Hazard Index	4.0	2.4
Chromium [2]												
Chromium (III)	4.1 J	--	--	NC	--	0.00014	0.000082	0.000058	0.000035	NC	0.0002	0.0001
Chromium (VI)	4.1 J	2.6E-05	1.2E-05	NC	3.8E-05	0.068	0.041	0.030	0.018	NC	0.10	0.059
Pathway Risk (including Chromium (III))		0.0E+00	0.0E+00	NC	--	3.9	2.3	0.12	0.071	NC	4.0	2.4
				Total Risk (including Chromium(III))	0.0E+00					Total Hazard (including Chromium(III))	4.0	2.4
Pathway Risk (including Chromium (VI))		2.6E-05	0.0E+00	NC	2.6E-05	3.9	2.4	0.15	0.089	NC	4.1	2.5
				Total Risk (including Chromium(VI))	3.8E-05					Total Hazard (including Chromium(VI))	4.1	2.5

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.32
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	828		--	--	NC	--	0.0001	0.00001	NC	**0.000074**
Antimony	23.1	J	--	--	NC	--	0.005	0.0027	NC	**0.0074**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	50.8	J	--	--	NC	--	0.00002	0.00003	NC	**0.000047**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	5.3	J	--	--	NC	--	0.002	0.00005	NC	**0.0016**
Copper	7.2	J	--	--	NC	--	0.00002	0.000001	NC	**0.000016**
Manganese (non-diet)	23.7		--	--	NC	--	0.000	0.000	NC	**0.00026**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			--	**--**	**NC**		**0.006**	**0.003**	**NC**	
					Total Risk	**0.0E+00**			**Hazard Index**	**0.009**
Chromium [2]										
Chromium (III)	4.1	J	--	--	NC	--	0.0000002	0.000002	NC	**0.0000017**
Chromium (VI)	4.1	J	2.4E-09	1.7E-08	NC	**1.9E-08**	0.0001	0.001	NC	**0.00089**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.0064**	**0.0030**	NC	**0.0093**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**0.0093**
Pathway Risk (including Chromium (VI))			**2.4E-09**	**1.7E-08**	NC	**1.9E-08**	**0.0065**	**0.0037**	NC	**0.00089**
					Total Risk (including Chromium(VI))	**1.9E-08**			**Total Hazard (including Chromium(VI))**	**0.010**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.33
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	828		--	--	NC	--	0.0	0.0000	NC	**0.016**
Antimony	23.1	J	--	--	NC	--	1.1	0.010	NC	**1.1**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	50.8	J	--	--	NC	--	0.005	0.0001	NC	**0.0050**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	5.3	J	--	--	NC	--	0.3	0.0002	NC	**0.34**
Copper	7.2	J	--	--	NC	--	0.004	0.000005	NC	**0.0035**
Manganese (non-diet)	23.7		--	--	NC	--	0.0	0.00	NC	**0.020**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			--	--	**NC**		**1.5**	**0.011**	**NC**	
					Total Risk	**0.0E+00**			**Hazard Index**	**1.5**
Chromium [2]										
Chromium (III)	4.1	J	--	--	NC	--	0.0001	0.00001	NC	**0.0001**
Chromium (VI)	4.1	J	1.4E-05	1.6E-06	NC	**1.6E-05**	0.03	0.003	NC	**0.029**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**1.5**	**0.011**	NC	**1.5**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**1.49**
Pathway Risk (including Chromium (VI))			**1.4E-05**	**0.0E+00**	NC	**1.4E-05**	**1.5**	**0.014**	NC	**1.5**
					Total Risk (including Chromium(VI))	**1.6E-05**			**Total Hazard (including Chromium(VI))**	**1.5**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.34
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	–	–	NC	–	–	–	–	–	NC	–	–
Metals													
Aluminum	828		–	–	NC	–	0.0028	0.0017	0.00000	0.000001	NC	**0.0028**	**0.0017**
Antimony	23.1	J	–	–	NC	–	0.20	0.12	0.0011	0.0005	NC	**0.20**	**0.12**
Arsenic	1.4	U	–	–	NC	–	–	–	–	–	NC	–	–
Barium	50.8	J	–	–	NC	–	0.001	0.0005	0.00001	0.000005	NC	**0.001**	**0.0005**
Beryllium	0.4	U	–	–	NC	–	–	–	–	–	NC	–	–
Cadmium	2.1	U	–	–	NC	–	–	–	–	–	NC	–	–
Cobalt	5.3	J	–	–	NC	–	0.1	0.04	0.00002	0.00001	NC	**0.1**	**0.04**
Copper	7.2	J	–	–	NC	–	0.001	0.0004	0.0000005	0.0000002	NC	**0.001**	**0.0004**
Manganese (non-diet)	23.7		–	–	NC	–	0.0034	0.0020	0.000070	0.000030	NC	**0.0035**	**0.0020**
Mercury	0.04	U	–	–	NC	–	–	–	–	–	NC	–	–
Nickel	4	U	–	–	NC	–	–	–	–	–	NC	–	–
Thallium	1.2	U	–	–	NC	–	–	–	–	–	NC	–	–
Vanadium	3.7	U	–	–	NC	–	–	–	–	–	NC	–	–
			–	**–**	**NC**		**0.27**	**0.16**	**0.001**	**0.0005**	**NC**		
					Total Risk	**0.0E+00**					**Hazard Index**	**0.27**	**0.16**
Chromium [2]													
Chromium (III)	4.1	J	–	–	NC	–	0.0000093	0.0000060	0.000001	0.0000003	NC	**0.00001**	**0.00001**
Chromium (VI)	4.1	J	1.8E-06	9.8E-08	NC	**1.9E-06**	0.0047	0.0028	0.0003	0.0001	NC	**0.01**	**0.003**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	–	**0.27**	**0.16**	**0.001**	**0.0005**	NC	**0.27**	**0.161**
					Total Risk (including Chromium(III))	**0.0E+00**					**Total Hazard (including Chromium(III))**	**0.27**	**0.16**
Pathway Risk (including Chromium (VI))			**1.8E-06**	**0.0E+00**	NC	**1.8E-06**	**0.27**	**0.16**	**0.002**	**0.001**	NC		
					Total Risk (including Chromium(VI))	**1.9E-06**					**Total Hazard (including Chromium(VI))**	**0.27**	**0.16**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
– Risk/hazard not calculated because toxicity value was not available.

Table 2.35
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	12		2.2E-06	--	NC	**2.2E-06**	0.030	0.018	--	--	NC	**0.030**	**0.018**
Metals													
Aluminum	83.5	J	--	--	NC	--	0.0042	0.0025	0.000023	0.000014	NC	**0.004**	**0.003**
Antimony	52.1	J	--	--	NC	--	6.5	3.9	0.24	0.15	NC	**6.7**	**4.0**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	25.5	J	--	--	NC	--	0.0064	0.0038	0.00050	0.00031	NC	**0.007**	**0.0041**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.9	J	--	--	NC	--	0.0049	0.0029	0.000027	0.000016	NC	**0.0049**	**0.0029**
Manganese (non-diet)	2.9	J	--	--	NC	--	0.0060	0.0036	0.00083	0.00051	NC	**0.007**	**0.004**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			2.2E-06	**--**	**NC**	**2.2E-06**	**6.5**	**3.9**	**0.24**	**0.147**	**NC**	**6.8**	**4.1**
					Total Risk	**2.2E-06**					**Hazard Index**	**6.8**	**4.1**
Chromium [2]													
Chromium (III)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**2.2E-06**	**0.0E+00**	NC	**2.2E-06**	**6.5**	**3.9**	**0.24**	**0.147**	NC	**6.8**	**4.1**
					Total Risk (including Chromium(III))	**2.2E-06**					**Total Hazard (including Chromium(III))**	**6.8**	**4.1**
Pathway Risk (including Chromium (VI))			**2.2E-06**	**0.0E+00**	NC	**2.2E-06**	**6.5**	**3.9**	**0.24**	**0.147**	NC	**6.8**	**4.1**
					Total Risk (including Chromium(VI))	**2.2E-06**					**Total Hazard (including Chromium(VI))**	**6.8**	**4.1**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.36
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	12		2.0E-10	--	NC	**2.0E-10**	0.000049	--	NC	**0.000049**
Metals										
Aluminum	83.5	J	--	--	NC	--	0.0000069	0.00000060	NC	**0.0000075**
Antimony	52.1	J	--	--	NC	--	0.011	0.0062	NC	**0.017**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	25.5	J	--	--	NC	--	0.000010	0.000013	NC	**0.000023**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.9	J	--	--	NC	--	0.0000080	0.00000070	NC	**0.0000087**
Manganese (non-diet)	2.9	J	--	--	NC	--	0.000010	0.000022	NC	**0.000031**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			2.0E-10	**--**	**NC**		**0.011**	**0.006**	**NC**	
					Total Risk	**2.0E-10**			**Hazard Index**	**0.017**
Chromium [2]										
Chromium (III)	2.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**2.0E-10**	**0.0E+00**	NC	**2.0E-10**	**0.0108**	**0.0062**	NC	**0.017**
					Total Risk (including Chromium(III))	**2.0E-10**			**Total Hazard (including Chromium(III))**	**0.017**
Pathway Risk (including Chromium (VI))			**2.0E-10**	**0.0E+00**	NC	**0.0E+00**	**0.0108**	**0.0062**	NC	**0.0000**
					Total Risk (including Chromium(VI))	**2.0E-10**			**Total Hazard (including Chromium(VI))**	**0.017**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.37
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	12		1.2E-06	--	NC	**1.2E-06**	0.012	--	NC	**0.012**
Metals										
Aluminum	83.5	J	--	--	NC	--	0.0016	0.0000022	NC	**0.0016**
Antimony	52.1	J	--	--	NC	--	2.5	0.023	NC	**2.5**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	25.5	J	--	--	NC	--	0.0025	0.000049	NC	**0.0025**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.9	J	--	--	NC	--	0.0019	0.0000026	NC	**0.0019**
Manganese (non-diet)	2.9	J	--	--	NC	--	0.0023	0.000081	NC	**0.0024**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			1.2E-06	**--**	**NC**		**2.5**	**0.023**	**NC**	
					Total Risk	**1.2E-06**			**Hazard Index**	**2.6**
Chromium [2]										
Chromium (III)	2.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**1.2E-06**	**0.0E+00**	NC	**1.2E-06**	**2.5**	**0.023**	NC	**2.6**
					Total Risk (including Chromium(III))	**1.2E-06**			**Total Hazard (including Chromium(III))**	**2.6**
Pathway Risk (including Chromium (VI))			**1.2E-06**	**0.0E+00**	NC	**1.2E-06**	**2.5**	**0.023**	NC	**2.6**
					Total Risk (including Chromium(VI))	**1.2E-06**			**Total Hazard (including Chromium(VI))**	**2.6**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.38
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	1.5E-07	--	NC	**1.5E-07**	0.0021	0.0012	--	--	NC	**0.0021**	**0.0012**
Metals													
Aluminum	828		--	--	NC	--	0.00029	0.00017	0.00000024	0.00000010	NC	**0.0003**	**0.0002**
Antimony	23.1	J	--	--	NC	--	0.45	0.27	0.0025	0.0011	NC	**0.45**	**0.27**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	50.8	J	--	--	NC	--	0.00044	0.00026	0.0000052	0.0000022	NC	**0.000**	**0.0003**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	5.3	J	--	--	NC	--	--	--	--	--	NC	--	--
Copper	7.2	J	--	--	NC	--	0.00033	0.00020	0.00000028	0.00000012	NC	**0.00033**	**0.00020**
Manganese (non-diet)	23.7		--	--	NC	--	0.00041	0.00025	0.0000086	0.0000037	NC	**0.00042**	**0.00025**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			1.5E-07	**--**	**NC**		**0.45**	**0.27**	**0.002**	**0.0011**	**NC**		
					Total Risk	1.5E-07					**Hazard Index**	0.45	0.27
Chromium [2]													
Chromium (III)	4.1	J	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	4.1	J	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**1.5E-07**	**0.0E+00**	NC	**1.5E-07**	**0.45**	**0.27**	**0.002**	**0.0011**	NC	**0.45**	**0.271**
					Total Risk (including Chromium(III))	1.5E-07					**Total Hazard (including Chromium(III))**	0.45	0.27
Pathway Risk (including Chromium (VI))			**1.5E-07**	**0.0E+00**	NC	**1.5E-07**	**0.45**	**0.27**	**0.002**	**0.001**	NC		
					Total Risk (including Chromium(VI))	1.5E-07					**Total Hazard (including Chromium(VI))**	0.45	0.27

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.39
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11		2.0E-06	--	NC	**2.0E-06**	0.027	0.016	--	--	NC	**0.027**	**0.016**
Metals													
Aluminum	17700		--	--	NC	--	0.88	0.53	0.004800	0.003000	NC	**0.89**	**0.53**
Antimony	49.6	J	--	--	NC	--	6.2	3.7	0.23	0.14	NC	**6.4**	**3.9**
Arsenic	1.7	J	3.3E-05	1.8E-07	NC	**3.3E-05**	0.28	0.17	0.002	0.001	NC	**0.3**	**0.17**
Barium	195	J	--	--	NC	--	0.049	0.029	0.00380	0.00230	NC	**0.052**	**0.032**
Beryllium	0.87	J	--	--	NC	--	0.022	0.013	0.0170	0.010	NC	**0.04**	**0.02**
Cadmium	3.8	J	--	--	NC	--	0.38	0.23	0.042	0.026	NC	**0.42**	**0.25**
Cobalt	11	J	--	--	NC	--	1.8	1.1	0.004	0.003	NC	**1.8**	**1.1**
Copper	79.2		--	--	NC	--	0.10	0.059	0.000540	0.000330	NC	**0.099**	**0.060**
Manganese (non-diet)	384		--	--	NC	--	0.80	0.48	0.11000	0.06700	NC	**0.91**	**0.55**
Mercury	1.8		--	--	NC	--	0.30	0.18	0.023	0.014	NC	**0.32**	**0.19**
Nickel	43.9		--	--	NC	--	0.11	0.066	0.003	0.002	NC	**0.11**	**0.07**
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	29.7	J	--	--	NC	--	0.30	0.18	0.062	0.038	NC	**0.4**	**0.22**
			3.5E-05	**1.8E-07**	**NC**	**3.5E-05**	**11.3**	**6.8**	**0.50**	**0.306**	**NC**	**11.8**	**7.1**
					Total Risk	**3.5E-05**					**Hazard Index**	**11.8**	**7.1**
Chromium [2]													
Chromium (III)	28.9		--	--	NC	--	0.0010	0.00058	0.00	0.00	NC	**0.0014**	**0.0008**
Chromium (VI)	28.9		1.9E-04	8.3E-05	NC	**2.7E-04**	0.48	0.29	0.21	0.13	NC	**0.69**	**0.419**
Pathway Risk (including Chromium (III))			**3.5E-05**	**1.8E-07**	NC	**3.5E-05**	**11**	**6.8**	**0.50**	**0.31**	NC	**12**	**7.1**
					Total Risk (including Chromium(III))	**3.5E-05**					**Total Hazard (including Chromium(III))**	**12**	**7.1**
Pathway Risk (including Chromium (VI))			**2.2E-04**	**1.8E-07**	NC	**2.2E-04**	**12**	**7.1**	**0.71**	**0.44**	NC	**12**	**7.5**
					Total Risk (including Chromium(VI))	**3.0E-04**					**Total Hazard (including Chromium(VI))**	**12**	**7.5**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.40
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11		1.8E-10	--	NC	**1.8E-10**	0.000045	--	NC	**0.000045**
Metals										
Aluminum	17700		--	--	NC	--	0.0015000	0.00013000	NC	**0.0016**
Antimony	49.6	J	--	--	NC	--	0.010	0.0059	NC	**0.016**
Arsenic	1.7	J	3.0E-09	2.6E-10	NC	**3.3E-09**	0.0005	0.00004	NC	**0.0005**
Barium	195	J	--	--	NC	--	0.000080	0.000100	NC	**0.00018**
Beryllium	0.87	J	--	--	NC	--	0.00004	0.0004	NC	**0.0005**
Cadmium	3.8	J	--	--	NC	--	0.00062	0.0011	NC	**0.0017**
Cobalt	11	J	--	--	NC	--	0.003	0.00010	NC	**0.0031**
Copper	79.2		--	--	NC	--	0.0001600	0.00001400	NC	**0.00017**
Manganese (non-diet)	384		--	--	NC	--	0.001300	0.002900	NC	**0.0042**
Mercury	1.8		--	--	NC	--	0.00049	0.00061	NC	**0.0011**
Nickel	43.9		--	--	NC	--	0.00018	0.00008	NC	**0.0003**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	29.7	J	--	--	NC	--	0.0005	0.00160	NC	**0.0021**
			3.2E-09	**2.6E-10**	**NC**		**0.018**	**0.013**	**NC**	
					Total Risk	**3.4E-09**			**Hazard Index**	**0.031**
Chromium [2]										
Chromium (III)	28.9		--	--	NC	--	0.000002	0.000011	NC	**0.0000126**
Chromium (VI)	28.9		1.7E-08	1.2E-07	NC	**1.4E-07**	0.001	0.006	NC	**0.00629**
Pathway Risk (including Chromium (III))			**3.2E-09**	**2.6E-10**	NC	**3.4E-09**	**0.018**	**0.013**	NC	**0.031**
					Total Risk (including Chromium(III))	**3.4E-09**			**Total Hazard (including Chromium(III))**	**0.031**
Pathway Risk (including Chromium (VI))			**2.0E-08**	**1.2E-07**	NC	**1.4E-07**	**0.019**	**0.019**	NC	**0.0063**
					Total Risk (including Chromium(VI))	**1.4E-07**			**Total Hazard (including Chromium(VI))**	**0.038**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.41
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11		1.1E-06	--	NC	**1.1E-06**	0.011	--	NC	**0.011**
Metals										
Aluminum	17700		--	--	NC	--	0.3400	0.0004700	NC	**0.34**
Antimony	49.6	J	--	--	NC	--	2.4	0.022	NC	**2.4**
Arsenic	1.7	J	1.8E-05	2.4E-08	NC	**1.8E-05**	0.11	0.00015	NC	**0.11**
Barium	195	J	--	--	NC	--	0.0190	0.000370	NC	**0.019**
Beryllium	0.87	J	--	--	NC	--	0.008	0.0017	NC	**0.010**
Cadmium	3.8	J	--	--	NC	--	0.15	0.0041	NC	**0.15**
Cobalt	11	J	--	--	NC	--	0.7	0.00039	NC	**0.71**
Copper	79.2		--	--	NC	--	0.0380	0.0000530	NC	**0.038**
Manganese (non-diet)	384		--	--	NC	--	0.3100	0.011000	NC	**0.32**
Mercury	1.8		--	--	NC	--	0.12	0.00230	NC	**0.12**
Nickel	43.9		--	--	NC	--	0.04	0.00029	NC	**0.042**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	29.7	J	--	--	NC	--	0.11	0.00610	NC	**0.12**
			1.9E-05	**2.4E-08**	**NC**		**4.4**	**0.049**	**NC**	
					Total Risk	**1.9E-05**			**Hazard Index**	**4.4**
Chromium [2]										
Chromium (III)	28.9		--	--	NC	--	0.000370	0.000040	NC	**0.00041**
Chromium (VI)	28.9		9.9E-05	1.1E-05	NC	**1.1E-04**	0.190	0.021	NC	**0.21**
Pathway Risk (including Chromium (III))			**1.9E-05**	**2.4E-08**	NC	**1.9E-05**	**4.4**	**0.049**	NC	**4.4**
					Total Risk (including Chromium(III))	**1.9E-05**			**Total Hazard (including Chromium(III))**	**4.4**
Pathway Risk (including Chromium (VI))			**1.2E-04**	**2.4E-08**	NC	**1.2E-04**	**4.6**	**0.070**	NC	**4.6**
					Total Risk (including Chromium(VI))	**1.3E-04**			**Total Hazard (including Chromium(VI))**	**4.6**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.42
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11		1.4E-07	--	NC	**1.4E-07**	0.0019	0.0011	--	--	NC	**0.0019**	**0.0011**
Metals													
Aluminum	17700		--	--	NC	--	0.06100	0.04000	0.00005000	0.00002200	NC	**0.0611**	**0.0400**
Antimony	49.6	J	--	--	NC	--	0.42	0.25	0.0024	0.0010	NC	**0.42**	**0.25**
Arsenic	1.7	J	2.2E-06	1.50E-09	NC	**2.2E-06**	0.02	0.012	0.00002	0.00001	NC	**0.02**	**0.012**
Barium	195	J	--	--	NC	--	0.00330	0.00200	0.0000400	0.0000170	NC	**0.003**	**0.0020**
Beryllium	0.87	J	--	--	NC	--	0.0015	0.0009	0.0002	0.0001	NC	**0.002**	**0.0010**
Cadmium	3.8	J	--	--	NC	--	0.026	0.016	0.0004	0.0002	NC	**0.026**	**0.016**
Cobalt	11	J	--	--	NC	--	0.1	0.08	0.00004	0.00002	NC	**0.1**	**0.08**
Copper	79.2		--	--	NC	--	0.00680	0.00410	0.00000560	0.00000240	NC	**0.00681**	**0.00410**
Manganese (non-diet)	384		--	--	NC	--	0.05500	0.03300	0.0011000	0.0004900	NC	**0.05610**	**0.03349**
Mercury	1.8		--	--	NC	--	0.021	0.012	0.00024	0.00011	NC	**0.021**	**0.012**
Nickel	43.9		--	--	NC	--	0.008	0.005	0.00003	0.00001	NC	**0.008**	**0.005**
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	29.7	J	--	--	NC	--	0.020	0.012	0.00065	0.00028	NC	**0.021**	**0.012**
			2.3E-06	**1.5E-09**	**NC**		**0.77**	**0.46**	**0.005**	**0.0022**	**NC**		
					Total Risk	**2.3E-06**					**Hazard Index**	**0.78**	**0.46**
Chromium [2]													
Chromium (III)	28.9		--	--	NC	--	0.00007	0.00004	0.000004	0.000002	NC	**0.00007**	**0.00004**
Chromium (VI)	28.9		1.3E-05	6.90E-07	NC	**1.4E-05**	0.03	0.020	0.00220	0.00095	NC	**0.04**	**0.021**
Pathway Risk (including Chromium (III))			**2.3E-06**	**1.5E-09**	NC	**2.3E-06**	**0.77**	**0.46**	**0.005**	**0.0022**	NC	**0.78**	**0.465**
					Total Risk (including Chromium(III))	**2.3E-06**					**Total Hazard (including Chromium(III))**	**0.78**	**0.46**
Pathway Risk (including Chromium (VI))			**1.5E-05**	**1.5E-09**	NC	**1.5E-05**	**0.81**	**0.48**	**0.007**	**0.003**	NC		
					Total Risk (including Chromium(VI))	**1.6E-05**					**Total Hazard (including Chromium(VI))**	**0.81**	**0.49**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.43
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 5
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	10	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	821		--	--	NC	--	0.041	0.025	0.00022	0.00014	NC	**0.041**	**0.025**
Antimony	28.1	J	--	--	NC	--	3.5	2.1	0.13	0.079	NC	**3.6**	**2.2**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	82.8	J	--	--	NC	--	0.021	0.012	0.0016	0.0010	NC	**0.023**	**0.013**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	55		--	--	NC	--	0.11	0.069	0.016	0.010	NC	**0.13**	**0.079**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			--	--	**NC**	--	**3.7**	**2.2**	**0.15**	**0.090**	**NC**	**3.8**	**2.3**
					Total Risk	**0.0E+00**					**Hazard Index**	**3.8**	**2.3**
Chromium [2]													
Chromium (III)	2.6	J	--	--	NC	--	0.000086	0.000052	0.000036	0.000022	NC	**0.00012**	**0.000074**
Chromium (VI)	2.6	J	1.7E-05	7.4E-06	NC	**2.4E-05**	0.043	0.026	0.019	0.012	NC	**0.062**	**0.038**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**3.7**	**2.2**	**0.15**	**0.090**	NC	**3.8**	**2.3**
					Total Risk (including Chromium(III))	**0.0E+00**					**Total Hazard (including Chromium(III))**	**3.8**	**2.3**
Pathway Risk (including Chromium (VI))			**1.7E-05**	**0.0E+00**	NC	**1.7E-05**	**3.7**	**2.2**	**0.17**	**0.10**	NC	**3.9**	**2.3**
					Total Risk (including Chromium(VI))	**2.4E-05**					**Total Hazard (including Chromium(VI))**	**3.9**	**2.3**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.44
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 5
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	10	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	821		--	--	NC	--	0.000067	0.0000059	NC	**0.000073**
Antimony	28.1	J	--	--	NC	--	0.0058	0.0033	NC	**0.0091**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	82.8	J	--	--	NC	--	0.000034	0.000042	NC	**0.000076**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.1	U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	55		--	--	NC	--	0.00019	0.00041	NC	**0.00060**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			--	--	**NC**		**0.0061**	**0.0038**	**NC**	
					Total Risk	**0.0E+00**			**Hazard Index**	**0.010**
Chromium [2]										
Chromium (III)	2.6	J	--	--	NC	--	0.0000016	0.000011	NC	**0.000013**
Chromium (VI)	2.6	J	1.5E-09	1.1E-08	NC	**1.3E-08**	0.00079	0.0055	NC	**0.0063**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.0061**	**0.0038**	NC	**0.010**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**0.010**
Pathway Risk (including Chromium (VI))			**1.5E-09**	**1.1E-08**	NC	**1.3E-08**	**0.0069**	**0.0093**	NC	**0.0063**
					Total Risk (including Chromium(VI))	**1.3E-08**			**Total Hazard (including Chromium(VI))**	**0.016**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.45
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 5
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	10	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	821		--	--	NC	--	0.016	0.000022	NC	**0.016**
Antimony	28.1	J	--	--	NC	--	1.4	0.013	NC	**1.4**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	82.8	J	--	--	NC	--	0.0080	0.00016	NC	**0.0082**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.1	U	--	--	NC	--	--	--	NC	--
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.1	U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	55		--	--	NC	--	0.044	0.0015	NC	**0.046**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	4	U	--	--	NC	--	--	--	NC	--
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			--	--	**NC**		**1.5**	**0.015**	**NC**	
					Total Risk	**0.0E+00**			**Hazard Index**	**1.5**
Chromium [2]										
Chromium (III)	2.6	J	--	--	NC	--	0.000033	0.000040	NC	**0.000073**
Chromium (VI)	2.6	J	8.9E-06	9.9E-07	NC	**9.9E-06**	0.017	0.021	NC	**0.038**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**1.5**	**0.015**	NC	**1.5**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**1.5**
Pathway Risk (including Chromium (VI))			**8.9E-06**	**0.0E+00**	NC	**8.9E-06**	**1.5**	**0.036**	NC	**1.5**
					Total Risk (including Chromium(VI))	**9.9E-06**			**Total Hazard (including Chromium(VI))**	**1.5**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.46
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 5
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	10	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	821		--	--	NC	--	0.0028	0.0017	0.0000023	0.0000010	NC	0.0028	0.0017
Antimony	28.1	J	--	--	NC	--	0.24	0.14	0.0013	0.00058	NC	0.24	0.14
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	82.8	J	--	--	NC	--	0.0014	0.00085	0.000017	0.0000073	NC	0.0014	0.00086
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	55		--	--	NC	--	0.0078	0.0047	0.00016	0.000070	NC	0.0080	0.0048
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			--	--	**NC**		**0.25**	**0.15**	**0.0015**	**0.00066**	**NC**		
					Total Risk	**0.0E+00**					**Hazard Index**	**0.25**	**0.15**
Chromium [2]													
Chromium (III)	2.6	J	--	--	NC	--	0.0000059	0.000040	0.00000038	0.00000016	NC	**0.0000063**	**0.000040**
Chromium (VI)	2.6	J	1.1E-06	6.20E-08	NC	**1.2E-06**	0.0030	0.020	0.00020	0.000085	NC	**0.0032**	**0.020**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.25**	**0.15**	**0.0015**	**0.00066**	NC	**0.25**	**0.148**
					Total Risk (including Chromium(III))	**0.0E+00**					**Total Hazard (including Chromium(III))**	**0.25**	**0.15**
Pathway Risk (including Chromium (VI))			**1.1E-06**	**0.0E+00**	NC	**1.1E-06**	**0.26**	**0.17**	**0.0017**	**0.00074**	NC		
					Total Risk (including Chromium(VI))	**1.2E-06**					**Total Hazard (including Chromium(VI))**	**0.26**	**0.17**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.47
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 45-2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	23		4.1E-06	--	NC	**4.1E-06**	0.057	0.034	--	--	NC	**0.057**	**0.034**
Metals													
Aluminum	42	U	--	--	NC	--	--	--	--	--	NC	--	--
Antimony	26.8	J	--	--	NC	--	3.3	2.0	0.12	0.075	NC	**3.4**	**2.1**
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	27.2	J	--	--	NC	--	0.0068	0.0041	0.00053	0.00033	NC	**0.0073**	**0.0044**
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.9	J	--	--	NC	--	0.29	0.17	0.032	0.019	NC	**0.32**	**0.19**
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	1400		--	--	NC	--	2.9	1.7	0.40	0.25	NC	**3.3**	**2.0**
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	10.2	J	--	--	NC	--	0.025	0.015	0.00070	0.00043	NC	**0.026**	**0.015**
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			4.1E-06	**--**	**NC**	**4.1E-06**	**6.6**	**3.9**	**0.55**	**0.34**	**NC**	**7.1**	**4.3**
					Total Risk	**4.1E-06**					**Hazard Index**	**7.1**	**4.3**
Chromium [2]													
Chromium (III)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**4.1E-06**	**0.0E+00**	NC	**4.1E-06**	**6.6**	**3.9**	**0.55**	**0.34**	NC	**7.1**	**4.3**
					Total Risk (including Chromium(III))	**4.1E-06**					**Total Hazard (including Chromium(III))**	**7.1**	**4.3**
Pathway Risk (including Chromium (VI))			**4.1E-06**	**0.0E+00**	NC	**4.1E-06**	**6.6**	**3.9**	**0.55**	**0.34**	NC	**7.1**	**4.3**
					Total Risk (including Chromium(VI))	**4.1E-06**					**Total Hazard (including Chromium(VI))**	**7.1**	**4.3**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.48
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 45-2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	23		3.8E-10	--	NC	**3.8E-10**	0.000095	--	NC	**0.000095**
Metals										
Aluminum	42	U	--	--	NC	--	--	--	NC	--
Antimony	26.8	J	--	--	NC	--	0.0055	0.0032	NC	**0.0087**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	27.2	J	--	--	NC	--	0.000011	0.000014	NC	**0.000025**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.9	J	--	--	NC	--	0.00048	0.00083	NC	**0.0013**
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.1	U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	1400		--	--	NC	--	0.0048	0.010	NC	**0.01480**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	10.2	J	--	--	NC	--	0.000042	0.000018	NC	**0.0001**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			3.8E-10	**--**	**NC**		**0.011**	**0.014**	**NC**	
					Total Risk	**3.8E-10**			**Hazard Index**	**0.025**
Chromium [2]										
Chromium (III)	2.6	U	--	--	NC	--	--	0.000011	NC	**0.000011**
Chromium (VI)	2.6	U	--	--	NC	--	--	0.0055	NC	**0.0055**
Pathway Risk (including Chromium (III))			**3.8E-10**	**0.0E+00**	NC	**3.8E-10**	**0.011**	**0.014**	NC	**0.025**
					Total Risk (including Chromium(III))	**3.8E-10**			**Total Hazard (including Chromium(III))**	**0.025**
Pathway Risk (including Chromium (VI))			**3.8E-10**	**0.0E+00**	NC	**0.0E+00**	**0.011**	**0.020**	NC	**0.0055**
					Total Risk (including Chromium(VI))	**3.8E-10**			**Total Hazard (including Chromium(VI))**	**0.030**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.49
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 45-2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	23		2.2E-06	--	NC	**2.2E-06**	0.022	--	NC	**0.022**
Metals										
Aluminum	42	U	--	--	NC	--	--	--	NC	--
Antimony	26.8	J	--	--	NC	--	1.3	0.012	NC	**1.3**
Arsenic	1.4	U	--	--	NC	--	--	--	NC	--
Barium	27.2	J	--	--	NC	--	0.0026	0.000052	NC	**0.0027**
Beryllium	0.4	U	--	--	NC	--	--	--	NC	--
Cadmium	2.9	J	--	--	NC	--	0.11	0.0031	NC	**0.11**
Cobalt	4.4	U	--	--	NC	--	--	--	NC	--
Copper	3.1	U	--	--	NC	--	--	--	NC	--
Manganese (non-diet)	1400		--	--	NC	--	1.1	0.039	NC	**1.1**
Mercury	0.04	U	--	--	NC	--	--	--	NC	--
Nickel	10.2	J	--	--	NC	--	0.010	0.000068	NC	**0.010**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	3.7	U	--	--	NC	--	--	--	NC	--
			2.2E-06	**--**	**NC**		**2.5**	**0.054**	**NC**	
					Total Risk	**2.2E-06**			**Hazard Index**	**2.6**
Chromium [2]										
Chromium (III)	2.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**2.2E-06**	**0.0E+00**	NC	**2.2E-06**	**2.5**	**0.054**	NC	**2.6**
					Total Risk (including Chromium(III))	**2.2E-06**			**Total Hazard (including Chromium(III))**	**2.6**
Pathway Risk (including Chromium (VI))			**2.2E-06**	**0.0E+00**	NC	**2.2E-06**	**2.5**	**0.054**	NC	**2.6**
					Total Risk (including Chromium(VI))	**2.2E-06**			**Total Hazard (including Chromium(VI))**	**2.6**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.50
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 45-2
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	23		2.8E-07	--	NC	2.8E-07	0.0039	0.0024	--	--	NC	0.0039	0.0024
Metals													
Aluminum	42	U	--	--	NC	--	--	--	--	--	NC	--	--
Antimony	26.8	J	--	--	NC	--	0.23	0.14	0.0013	0.00055	NC	0.23	0.14
Arsenic	1.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	27.2	J	--	--	NC	--	0.00047	0.00028	0.0000055	0.0000024	NC	0.00048	0.00028
Beryllium	0.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cadmium	2.9	J	--	--	NC	--	0.020	0.012	0.00033	0.00014	NC	0.020	0.012
Cobalt	4.4	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Manganese (non-diet)	1400		--	--	NC	--	0.20	0.12	0.0042	0.0018	NC	0.20	0.12
Mercury	0.04	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	10.2	J	--	--	NC	--	0.0017	0.0010	0.0000073	0.0000031	NC	0.0017	0.0010
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	3.7	U	--	--	NC	--	--	--	--	--	NC	--	--
			2.8E-07	--	NC		0.46	0.28	0.0058	0.0025	NC		
					Total Risk	2.8E-07					Hazard Index	0.46	0.28
Chromium [2]													
Chromium (III)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	2.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			2.8E-07	0.0E+00	NC	2.8E-07	0.46	0.28	0.0058	0.0025	NC	0.46	0.278
					Total Risk (including Chromium(III))	2.8E-07					Total Hazard (including Chromium(III))	0.46	0.28
Pathway Risk (including Chromium (VI))			2.8E-07	0.0E+00	NC	2.8E-07	0.46	0.28	0.0058	0.0025	NC		
					Total Risk (including Chromium(VI))	2.8E-07					Total Hazard (including Chromium(VI))	0.46	0.28

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.51
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 45-3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	7510		--	--	NC	--	0.37	0.23	0.0021	0.0013	NC	**0.372**	**0.231**
Antimony	36.7	J	--	--	NC	--	4.6	2.7	0.17	0.10	NC	**4.8**	**2.8**
Arsenic	1.8	J	3.5E-05	1.9E-07	NC	**3.5E-05**	0.30	0.18	0.0016	0.0010	NC	**0.3**	**0.18**
Barium	62.1	J	--	--	NC	--	0.015	0.010	0.0012	0.00075	NC	**0.0162**	**0.0108**
Beryllium	0.52	J	--	--	NC	--	0.013	0.0080	0.010	0.0062	NC	**0.02**	**0.01**
Cadmium	3.2	J	--	--	NC	--	0.32	0.19	0.035	0.022	NC	**0.36**	**0.21**
Cobalt	14.6	J	--	--	NC	--	2.4	1.5	0.0053	0.0033	NC	**2.4**	**1.5**
Copper	11.9	J	--	--	NC	--	0.015	0.0090	0.000081	0.000050	NC	**0.015**	**0.009**
Manganese (non-diet)	625		--	--	NC	--	1.3	0.80	0.18	0.11	NC	**1.5**	**0.9**
Mercury	0.08	J	--	--	NC	--	0.013	0.010	0.0010	0.00064	NC	**0.01**	**0.01**
Nickel	30.7	J	--	--	NC	--	0.077	0.046	0.0021	0.0013	NC	**0.079**	**0.047**
Thallium	1.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	11.7	J	--	--	NC	--	0.12	0.070	0.025	0.015	NC	**0.1**	**0.09**
			3.5E-05	**1.9E-07**	**NC**	**3.5E-05**	**9.5**	**5.8**	**0.43**	**0.26**	**NC**	**10.0**	**6.0**
					Total Risk	3.5E-05					**Hazard Index**	**10.0**	**6.0**
Chromium [2]													
Chromium (III)	16.1		--	--	NC	--	0.00054	0.00032	0.00023	0.00014	NC	**0.00077**	**0.000460**
Chromium (VI)	16.1		1.0E-04	4.6E-05	NC	**1.5E-04**	0.27	0.16	0.12	0.070	NC	**0.390**	**0.230**
Pathway Risk (including Chromium (III))			**3.5E-05**	**1.9E-07**	NC	**3.5E-05**	**9.5**	**5.8**	**0.43**	**0.26**	NC	**10**	**6.0**
					Total Risk (including Chromium(III))	3.5E-05					**Total Hazard (including Chromium(III))**	**10**	**6.0**
Pathway Risk (including Chromium (VI))			**1.4E-04**	**1.9E-07**	NC	**1.4E-04**	**9.8**	**5.9**	**0.55**	**0.33**	NC	**10**	**6.2**
					Total Risk (including Chromium(VI))	1.8E-04					**Total Hazard (including Chromium(VI))**	**10**	**6.2**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.52
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 45-3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	7510		--	--	NC	--	0.00062	0.000054	NC	**0.00067**
Antimony	36.7	J	--	--	NC	--	0.0075	0.0044	NC	**0.012**
Arsenic	1.8	J	3.2E-09	2.8E-10	NC	**3.5E-09**	0.00049	0.000043	NC	**0.00053**
Barium	62.1	J	--	--	NC	--	0.000026	0.000032	NC	**0.000058**
Beryllium	0.52	J	--	--	NC	--	0.000021	0.00026	NC	**0.00028**
Cadmium	3.2	J	--	--	NC	--	0.00053	0.00091	NC	**0.0014**
Cobalt	14.6	J	--	--	NC	--	0.0040	0.00014	NC	**0.0041**
Copper	11.9	J	--	--	NC	--	0.000024	0.0000021	NC	**0.000026**
Manganese (non-diet)	625		--	--	NC	--	0.0021	0.0046	NC	**0.0067**
Mercury	0.08	J	--	--	NC	--	0.000022	0.000027	NC	**0.000049**
Nickel	30.7	J	--	--	NC	--	0.00013	0.000055	NC	**0.00019**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	11.7	J	--	--	NC	--	0.00019	0.00064	NC	**0.00083**
			3.2E-09	**2.8E-10**	**NC**		**0.016**	**0.011**	**NC**	
					Total Risk	**3.5E-09**			**Hazard Index**	**0.027**
Chromium [2]										
Chromium (III)	16.1		--	--	NC	--	0.00000088	0.0000059	NC	**0.0000068**
Chromium (VI)	16.1		9.5E-09	6.6E-08	NC	**7.6E-08**	0.00044	0.0031	NC	**0.0035**
Pathway Risk (including Chromium (III))			**3.2E-09**	**2.8E-10**	NC	**3.5E-09**	**0.016**	**0.011**	NC	**0.027**
					Total Risk (including Chromium(III))	**3.5E-09**			**Total Hazard (including Chromium(III))**	**0.027**
Pathway Risk (including Chromium (VI))			**1.3E-08**	**6.6E-08**	NC	**7.6E-08**	**0.016**	**0.014**	NC	**0.0035**
					Total Risk (including Chromium(VI))	**7.9E-08**			**Total Hazard (including Chromium(VI))**	**0.030**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.53
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 45-3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	7510		--	--	NC	--	0.14	0.00020	NC	**0.14**
Antimony	36.7	J	--	--	NC	--	1.8	0.016	NC	**1.8**
Arsenic	1.8	J	1.9E-05	2.6E-08	NC	**1.9E-05**	0.12	0.00016	NC	**0.12**
Barium	62.1	J	--	--	NC	--	0.0060	0.00012	NC	**0.0061**
Beryllium	0.52	J	--	--	NC	--	0.0050	0.0010	NC	**0.0060**
Cadmium	3.2	J	--	--	NC	--	0.12	0.0034	NC	**0.12**
Cobalt	14.6	J	--	--	NC	--	0.94	0.00052	NC	**0.94**
Copper	11.9	J	--	--	NC	--	0.0057	0.0000080	NC	**0.0057**
Manganese (non-diet)	625		--	--	NC	--	0.50	0.017	NC	**0.52**
Mercury	0.08	J	--	--	NC	--	0.0050	0.00010	NC	**0.0051**
Nickel	30.7	J	--	--	NC	--	0.030	0.00021	NC	**0.030**
Thallium	1.2	U	--	--	NC	--	--	--	NC	--
Vanadium	11.7	J	--	--	NC	--	0.045	0.0024	NC	**0.047**
			1.9E-05	**2.6E-08**	**NC**		**3.7**	**0.041**	**NC**	
					Total Risk	**1.9E-05**			**Hazard Index**	**3.8**
Chromium [2]										
Chromium (III)	16.1		--	--	NC	--	0.00021	0.000022	NC	**0.00023**
Chromium (VI)	16.1		5.5E-05	6.1E-06	NC	**6.1E-05**	0.10	0.011	NC	**0.11**
Pathway Risk (including Chromium (III))			**1.9E-05**	**2.6E-08**	NC	**1.9E-05**	**3.7**	**0.041**	NC	**3.8**
					Total Risk (including Chromium(III))	**1.9E-05**			**Total Hazard (including Chromium(III))**	**3.8**
Pathway Risk (including Chromium (VI))			**7.4E-05**	**2.6E-08**	NC	**7.4E-05**	**3.8**	**0.052**	NC	**3.9**
					Total Risk (including Chromium(VI))	**8.0E-05**			**Total Hazard (including Chromium(VI))**	**3.9**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.54
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 45-3
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	–	–	NC	–	–	–	–	–	NC	–	–
Metals													
Aluminum	7510		–	–	NC	–	0.026	0.015	0.000021	0.0000092	NC	**0.026**	**0.015**
Antimony	36.7	J	–	–	NC	–	0.31	0.19	0.0017	0.00075	NC	**0.31**	**0.19**
Arsenic	1.8	J	2.4E-06	1.60E-09	NC	**2.4E-06**	0.021	0.012	0.000017	0.0000074	NC	**0.021**	**0.012**
Barium	62.1	J	–	–	NC	–	0.0011	0.00064	0.000013	0.0000055	NC	**0.0011**	**0.00065**
Beryllium	0.52	J	–	–	NC	–	0.00089	0.00053	0.00011	0.000046	NC	**0.0010**	**0.00058**
Cadmium	3.2	J	–	–	NC	–	0.022	0.013	0.00037	0.00016	NC	**0.022**	**0.013**
Cobalt	14.6	J	–	–	NC	–	0.17	0.10	0.000056	0.000024	NC	**0.17**	**0.10**
Copper	11.9	J	–	–	NC	–	0.0010	0.00061	0.00000085	0.00000037	NC	**0.0010**	**0.00061**
Manganese (non-diet)	625		–	–	NC	–	0.089	0.054	0.0019	0.00080	NC	**0.091**	**0.055**
Mercury	0.08	J	–	–	NC	–	0.00090	0.00055	0.000011	0.0000047	NC	**0.00091**	**0.00055**
Nickel	30.7	J	–	–	NC	–	0.0052	0.0032	0.000022	0.0000094	NC	**0.0052**	**0.0032**
Thallium	1.2	U	–	–	NC	–	–	–	–	–	NC	–	–
Vanadium	11.7	J	–	–	NC	–	0.0080	0.0048	0.00026	0.00011	NC	**0.0083**	**0.0049**
			2.4E-06	**1.6E-09**	**NC**		**0.66**	**0.39**	**0.0045**	**0.0019**	**NC**		
					Total Risk	2.4E-06					**Hazard Index**	0.66	0.40
Chromium [2]													
Chromium (III)	16.1		–	–	NC	–	0.0000370	0.000020	0.0000024	0.0000010	NC	**0.000039**	**0.000021**
Chromium (VI)	16.1		7.1E-06	3.8E-07	NC	**7.5E-06**	0.0180	0.011	0.0012	0.00053	NC	**0.019**	**0.012**
Pathway Risk (including Chromium (III))			**2.4E-06**	**1.6E-09**	NC	**2.4E-06**	**0.66**	**0.39**	**0.0045**	**0.0019**	NC	**0.66**	**0.40**
					Total Risk (including Chromium(III))	2.4E-06					**Total Hazard (including Chromium(III))**	0.66	0.40
Pathway Risk (including Chromium (VI))			**9.5E-06**	**1.6E-09**	NC	**9.5E-06**	**0.67**	**0.41**	**0.0057**	**0.0025**	NC		
					Total Risk (including Chromium(VI))	9.9E-06					**Total Hazard (including Chromium(VI))**	0.68	0.41

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
– Risk/hazard not calculated because toxicity value was not available.

Table 2.55
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Resident
Monitoring Well 45-4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	63300		--	--	NC	--	3.2	1.9	0.017	0.011	NC	3.2	1.9
Antimony	21.6	UJ	--	--	NC	--	--	--	--	--	NC	--	--
Arsenic	9.5	J	1.8E-04	1.0E-06	NC	1.8E-04	1.6	0.95	0.0087	0.0053	NC	1.6	0.96
Barium	751		--	--	NC	--	0.19	0.11	0.015	0.0090	NC	0.21	0.12
Beryllium	5		--	--	NC	--	0.12	0.075	0.098	0.060	NC	0.22	0.14
Cadmium	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	94.4		--	--	NC	--	16	9.4	0.034	0.021	NC	16	9.4
Copper	123		--	--	NC	--	0.15	0.092	0.00084	0.00052	NC	0.15	0.093
Manganese (non-diet)	4640		--	--	NC	--	9.6	5.8	1.3	0.81	NC	11	6.6
Mercury	0.29		--	--	NC	--	0.048	0.029	0.0038	0.0023	NC	0.052	0.031
Nickel	209		--	--	NC	--	0.52	0.31	0.014	0.0088	NC	0.53	0.32
Thallium	3.4	J	--	--	NC	--	17	10	0.093	0.057	NC	17	10
Vanadium	93.1		--	--	NC	--	0.93	0.56	0.20	0.12	NC	1.1	0.68
			1.8E-04	**1.0E-06**	**NC**	**1.8E-04**	**49**	**29**	**1.8**	**1.1**	**NC**	**51**	**30**
					Total Risk	1.8E-04					**Hazard Index**	51	30
Chromium [2]													
Chromium (III)	106		--	--	NC	--	0.0035	0.00210	0.00150	0.00091	NC	0.0050	0.0030
Chromium (VI)	106		6.8E-04	3.0E-04	NC	9.8E-04	1.8	1.10	0.77	0.470	NC	2.6	1.6
Pathway Risk (including Chromium (III))			**1.8E-04**	**1.0E-06**	NC	1.8E-04	**49**	**29**	**1.8**	**1.1**	NC	**51**	**30**
					Total Risk (including Chromium(III))	1.8E-04					**Total Hazard (including Chromium(III))**	51	30
Pathway Risk (including Chromium (VI))			**8.6E-04**	**1.0E-06**	NC	**8.6E-04**	**51**	**30**	**2.6**	**1.6**	NC	**54**	**32**
					Total Risk (including Chromium(VI))	1.2E-03					**Total Hazard (including Chromium(VI))**	54	32

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.56
Human Health Risk Evaluation
Potable Uses of Groundwater
Hypothetical Future Excavation/Construction Worker
Monitoring Well 45-4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	63300		--	--	NC	--	0.0052	0.00045	NC	**0.0057**
Antimony	21.6	UJ	--	--	NC	--	--	--	NC	--
Arsenic	9.5	J	1.7E-08	1.5E-09	NC	**1.9E-08**	0.0026	0.00023	NC	**0.0028**
Barium	751		--	--	NC	--	0.00031	0.00038	NC	**0.00069**
Beryllium	5		--	--	NC	--	0.00021	0.0025	NC	**0.0027**
Cadmium	4	U	--	--	NC	--	--	--	NC	--
Cobalt	94.4		--	--	NC	--	0.026	0.00090	NC	**0.027**
Copper	123		--	--	NC	--	0.00025	0.000022	NC	**0.00027**
Manganese (non-diet)	4640		--	--	NC	--	0.016	0.034	NC	**0.050**
Mercury	0.29		--	--	NC	--	0.000079	0.00010	NC	**0.00018**
Nickel	209		--	--	NC	--	0.00086	0.00037	NC	**0.0012**
Thallium	3.4	J	--	--	NC	--	0.028	0.0024	NC	**0.030**
Vanadium	93.1		--	--	NC	--	0.0015	0.0051	NC	**0.0066**
			1.7E-08	**1.5E-09**	**NC**		**0.081**	**0.046**	**NC**	
					Total Risk	**1.9E-08**			**Hazard Index**	**0.13**
Chromium [2]										
Chromium (III)	106		--	--	NC	--	0.0000058	0.000039	NC	**0.000045**
Chromium (VI)	106		6.2E-08	4.3E-07	NC	**4.9E-07**	0.0029	0.020	NC	**0.023**
Pathway Risk (including Chromium (III))			**1.7E-08**	**1.5E-09**	NC	**1.9E-08**	**0.081**	**0.046**	NC	**0.13**
					Total Risk (including Chromium(III))	**1.9E-08**			**Total Hazard (including Chromium(III))**	**0.13**
Pathway Risk (including Chromium (VI))			**7.9E-08**	**4.3E-07**	NC	**4.9E-07**	**0.084**	**0.066**	NC	**0.023**
					Total Risk (including Chromium(VI))	**5.1E-07**			**Total Hazard (including Chromium(VI))**	**0.15**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.57
Human Health Risk Evaluation
Potable Uses of Groundwater
Future Park Worker
Monitoring Well 45-4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds										
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	63300		--	--	NC	--	1.2	0.0017	NC	**1.2**
Antimony	21.6	UJ	--	--	NC	--	--	--	NC	--
Arsenic	9.5	J	9.8E-05	1.4E-07	NC	**9.8E-05**	0.61	0.00085	NC	**0.61**
Barium	751		--	--	NC	--	0.072	0.0014	NC	**0.073**
Beryllium	5		--	--	NC	--	0.048	0.0095	NC	**0.058**
Cadmium	4	U	--	--	NC	--	--	--	NC	--
Cobalt	94.4		--	--	NC	--	6.1	0.0034	NC	**6.1**
Copper	123		--	--	NC	--	0.059	0.000082	NC	**0.059**
Manganese (non-diet)	4640		--	--	NC	--	3.7	0.13	NC	**3.8**
Mercury	0.29		--	--	NC	--	0.019	0.00037	NC	**0.019**
Nickel	209		--	--	NC	--	0.20	0.0014	NC	**0.20**
Thallium	3.4	J	--	--	NC	--	6.5	0.0091	NC	**6.5**
Vanadium	93.1		--	--	NC	--	0.36	0.019	NC	**0.38**
			9.8E-05	**1.4E-07**	**NC**		**19**	**0.18**	**NC**	
					Total Risk	**9.8E-05**			**Hazard Index**	**19**
Chromium [2]										
Chromium (III)	106		--	--	NC	--	0.0014	0.00015	NC	**0.0016**
Chromium (VI)	106		3.6E-04	4.0E-05	NC	**4.0E-04**	0.68	0.076	NC	**0.76**
Pathway Risk (including Chromium (III))			**9.8E-05**	**1.4E-07**	NC	**9.8E-05**	**19**	**0.177**	NC	**19**
					Total Risk (including Chromium(III))	**9.8E-05**			**Total Hazard (including Chromium(III))**	**19**
Pathway Risk (including Chromium (VI))			**4.6E-04**	**1.4E-07**	NC	**4.6E-04**	**20**	**0.253**	NC	**20**
					Total Risk (including Chromium(VI))	**5.0E-04**			**Total Hazard (including Chromium(VI))**	**20**

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.58
Human Health Risk Evaluation
Potable Uses of Groundwater
Current and Future Recreational User
Monitoring Well 45-4
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds													
Bis(2-Ethylhexyl)phthalate	11	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	63300		--	--	NC	--	0.22	0.13	0.00018	0.000078	NC	**0.22**	**0.13**
Antimony	21.6	UJ	--	--	NC	--	--	--	--	--	NC	--	--
Arsenic	9.5	J	1.3E-05	8.50E-09	NC	**1.3E-05**	0.11	0.065	0.000090	0.000039	NC	**0.11**	**0.065**
Barium	751		--	--	NC	--	0.013	0.0077	0.00015	0.000066	NC	**0.013**	**0.0078**
Beryllium	5		--	--	NC	--	0.0085	0.0051	0.0010	0.00044	NC	**0.0095**	**0.0055**
Cadmium	4	U	--	--	NC	--	--	--	--	--	NC	--	--
Cobalt	94.4		--	--	NC	--	1.1	0.65	0.00036	0.00015	NC	**1.1**	**0.65**
Copper	123		--	--	NC	--	0.011	0.0063	0.0000088	0.0000038	NC	**0.011**	**0.0063**
Manganese (non-diet)	4640		--	--	NC	--	0.66	0.40	0.014	0.0059	NC	**0.67**	**0.41**
Mercury	0.29		--	--	NC	--	0.0033	0.0020	0.000039	0.000017	NC	**0.0033**	**0.0020**
Nickel	209		--	--	NC	--	0.036	0.021	0.00015	0.000064	NC	**0.036**	**0.021**
Thallium	3.4	J	--	--	NC	--	1.2	0.70	0.0010	0.00042	NC	**1.2**	**0.70**
Vanadium	93.1		--	--	NC	--	0.064	0.038	0.0020	0.00088	NC	**0.066**	**0.039**
			1.3E-05	**8.5E-09**	**NC**		**3.4**	**2.0**	**0.019**	**0.0081**	**NC**		
					Total Risk	1.3E-05					**Hazard Index**	3.4	2.0
Chromium [2]													
Chromium (III)	106		--	--	NC	--	0.00024	0.00015	0.000016	0.000010	NC	**0.00026**	**0.00016**
Chromium (VI)	106		4.7E-05	2.5E-06	NC	**5.0E-05**	0.12	0.073	0.0081	0.0030	NC	**0.13**	**0.076**
Pathway Risk (including Chromium (III))			**1.3E-05**	**8.5E-09**	NC	**1.3E-05**	**3.4**	**2.0**	**0.019**	**0.0081**	NC	**3.4**	**2.0**
					Total Risk (including Chromium(III))	1.3E-05					**Total Hazard (including Chromium(III))**	3.4	2.0
Pathway Risk (including Chromium (VI))			**6.0E-05**	**8.5E-09**	NC	**6.0E-05**	3.5	**2.1**	**0.027**	**0.011**	NC		
					Total Risk (including Chromium(VI))	6.3E-05					**Total Hazard (including Chromium(VI))**	3.6	2.1

[1] Exposure point concentration is the maximum detected concentration from an individual groundwater well onsite. See Table 2.12.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.59
Human Health Risk Evaluation
Summary of Risk and Hazard Associated with the Potable Uses of Groundwater
Seneca Army Depot Activity

All COPCs including chromium(III)

	Hypothetical Future Resident	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User	Hypothetical Future Resident (Child)	Hypothetical Future Resident (Adult)	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User (Child)	Current and Future Recreational User (Adult)
Monitoring Well	**Carcinogenic Risk**				**Noncarcinogenic Hazard Index**					
MW1	5.9E-06	5.4E-10	3.2E-06	4.1E-07	3.5	2.1	0.0091	1.3	0.23	0.14
MW2	NC	NC	NC	NC	4.0	2.4	0.0093	1.5	0.27	0.16
MW3	2.2E-06	2.0E-10	1.2E-06	1.5E-07	6.8	4.1	0.017	2.6	0.45	0.27
MW4	3.5E-05	3.4E-09	1.9E-05	2.3E-06	12	7.1	0.031	4.4	0.78	0.46
MW5	NC	NC	NC	NC	3.8	2.3	0.010	1.5	0.25	0.15
MW45-2	4.1E-06	3.8E-10	2.2E-06	2.8E-07	7.1	4.3	0.025	2.6	0.46	0.28
MW45-3	3.5E-05	1.9E-08	9.8E-05	1.3E-05	10	6.0	0.13	19	3.4	2.0
MW45-4	1.8E-04	1.9E-08	9.8E-05	1.3E-05	51	30	0.13	19	3.4	2.0
MW23-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW23-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW23-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

All COPCs including chromium(VI)

	Hypothetical Future Resident	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User	Hypothetical Future Resident (Child)	Hypothetical Future Resident (Adult)	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User (Child)	Current and Future Recreational User (Adult)
Monitoring Well	**Carcinogenic Risk**				**Noncarcinogenic Hazard Index**					
MW1	5.9E-06	5.4E-10	3.2E-06	4.1E-07	3.5	2.1	0.0091	1.3	0.23	0.14
MW2	3.8E-05	1.9E-08	1.6E-05	1.9E-06	4.1	2.5	0.010	1.5	0.27	0.16
MW3	2.2E-06	2.0E-10	1.2E-06	1.5E-07	6.8	4.1	0.017	2.6	0.45	0.27
MW4	3.0E-04	1.4E-07	1.3E-04	1.6E-05	12	7.5	0.038	4.6	0.81	0.49
MW5	2.4E-05	1.3E-08	9.9E-06	1.2E-06	3.9	2.3	0.016	1.5	0.26	0.17
MW45-2	4.1E-06	3.8E-10	2.2E-06	2.8E-07	7.1	4.3	0.030	2.6	0.46	0.28
MW45-3	1.8E-04	5.1E-07	5.0E-04	6.3E-05	10	6.2	0.15	20	3.6	2.1
MW45-4	1.2E-03	5.1E-07	5.0E-04	6.3E-05	54	32	0.15	20	3.6	2.1
MW23-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW23-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW23-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NC = not caluclated because no carcinogenic analytes detected
NA = no risk calculated for these wells because the only detected COPC was lead, which is addressed separately.

Table 2.60
Calculations of Blood Lead Concentrations (PbBs)
Surface Soil (0 - ≤ 2 feet bgs)
Seneca Army Depot Activity

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09 EDIT RED CELLS

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
PbS	Soil lead concentration	ug/g or ppm	169	169
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	225	225
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.5**	**2.0**
$PbB_{fetal,0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.6	6.1
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**	**1.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Table 2.61
Calculations of Blood Lead Concentrations (PbBs)
Combined Surface and Subsurface Soil (0 - ≤ 15 feet bgs)
Seneca Army Depot Activity

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee
Version date 6/21/09 EDIT RED CELLS

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
PbS	Soil lead concentration	ug/g or ppm	139	139
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	225	225
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.4**	**1.9**
$PbB_{fetal,\ 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.3	5.8
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	10.0	10.0
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**	**0.9%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Table 2.62
Predicted Blood-Lead Concentrations
Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children
OD Hill MRS, Seneca Army Depot

	Surface Soil EPC (mg/kg)	Groundwater EPC (µg/L)	Surface Water EPC (µg/L)	Predicted Blood-Lead Concentration [1] (µg/dL)	Predicted Percentage of Children with Blood-Lead Concentration Greater than 10 µg/dL	Is the predicted blood-lead concentration greater than the blood-lead level of concern of 10 µg/dL or predicted percentage greater than 5% [2]? (Y/N)
Future Resident - MW1	169	0.71 J	68.7	3.1	0.14%	N
Future Resident - MW2	169	0.66 J	68.7	3.1	0.14%	N
Future Resident - MW3	169	0.73 J	68.7	3.1	0.14%	N
Future Resident - MW4	169	15.7	68.7	5.6	3.7%	N
Future Resident - MW5	169	1.1 J	68.7	3.2	0.16%	N
Future Resident - MW45-2	169	0.71 J	68.7	3.1	0.14%	N
Future Resident - MW45-3	169	9.5	68.7	4.5	1.4%	N
Future Resident - MW45-4	169	75.6	68.7	13	54%	Y
Future Resident - MW23-4	169	5.4	68.7	3.8	0.59%	N
Future Resident - MW23-5	169	2.4 J	68.7	3.4	0.25%	N
Future Resident - MW23-6	169	3.6 J	68.7	3.6	0.36%	N

[1] The highest predicted blood lead concentration for all child age groups reported. See Appendix Cfor supporting output.
[2] EPA (2007) Intergrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children.

Table 2.63
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Hypothetical Future Resident
Kickout Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
Phenanthrene	0.018	--	--	--	--	--	--	--	--	--	--	--
Herbicides												
MCPA	9.4	--	--	--	--	0.24	0.023	0.065	0.010	--	**0.3**	**0.03**
Metals												
Aluminum	18000	--	--	--	--	0.23	0.022	--	--	0.0026	**0.2**	**0.02**
Arsenic	6.3	5.5E-07	--	7.3E-09	**5.6E-07**	0.27	0.025	0.022	0.0032	0.00031	**0.3**	**0.03**
Cadmium	2.6	--	--	1.3E-09	**1.3E-09**	0.033	0.0031	0.0036	0.00053	0.00019	**0.0**	**0.00**
Cobalt	44	--	--	1.1E-07	**1.1E-07**	1.88	0.176	--	--	0.0053	**1.9**	**0.18**
Manganese	1700	--	--	--	--	0.16	0.015	--	--	0.025	**0.2**	**0.04**
Vanadium	33	--		--		0.084	0.008	--	--	0.0002	**0.1**	**0.01**
	Pathway Risk	**5.5E-07**	**0.0E+00**	**1.2E-07**		**2.9**	**0.27**	**0.090**	**0.013**	**0.033**		
				Total Risk	**6.7E-07**						**3.0**	**0.32**
Chromium [2]												
Chromium (III)	29	--	--	--	--	0.00024	0.000023	--	--	--	**0.00024**	**0.000023**
Chromium (VI)	29	2.0E-05	--	6.5E-07	**2.1E-05**	0.12	0.011	--	--	0.0002	**0.12**	**0.012**
Pathway Risk (including Chromium (III))		**5.5E-07**	**0.0E+00**	**1.2E-07**	--	**2.9**	**0.27**	**0.090**	**0.013**	**0.033**	**3.0**	**0.32**
				Total Risk (including Chromium(III))	**6.7E-07**					**Total Hazard (including Chromium(III))**	**3.0**	**0.32**
Pathway Risk (including Chromium (VI))		**2.1E-05**	**0.0E+00**	**7.6E-07**	--	**3.0**	**0.28**	**0.090**	**0.013**	**0.034**	--	--
				Total Risk (including Chromium(VI))	**2.2E-05**					**Total Hazard (including Chromium(VI))**	**3.1**	**0.33**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.11.
[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.64
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Hypothetical Future Excavation/Construction Worker
Kickout Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
Phenanthrene	0.018	--	--	--	--	--	--	--	--
Herbicides									
MCPA	9.4	--	--	--	--	0.0019	0.00080	--	0.003
Metals									
Aluminum	18000	--	--	--	--	0.0018	--	0.00007	0.002
Arsenic	6.3	1.4E-08	1.73E-09	8.0E-12	2E-08	0.0022	0.00027	0.000009	0.0024
Cadmium	2.6	--	--	1.4E-12	1E-12	0.00027	0.000045	0.000005	0.000319
Cobalt	44	--	--	1.2E-10	1E-10	0.015	--	0.000152	0.015
Manganese	1700	--	--	--	--	0.0012	--	0.0007	0.0020
Vanadium	33	--	--	--	--	0.00067	--	0.000007	
	Pathway Risk	**1.4E-08**	**1.7E-09**	**1.3E-10**	**1.6E-08**	**0.023**	**0.0011**	**0.0010**	**0.025**
				Total Risk	**1.6E-08**			**Hazard Index**	**0.025**
Chromium [2]									
Chromium (III)	29	--	--	--	--	0.0000020	--	--	0.0000020
Chromium (VI)	29	2.1E-08	--	7.1E-10	2E-08	0.0010	--	0.0000059	0.0010
Pathway Risk (including Chromium (III))		**1E-08**	**2E-09**	**1E-10**	--	**0.023**	**0.001**	**0.001**	--
				Total Risk (including Chromium(III))	**2E-08**			**Total Hazard (including Chromium(III))**	**0.025**
Pathway Risk (including Chromium (VI))		**3E-08**	**2E-09**	**8E-10**	--	**0.024**	**0.001**	**0.001**	--
				Total Risk (including Chromium(VI))	**4E-08**			**Total Hazard (including Chromium(VI))**	**0.026**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.11.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.65
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Future Park Worker
Kickout Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Semivolatile Organic Compounds									
Phenanthrene	0.018	--	--	--	--	--	--	--	--
Herbicides					--				
MCPA	9.4	--	--	--	--	0.014	0.0060	--	**0.021**
Metals					--				
Aluminum	18000	--	--	--	--	0.014	--	0.00056	**0.014**
Arsenic	6.3	2.6E-06	3.2E-07	2E-09	**3E-06**	0.016	0.0020	0.000066	**0.018**
Cadmium	2.6	--	--	3E-10	**3E-10**	0.0020	0.00034	0.000041	**0.002**
Cobalt	44		--	--	--	0.11	--	0.0011	**0.114**
Manganese	1700	--	--	--	--	0.0094	--	0.0053	**0.0147**
Vanadium	33	--	--	--	--	0.0050	--	0.000051	**0.0051**
	Pathway Risk	**2.6E-06**	**3.2E-07**	**1.8E-09**		**0.17**	**0.0084**	**0.0072**	
				Total Risk	**2.9E-06**			**Hazard Index**	**0.19**
Chromium [2]									
Chromium (III)	29	--	--	--	--	0.000015	--	--	**0.000015**
Chromium (VI)	29	3.9E-06	--	1.3E-07	**4E-06**	0.01	--	0.000044	**0.0074**
Pathway Risk (including Chromium (III))		**3E-06**	**3E-07**	**2E-09**	--	**0.174**	**0.008**	**0.007**	--
				Total Risk (including Chromium(III))	**2.9E-06**			**Total Hazard (including Chromium(III))**	**0.19**
Pathway Risk (including Chromium (VI))		**7E-06**	**3E-07**	**1E-07**	--	**0.181**	**0.008**	**0.007**	--
				Total Risk (including Chromium(VI))	**7.0E-06**			**Total Hazard (including Chromium(VI))**	**0.20**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.11.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.66
Human Health Risk Evaluation Summary
Surface Soil (0 - ≤ 2 feet bgs)
Current and Future Recreational User
Kickout Area - Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (mg/kg)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Semivolatile Organic Compounds												
Phenanthrene	0.018	--	--	--	--	--	--	--	--	--	--	--
Herbicides												
MCPA	9.4	--	--	--	--	0.016	0.0015	0.0044	0.00065	--	**0.021**	**0.0022**
Metals												
Aluminum	18000	--	--	--	--	0.016	0.0015	--	--	0.00018	**0.016**	**0.0017**
Arsenic	6.3	9.3E-07	8.5E-08	5E-10	**1E-06**	0.018	0.0017	0.0015	0.00022	0.000021	**0.020**	**0.0020**
Cadmium	2.6	--	--	9E-11	**9E-11**	0.0023	0.00021	0.00025	0.000036	0.000013	**0.0026**	**0.00026**
Cobalt	44	--	--	--	--	0.13	0.012	--	--	0.00037	**0.13**	**0.012**
Manganese	1700	--	--	--	--	0.011	0.0010	--	--	0.0017	**0.012**	**0.0027**
Vanadium	33	--	--	--		0.0057	0.00054	--	--	0.000016	**0.0058**	**0.00055**
	Pathway Risk	**9.3E-07**	**8.5E-08**	**5.9E-10**		**0.20**	**0.019**	**0.0062**	**0.00091**	**0.0023**		
				Total Risk	**1.0E-06**						**0.21**	**0.022**
Chromium [2]												
Chromium (III)	29	--	--	--	--	0.000017	0.0000016	--	--	--	**0.000017**	**0.0000016**
Chromium (VI)	29	1.4E-06	--	4E-08	**1.4E-06**	0.0083	0.00078	--	--	0.000014	**0.0083**	**0.00080**
Pathway Risk (including Chromium (III))		9E-07	9E-08	6E-10	--	0.20	0.019	0.0062	0.00091	0.0023	**0.21**	**0.022**
				Total Risk (including Chromium(III))	**1.0E-06**					**Total Hazard (including Chromium(III))**	**0.000017**	**0.0000016**
Pathway Risk (including Chromium (VI))		2E-06	9E-08	5E-08	--	0.21	0.019	0.0062	0.00091	0.0023	--	--
				Total Risk (including Chromium(VI))	**2.5E-06**					**Total Hazard (including Chromium(VI))**	**0.0083**	**0.00080**

[1] Exposure point concentration is the 95% UCL or the maximum detected concentration. See Table 2.11.

[2] TChromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.67
Human Health Risk Evaluation
Hypothetical Future Resident
Surface Water, Upstream of OD Area
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic Compounds													
1,2-Dichloroethane	5	U	--	--	NC	--	--	--	--	--	NC	--	--
Explosives													
RDX	0.12	U	--	--	NC	--	--	--	--	--	NC	--	--
Metals													
Aluminum	140		--	--	NC	--	0.000089	0.000017	0.000024	0.000010	NC	0.00011	0.000027
Arsenic	3.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	48.3			--	NC	--	0.00015	0.000029	0.00059	0.00025	NC	0.00075	0.00028
Cadmium	0.88		--	--	NC	--	0.0011	0.00021	0.0061	0.0025	NC	0.0072	0.0028
Cobalt	1.70	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	3		--	--	NC	--	0.000048	0.0000090	0.000013	0.0000054	NC	0.000061	0.000014
Cyanide	10			--	NC	--	0.011	0.0020	0.0029	0.0012	NC	0.014	0.0032
Manganese	69.4		--	--	NC	--	0.0018	0.00035	0.012	0.0052	NC	0.014	0.0056
Mercury	0.10	U	--	--	NC	--	--	--	--	--	NC	--	--
Nickel	15.9	U		--	NC	--	--	--	--	--	NC	--	--
Vanadium	39.2		--	--	NC	--	0.0050	0.00094	0.051	0.022	NC	0.056	0.023
Zinc	14.3		--	--	NC	--	0.000030	0.0000057	0.0000049	0.0000021	NC	0.000035	0.0000078
			--	--	**NC**	--	**0.019**	**0.0036**	**0.073**	**0.031**	**NC**	**0.092**	**0.034**
					Total Risk	**0.0E+00**					**Hazard Index**	**0.092**	**0.034**
Chromium [2]													
Chromium (III)	6.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	6.1	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.019**	**0.0036**	**0.073**	**0.031**	NC	**0.092**	**0.034**
					Total Risk (including Chromium(III))	**0.0E+00**					**Total Hazard (including Chromium(III))**	**0.092**	**0.034**
Pathway Risk (including Chromium (VI))			**0.0E+00**	**0.0E+00**	NC	--	**0.019**	**0.0036**	**0.073**	**0.031**	NC	**0.092**	**0.034**
					Total Risk (including Chromium(VI))	**0.0E+00**					**Total Hazard (including Chromium(VI))**	**0.092**	**0.034**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.68
Human Health Risk Evaluation
Hypothetical Future Excavation/Construction Worker
Surface Water, Upstream of OD Area
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds										
1,2-Dichloroethane	5	U	--	--	NC	--	--	--	NC	--
Explosives										
RDX	0.12	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	140		--	--	NC	--	0.0000029	0.0000020	NC	**0.0000049**
Arsenic	3.6	U	--	--	NC	--	--	--	NC	--
Barium	48.3			--	NC	--	0.0000050	0.000040	NC	**0.000045**
Cadmium	0.88		--	--	NC	--	0.000036	0.00036	NC	**0.00040**
Cobalt	1.70	U	--	--	NC	--	--	--	NC	--
Copper	3		--	--	NC	--	0.0000015	0.00000066	NC	**0.0000022**
Cyanide	10			--	NC	--	0.00034	0.00014	NC	**0.00048**
Manganese	69.4		--	--	NC	--	0.000059	0.00062	NC	**0.00068**
Mercury	0.10	U	--	--	NC	--	--	--	NC	--
Nickel	15.9	U		--	NC	--	--	--	NC	--
Vanadium	39.2		--	--	NC	--	0.00016	0.0026	NC	**0.0027**
Zinc	14.3		--	--	NC	--	0.0000010	0.00000025	NC	**0.0000012**
			--	--	**NC**	--	**0.00061**	**0.0037**	**NC**	**0.0043**
					Total Risk	**0.0E+00**			**Hazard Index**	**0.0043**
Chromium [2]										
Chromium (III)	6.1	U	--	--	NC	--	0.0000058	0.000039	NC	**0.000045**
Chromium (VI)	6.1	U	--	--	NC	--	0.0029	0.020	NC	**0.023**
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.00061**	**0.0038**	NC	**0.0044**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**0.0044**
Pathway Risk (including Chromium (VI))			**0.0E+00**	**0.0E+00**	NC	**0.0E+00**	**0.0035**	**0.024**	NC	**0.027**
					Total Risk (including Chromium(VI))	**0.0E+00**			**Total Hazard (including Chromium(VI))**	**0.027**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.69
Human Health Risk Evaluation
Future Park Worker
Surface Water, Upstream of OD Area
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds										
1,2-Dichloroethane	5	U	--	--	NC	--	--	--	NC	--
Explosives										
RDX	0.12	U	--	--	NC	--	--	--	NC	--
Metals										
Aluminum	140		--	--	NC	--	0.000011	0.00000015	NC	**0.000011**
Arsenic	3.6	U	--	--	NC	--	--	--	NC	--
Barium	48.3		--	--	NC	--	0.000019	0.0000037	NC	**0.000022**
Cadmium	0.88		--	--	NC	--	0.00014	0.000038	NC	**0.00017**
Cobalt	1.70	U	--	--	NC	--	--	--	NC	--
Copper	3		--	--	NC	--	0.0000058	0.000000081	NC	**0.0000059**
Cyanide	10		--	--	NC	--	0.0013	0.000018	NC	**0.0013**
Manganese	69.4		--	--	NC	--	0.00022	0.000078	NC	**0.00030**
Mercury	0.10	U	--	--	NC	--	--	--	NC	--
Nickel	15.9	U	--	--	NC	--	--	--	NC	--
Vanadium	39.2		--	--	NC	--	0.00061	0.00032	NC	**0.00093**
Zinc	14.3		--	--	NC	--	0.0000037	0.000000031	NC	**0.0000037**
			--	--	**NC**	--	**0.0023**	**0.00046**	**NC**	**0.00275**
					Total Risk	**0.0E+00**			**Hazard Index**	**0.0028**
Chromium [2]										
Chromium (III)	6.1	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	6.1	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	--	**0.0023**	**0.00046**	NC	**0.0028**
					Total Risk (including Chromium(III))	**0.0E+00**			**Total Hazard (including Chromium(III))**	**0.0028**
Pathway Risk (including Chromium (VI))			**0.0E+00**	**0.0E+00**	NC	--	**0.0023**	**0.00046**	NC	**0.0028**
					Total Risk (including Chromium(VI))	**0.0E+00**			**Total Hazard (including Chromium(VI))**	**0.0028**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.70
Human Health Risk Evaluation
Current and Future Recreational User
Surface Water, Upstream of OD Area
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic													
1,2-Dichloroethane	5	U	–	–	NC	–	–	–	–	–	NC	–	–
Explosives													
RDX	0.12	U	–	–	NC	–	–	–	–	–	NC	–	–
Metals													
Aluminum	140		–	–	NC	–	0.000012	0.0000023	0.0000033	0.0000014	NC	0.000016	0.0000037
Arsenic	3.6	U	–	–	NC	–	–	–	–	–	NC	–	–
Barium	48.3		–	–	NC	–	0.000021	0.0000040	0.000081	0.000034	NC	0.00010	0.000038
Cadmium	0.88		–	–	NC	–	0.00015	0.000029	0.00083	0.00035	NC	0.0010	0.00038
Cobalt	1.70	U	–	–	NC	–	–	–	–	–	NC	–	–
Copper	3		–	–	NC	–	0.0000066	0.0000012	0.0000018	0.00000074	NC	0.0000083	0.0000020
Cyanide	10		–	–	NC	–	0.0015	0.00027	0.00039	0.00017	NC	0.0019	0.00044
Manganese	69.4		–	–	NC	–	0.00025	0.000048	0.0017	0.00072	NC	0.0020	0.00076
Mercury	0.10	U	–	–	NC	–	–	–	–	–	NC	–	–
Nickel	15.9	U	–	–	NC	–	–	–	–	–	NC	–	–
Vanadium	39.2		–	–	NC	–	0.00069	0.00013	0.0071	0.0030	NC	0.0077	0.0031
Zinc	14.3		–	–	NC	–	0.0000042	0.00000078	0.00000067	0.00000028	NC	0.0000049	0.0000011
			–	–	**NC**	–	**0.0026**	**0.00049**	**0.010**	**0.0042**	**NC**	**0.013**	**0.0047**
					Total Risk	**0.0E+00**					**Hazard Index**	**0.013**	**0.0047**
Chromium [2]													
Chromium (III)	6.1	U	–	–	NC	–	–	–	–	–	NC	–	–
Chromium (VI)	6.1	U	–	–	NC	–	–	–	–	–	NC	–	–
Pathway Risk (including Chromium (III))			**0.0E+00**	**0.0E+00**	NC	–	**0.0026**	**0.00049**	**0.010**	**0.0042**	NC	**0.013**	**0.0047**
					Total Risk (including Chromium(III))	**0.0E+00**					**Total Hazard (including Chromium(III))**	**0.013**	**0.0047**
Pathway Risk (including Chromium (VI))			**0.0E+00**	**0.0E+00**	NC	–	**0.0026**	**0.00049**	**0.010**	**0.0042**	NC		
					Total Risk (including Chromium(VI))	**0.0E+00**					**Total Hazard (including Chromium(VI))**	**0.013**	**0.0047**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
– Risk/hazard not calculated because toxicity value was not available.

Table 2.71
Human Health Risk Evaluation
Hypothetical Future Resident
Surface Water, Drainage Ditch
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic Compounds												
1,2-Dichloroethane	10 U	--	--	NC	--	--	--	--	--	NC	--	--
Explosives												
RDX	2	2.0E-08	6.9E-09	NC	2.7E-08	0.00043	0.000080	0.0001	0.000043	NC	0.0	0.0
Metals												
Aluminum	37,500	--	--	NC	--	0.02397	0.004495	0.0064	0.0027	NC	0.03042	0.007206
Arsenic	2.3 J	3.1E-07	1.2E-07	NC	4.3E-07	0.00490	0.000919	0.0013	0.00055	NC	0.0	0.00
Barium	439	--	--	NC	--	0.00140	0.000263	0.0054	0.0023	NC	0.00680	0.00253
Cadmium	11.2	--	--	NC	--	0.01432	0.002685	0.077	0.032	NC	0.0914	0.0351
Cobalt	18.2	--	--	NC	--	0.03878	0.007272	0.0042	0.0018	NC	0.04	0.01
Copper	612	--	--	NC	--	0.00978	0.001834	0.0026	0.0011	NC	0.012412	0.002940
Cyanide	47.7	--	--	NC	--	0.05082	0.009529	0.014	0.0057	NC	0.064	0.0153
Manganese	1,250	--	--	NC	--	0.03330	0.006243	0.22	0.094	NC	0.257	0.1004
Mercury	3.0	--	--	NC	--	0.00639	0.001199	0.025	0.010	NC	0.031	0.012
Nickel	74.2	--	--	NC	--	0.00237	0.000445	0.0032	0.0013	NC	0.01	0.00
Vanadium	54.9	--	--	NC	--	0.00702	0.001316	0.1	0.0	NC	0.079	0.032
Zinc	883	--	--	NC	--	0.00188	0.000353	0.00030	0.00013	NC	0.002185	0.0004805
		3.3E-07	1.3E-07	NC	4.6E-07	0.195	0.0366	0.435	0.183	NC	0.630	0.219
				Total Risk	4.6E-07					Hazard Index	0.630	0.219
Chromium [2]												
Chromium (III)	50.8	--	--	NC	--	0.00002	0.000004	0.00045	0.000	NC	0.0005	0.0002
Chromium (VI)	50.8	2.3E-06	7.2E-05	NC	7.4E-05	0.01082	0.002030	0.23	0.10	NC	0.2	0.1
Pathway Risk (including Chromium (III))		3.3E-07	1.3E-07	NC	4.6E-07	0.195	0.0366	0.435	0.183	NC	0.631	0.220
				Total Risk (including Chromium(III))	4.6E-07					Total Hazard (including Chromium(III))	0.631	0.220
Pathway Risk (including Chromium (VI))		2.6E-06	1.3E-07	NC	2.7E-06	0.206	0.0387	0.668	0.281	NC	0.874	0.319
				Total Risk (including Chromium(VI))	7.5E-05					Total Hazard (including Chromium(VI))	0.874	0.319

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.72
Human Health Risk Evaluation
Hypothetical Future Excavation/Construction Worker
Surface Water, Drainage Ditch
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds									
1,2-Dichloroethane	10 U	--	--	NC	--	--	--	NC	--
Explosives									
RDX	2	6.5E-11	2.0E-11	NC	**8.5E-11**	0.000014	0.000004	NC	**0.0000**
Metals									
Aluminum	37,500	--	--	NC	--	0.00077	0.00054	NC	**0.0013098**
Arsenic	2.3 J	1.0E-09	4.5E-10	NC	**1.5E-09**	0.00016	0.000070	NC	**0.00023**
Barium	439		--	NC	--	0.00005	0.00036	NC	**0.000406**
Cadmium	11.2	--	--	NC	--	0.00046	0.0046	NC	**0.00508**
Cobalt	18.2	--	--	NC	--	0.00125	0.00021	NC	**0.001**
Copper	612	--	--	NC	--	0.00031	0.00013	NC	**0.0004493**
Cyanide	47.7		--	NC	--	0.00163	0.00065	NC	**0.00228**
Manganese	1,250	--	--	NC	--	0.0011	0.011	NC	**0.01232**
Mercury	3.0	--	--	NC	--	0.00021	0.0037	NC	**0.0039**
Nickel	74.2		--	NC	--	0.00008	0.00016	NC	**0.000**
Vanadium	54.9	--	--	NC	--	0.000	0.00	NC	**0.0038**
Zinc	883	--	--	NC	--	0.000060	0.000016	NC	**0.0000761**
		1.1E-09	**4.7E-10**	**NC**	**1.5E-09**	**0.00622**	**0.0253**	**NC**	**0.0315**
				Total Risk	**1.5E-09**			**Hazard Index**	**0.0315**
Chromium [2]									
Chromium (III)	50.8	--	--	NC	--	0.00000070	0.000022	NC	**0.000023**
Chromium (VI)	50.8	7.5E-09	2.5E-07	NC	**2.6E-07**	0.00035	0.012	NC	**0.012**
Pathway Risk (including Chromium (III))		**1.1E-09**	**4.7E-10**	NC	**1.5E-09**	**0.00622**	**0.0253**	NC	**0.0315**
				Total Risk (including Chromium(III))	**1.5E-09**			**Total Hazard (including Chromium(III))**	**0.0315**
Pathway Risk (including Chromium (VI))		**8.5E-09**	**2.5E-07**	NC	**2.6E-07**	**0.0066**	**0.037**	NC	**0.043**
				Total Risk (including Chromium(VI))	**2.6E-07**			**Total Hazard (including Chromium(VI))**	**0.043**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.73
Human Health Risk Evaluation
Future Park Worker
Surface Water, Drainage Ditch
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds									
1,2-Dichloroethane	10 U	--	--	NC	--	--	--	NC	--
Explosives									
RDX	2	6.1E-09	7.5E-11	NC	**6.2E-09**	0.000052	0.00000064	NC	**0.000052**
Metals									
Aluminum	37,500	--	--	NC	--	0.0029	0.000040	NC	**0.002943**
Arsenic	2.3 J	9.5E-08	1.3E-09	NC	**9.7E-08**	0.00059	0.0000082	NC	**0.001**
Barium	439	--	--	NC	--	0.00017	0.000034	NC	**0.000204**
Cadmium	11.2	--	--	NC	--	0.0017	0.00048	NC	**0.00221**
Cobalt	18.2	--	--	NC	--	0.0047	0.000026	NC	**0.0**
Copper	612	--	--	NC	--	0.0012	0.000016	NC	**0.0012006**
Cyanide	47.7	--	--	NC	--	0.0062	0.000085	NC	**0.0062**
Manganese	1,250		--	NC	--	0.0040	0.0014	NC	**0.00543**
Mercury	3.0	--	--	NC	--	0.00077	0.00015	NC	**0.00**
Nickel	74.2	--	--	NC	--	0.00029	0.000020	NC	**0.0**
Vanadium	54.9		--	NC	--	0.001	0.000	NC	**0.00130**
Zinc	883	--	--	NC	--	0.00023	0.0000019	NC	**0.0002297**
		1.0E-07	**1.4E-09**	**NC**	**1.0E-07**	**0.0234**	**0.00271**	**NC**	**0.02614**
				Total Risk	**1.0E-07**			**Hazard Index**	**0.0261**
Chromium [2]									
Chromium (III)	50.8	--	--	NC	--	0.0000026	0.0000028	NC	**0.0000**
Chromium (VI)	50.8	7.0E-07	7.8E-07	NC	**1.5E-06**	0.001	0.0015	NC	**0.00**
Pathway Risk (including Chromium (III))		**1.0E-07**	**1.4E-09**	NC	**1.0E-07**	**0.0234**	**0.00272**	NC	**0.0261**
				Total Risk (including Chromium(III))	**1.0E-07**			**Total Hazard (including Chromium(III))**	**0.0261**
Pathway Risk (including Chromium (VI))		**8.0E-07**	**1.4E-09**	NC	**8.0E-07**	**0.0247**	**0.00417**	NC	**0.0289**
				Total Risk (including Chromium(VI))	**1.6E-06**			**Total Hazard (including Chromium(VI))**	**0.0289**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.74
Human Health Risk Evaluation
Current and Future Recreational User
Surface Water, Drainage Ditch
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic												
1,2-Dichloroethane	10 U	–	–	NC	--	–	–	–	–	NC	--	--
Explosives												
RDX	2	2.7E-09	9.5E-10	NC	**3.6E-09**	0.00006	0.0000	0.000014	0.0000059	NC	**0.00**	**0.00**
Metals												
Aluminum	37,500	–	–	NC	--	0.0033	0.0006	0.00088	0.00037	NC	**0.004172**	**0.0009883**
Arsenic	2.3 J	4.2E-08	1.7E-08	NC	**5.9E-08**	0.00067	0.0001	0.00018	0.00008	NC	**0.001**	**0.0002**
Barium	439	–	–	NC	--	0.00019	0.0000	0.0007	0.00031	NC	**0.00093**	**0.000347**
Cadmium	11.2	–	–	NC	--	0.0020	0.0004	0.011	0.0044	NC	**0.0125**	**0.00481**
Cobalt	18.2	–	–	NC	--	0.0053	0.0010	0.00057	0.00024	NC	**0.006**	**0.0012**
Copper	612	–	–	NC	--	0.0013	0.0003	0.00036	0.00015	NC	**0.0017022**	**0.0004032**
Cyanide	47.7	–	–	NC	--	0.0070	0.0013	0.0019	0.00079	NC	**0.0088**	**0.00210**
Manganese	1,250	–	–	NC	--	0.0046	0.0009	0.031	0.013	NC	**0.0353**	**0.01377**
Mercury	3.0	–	–	NC	--	0.00088	0.0002	0.003	0.0014	NC	**0.004**	**0.002**
Nickel	74.2	–	–	NC	--	0.00033	0.0001	0.00044	0.00018	NC	**0.001**	**0.0002**
Vanadium	54.9	–	–	NC	--	0.00	0.0002	0.010	0.00	NC	**0.0108**	**0.0043**
Zinc	883	–	–	NC	--	0.00026	0.0000	0.000042	0.000018	NC	**0.0002997**	**0.0000659**
		4.5E-08	**1.8E-08**	**NC**	**6.3E-08**	**0.0265**	**0.00498**	**0.060**	**0.0251**	**NC**	**0.086**	**0.0300**
				Total Risk	**6.3E-08**					**Hazard Index**	**0.086**	**0.0300**
Chromium [2]												
Chromium (III)	50.8	–	–	NC	--	0.0000030	0.00000056	0.000061	0.000026	NC	**0.000064**	**0.000026**
Chromium (VI)	50.8	3.1E-07	9.9E-06	NC	**1.0E-05**	0.0015	0.00028	0.032	0.013	NC	**0.0334**	**0.0137**
Pathway Risk (including Chromium (III))		**4.5E-08**	**1.8E-08**	NC	**6.3E-08**	**0.0265**	**0.00498**	**0.060**	**0.0251**	NC	**0.086**	**0.0301**
				Total Risk (including Chromium(III))	**6.3E-08**					**Total Hazard (including Chromium(III))**	**0.086**	**0.0301**
Pathway Risk (including Chromium (VI))		**3.5E-07**	**1.8E-08**	NC	**3.7E-07**	**0.0280**	**0.00525**	**0.092**	**0.0385**	NC		
				Total Risk (including Chromium(VI))	**1.0E-05**					**Total Hazard (including Chromium(VI))**	**0.120**	**0.0437**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.75
Human Health Risk Evaluation
Hypothetical Future Resident
Surface Water, Reeder Creek
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic Compounds													
1,2-Dichloroethane	2	J	1.6E-08	3.7E-08	NC	**5.3E-08**	0.00021	0.000040	0.00033	0.00014	NC	**0.001**	**0.000**
Explosives													
RDX	0.67		6.6E-09	2.3E-09	NC	**8.9E-09**	0.00014	0.000027	0.0000	0.000014	NC	**0.0**	**0.0**
Metals													
Aluminum	300		--	--	NC	--	0.00019	0.000036	0.0001	0.0000	NC	**0.00029**	**0.000036**
Arsenic	3.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	66.6	J	--	--	NC	--	0.00021	0.000040	0.0008	0.0003	NC	**0.00101**	**0.00034**
Cadmium	0.45	J	--	--	NC	--	0.00058	0.000108	0.003	0.001	NC	**0.0036**	**0.0011**
Cobalt	1.7	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	19.7	U	--	--	NC	--	--	--	--	--	NC	--	--
Cyanide	14.9		--	--	NC	--	0.01588	0.002977	0.004	0.0018	NC	**0.020**	**0.0048**
Manganese	236		--	--	NC	--	0.00629	0.001179	0.04	0.018	NC	**0.046**	**0.0192**
Mercury	0.11	J	--	--	NC	--	0.00023	0.000044	0.001	0.000	NC	**0.001**	**0.000**
Nickel	35.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	30.9	U	--	--	NC	--	--	--	--	--	NC	--	--
Zinc	15.4	J	--	--	NC	--	0.00003	0.000006	0.00001	0.00000	NC	**0.000043**	**0.0000060**
			2.3E-08	**3.9E-08**	**NC**	**6.2E-08**	**0.024**	**0.0045**	**0.049**	**0.021**	NC	**0.073**	**0.026**
					Total Risk	**6.2E-08**					**Hazard Index**	**0.073**	**0.026**
Chromium [2]													
Chromium (III)	9.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	9.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**2.3E-08**	**3.9E-08**	NC	**6.2E-08**	**0.024**	**0.0045**	**0.049**	**0.021**	NC	**0.073**	**0.026**
					Total Risk (including Chromium(III))	**6.2E-08**					**Total Hazard (including Chromium(III))**	**0.073**	**0.026**
Pathway Risk (including Chromium (VI))			**2.3E-08**	**3.9E-08**	NC	**6.2E-08**	**0.024**	**0.0045**	**0.049**	**0.021**	NC	**0.073**	**0.026**
					Total Risk (including Chromium(VI))	**6.2E-08**					**Total Hazard (including Chromium(VI))**	**0.073**	**0.026**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.76
Human Health Risk Evaluation
Hypothetical Future Excavation/Construction Worker
Surface Water, Reeder Creek
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds										
1,2-Dichloroethane	2	J	8.7E-09	1.1E-10	NC	**8.8E-09**	0.0000068	0.000014	NC	**0.000021**
Explosives										
RDX	0.67		3.5E-09	6.7E-12	NC	**3.5E-09**	0.000005	0.000001	NC	**0.0000**
Metals										
Aluminum	300		--	--	NC	--	0.00001	0.00000	NC	**0.0000100**
Arsenic	3.6	U	--	--	NC	--	--	--	NC	--
Barium	66.6	J		--	NC	--	0.00001	0.00005	NC	**0.000060**
Cadmium	0.45	J	--	--	NC	--	0.00002	0.0002	NC	**0.00022**
Cobalt	1.7	U	--	--	NC	--	--	--	NC	--
Copper	19.7	U	--	--	NC	--	--	--	NC	--
Cyanide	14.9			--	NC	--	0.00051	0.00020	NC	**0.00071**
Manganese	236		--	--	NC	--	0.0002	0.002	NC	**0.00220**
Mercury	0.11	J	--	--	NC	--	0.00001	0.0001	NC	**0.0001**
Nickel	35.2	U		--	NC	--	--	--	NC	--
Vanadium	30.9	U	--	--	NC	--	--	--	NC	--
Zinc	15.4	J	--	--	NC	--	0.000001	0.000000	NC	**0.0000010**
			1.2E-08	**1.2E-10**	**NC**	**1.2E-08**	**0.00077**	**0.0026**	**NC**	**0.0033**
					Total Risk	**1.2E-08**			**Hazard Index**	**0.0033**
Chromium [2]										
Chromium (III)	9.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	9.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**1.2E-08**	**1.2E-10**	NC	**1.2E-08**	**0.00077**	**0.0026**	NC	**0.0033**
					Total Risk (including Chromium(III))	**1.2E-08**			**Total Hazard (including Chromium(III))**	**0.0033**
Pathway Risk (including Chromium (VI))			**1.2E-08**	**1.2E-10**	NC	**1.2E-08**	**0.0008**	**0.003**	NC	**0.003**
					Total Risk (including Chromium(VI))	**1.2E-08**			**Total Hazard (including Chromium(VI))**	**0.003**

[1]Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).

-- Risk/hazard not calculated because toxicity value was not available.

Table 2.77
Human Health Risk Evaluation
Future Park Worker
Surface Water, Reeder Creek
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds										
1,2-Dichloroethane	2	J	5.0E-09	4.0E-10	NC	**5.4E-09**	0.000026	0.0000021	NC	**0.000**
Explosives										
RDX	0.67		2.0E-09	2.5E-11	NC	**2.0E-09**	0.000017	0.00000021	NC	**0.000017**
Metals										
Aluminum	300		--	--	NC	--	0.0000	0.000000	NC	--
Arsenic	3.6	U	--	--	NC	--	--	--	NC	--
Barium	66.6	J	--	--	NC	--	0.00003	0.000005	NC	**0.000035**
Cadmium	0.45	J	--	--	NC	--	0.0001	0.00002	NC	**0.00012**
Cobalt	1.7	U	--	--	NC	--	--	--	NC	--
Copper	19.7	U	--	--	NC	--	--	--	NC	--
Cyanide	14.9		--	--	NC	--	0.0019	0.000027	NC	**0.0019**
Manganese	236		--	--	NC	--	0.0008	0.0003	NC	**0.00110**
Mercury	0.11	J	--	--	NC	--	0.00003	0.00001	NC	**0.00**
Nickel	35.2	U	--	--	NC	--	--	--	NC	--
Vanadium	30.9	U	--	--	NC	--	--	--	NC	--
Zinc	15.4	J	--	--	NC	--	0.00000	0.0000000	NC	--
			7.0E-09	**4.3E-10**	**NC**	**7.4E-09**	**0.0029**	**0.00036**	**NC**	**0.00327**
					Total Risk	**7.4E-09**			**Hazard Index**	**0.0033**
Chromium [2]										
Chromium (III)	9.6	U	--	--	NC	--	--	--	NC	--
Chromium (VI)	9.6	U	--	--	NC	--	--	--	NC	--
Pathway Risk (including Chromium (III))			**7.0E-09**	**4.3E-10**	NC	**7.4E-09**	**0.0029**	**0.00036**	NC	**0.0033**
					Total Risk (including Chromium(III))	**7.4E-09**			**Total Hazard (including Chromium(III))**	**0.0033**
Pathway Risk (including Chromium (VI))			**7.0E-09**	**4.3E-10**	NC	**7.4E-09**	**0.0029**	**0.00036**	NC	**0.0033**
					Total Risk (including Chromium(VI))	**7.4E-09**			**Total Hazard (including Chromium(VI))**	**0.0033**

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.78
Human Health Risk Evaluation
Current and Future Recreational User
Surface Water, Reeder Creek
Seneca Army Depot Activity

Analyte	Exposure Point Concentration [1] (µg/L)		Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient - Child	Ingestion Hazard Quotient - Adult	Dermal Hazard Quotient - Child	Dermal Hazard Quotient - Adult	Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic													
1,2-Dichloroethane	2	J	2.2E-09	5.1E-09	NC	**7.3E-09**	0.000029	0.000	0.000045	0.000019	NC	**0.0001**	**0.0000**
Explosives													
RDX	0.67		9.0E-10	3.2E-10	NC	**1.2E-09**	0.00002	0.0000	0.000005	0.0000020	NC	**0.00**	**0.00**
Metals													
Aluminum	300		--	--	NC	--	0.0000	0.0000	0.00001	0.00000	NC	**0.000010**	--
Arsenic	3.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Barium	66.6	J	--	--	NC	--	0.00003	0.0000	0.0001	0.00005	NC	**0.00013**	**0.000050**
Cadmium	0.45	J	--	--	NC	--	0.0001	0.0000	0.000	0.0002	NC	**0.0001**	**0.00020**
Cobalt	1.7	U	--	--	NC	--	--	--	--	--	NC	--	--
Copper	19.7	U	--	--	NC	--	--	--	--	--	NC	--	--
Cyanide	14.9		--	--	NC	--	0.0022	0.0000	0.0006	0.00025	NC	**0.0028**	**0.00025**
Manganese	236		--	--	NC	--	0.0009	0.0000	0.006	0.002	NC	**0.0069**	**0.00200**
Mercury	0.11	J	--	--	NC	--	0.00003	0.0000	0.000	0.0001	NC	**0.000**	**0.000**
Nickel	35.2	U	--	--	NC	--	--	--	--	--	NC	--	--
Vanadium	30.9	U	--	--	NC	--	--	--	--	--	NC	--	--
Zinc	15.4	J	--	--	NC	--	0.00000	0.0000	0.000001	0.000000	NC	**0.0000010**	--
			3.1E-09	**5.4E-09**	**NC**	**8.5E-09**	**0.0033**	--	**0.007**	**0.0026**	**NC**	**0.010**	**0.0026**
					Total Risk	8.5E-09					**Hazard Index**	0.010	0.0026
Chromium [2]													
Chromium (III)	9.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Chromium (VI)	9.6	U	--	--	NC	--	--	--	--	--	NC	--	--
Pathway Risk (including Chromium (III))			**3.1E-09**	**5.4E-09**	NC	**8.5E-09**	**0.0033**	**0.00000**	**0.007**	**0.0026**	NC	**0.010**	**0.0026**
					Total Risk (including Chromium(III))	8.5E-09					**Total Hazard (including Chromium(III))**	0.010	0.0026
Pathway Risk (including Chromium (VI))			**3.1E-09**	**5.4E-09**	NC	**8.5E-09**	**0.0033**	**0.00000**	**0.007**	**0.0026**	NC		
					Total Risk (including Chromium(VI))	8.5E-09					**Total Hazard (including Chromium(VI))**	0.010	0.0026

[1] Exposure point concentration is the maximum detected concentration from the surface water exposure area. See Table 2.13.

[2] Chromium can exist in environment as chromium(III) and chromium (VI). The cumulative risk/hazard estimates will be calculated with all analytes and either chromium(III) or chromium(VI).

NC = Exposure pathway is not calculated because volatile analytes not present.
J = Analyte detected between MDL and practical quantitation limit (PQL).
U= Analyte not detected.
-- Risk/hazard not calculated because toxicity value was not available.

Table 2.79
Human Health Risk Evaluation
Summary of Risk and Hazard Associated with Expsoure to Surface Water
Seneca Army Depot Activity

All COPCs including chromium(III)

Exposure Area	Hypothetical Future Resident	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User	Hypothetical Future Resident (Child)	Hypothetical Future Resident (Adult)	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User (Child)	Current and Future Recreational User (Adult)
	Carcinogenic Risk				Noncarcinogenic Hazard Index					
Reeder Creek - Upstream	NC	NC	NC	NC	0.092	0.034	0.0044	0.0028	0.013	0.0047
On-Site Drainage Ditches	4.6E-07	1.5E-09	1.0E-07	6.3E-08	0.631	0.220	0.0315	0.0261	0.086	0.0301
Reeder Creek - Downstream	6.2E-08	1.2E-08	7.4E-09	8.5E-09	0.073	0.026	0.0033	0.0033	0.010	0.0026

All COPCs including chromium(VI)

Exposure Area	Hypothetical Future Resident	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User	Hypothetical Future Resident (Child)	Hypothetical Future Resident (Adult)	Hypothetical Excavation/ Construction Worker	Future Park Worker	Current and Future Recreational User (Child)	Current and Future Recreational User (Adult)
	Carcinogenic Risk				Noncarcinogenic Hazard Index					
Reeder Creek - Upstream	8.6E-06	NC	NC	2.5E-06	0.092	0.034	0.027	0.0028	0.021	0.0077
On-Site Drainage Ditches	7.5E-05	2.6E-07	1.6E-06	1.0E-05	0.874	0.319	0.043	0.0289	0.120	0.0437
Reeder Creek - Downstream	1.4E-05	1.2E-08	7.4E-09	8.5E-09	0.073	0.026	0.003	0.0033	0.010	0.0026

NC = not caluclated because no carcinogenic analytes detected

Table 2.80
Human Health Quantitative Cumulative Risk Summary for all Media
Seneca Army Depot Activity

All COPCs including chromium(III)

Receptor and Medium	Exposure Pathways	Total Carcinogenic Risk [1]	Carcinogenic Risk Drivers [4]	Total Hazard Index - Child [1]	Non-Carcinogenic Risk Drivers (Child) [4]	Total Hazard Index - Adult [1]	Non-Carcinogenic Risk Drivers (Adult) [4]
Receptor: Hypothetical Future Resident							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	2.8E-05	--	**5.8**	**Aroclor-1254 31% Cadmium 30%**	0.60	--
Combined Surface and Subsurface Soil **(0 - ≤ 15 feet bgs)**	Ingestion, Dermal Contact, Inhalation	5.8E-05	--	**5.3**	**Aroclor-1254 33% Cadmium 25%**	0.55	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	**1.8E-04**	**Arsenic 100%**	**51**	**Cobalt 31% Manganese 21% Thallium 33%**	**30**	**Cobalt 31% Manganese 22% Thallium 33%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	6.7E-07	--	**3.0**	**MCPA 10% Cobalt 63%**	0.32	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	4.6E-07	--	0.63	--	0.22	--
Receptor: Hypothetical Future Excavation/ Construction Worker							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	8.2E-08	--	--	--	0.14	--
Combined Surface and Subsurface Soil **(0 - ≤ 15 feet bgs)**	Ingestion, Dermal Contact, Inhalation	6.3E-08	--	--	--	0.046	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	1.9E-08	--	--	--	0.13	--
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	1.6E-08	--	--	--	0.025	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	1.5E-09	--	--	--	0.032	--
Receptor: Future Park Worker							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	5.6E-06	--	--	--	0.37	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	9.8E-05	--	--	--	**19**	**Cobalt 32% Manganese 20% Thallium 34%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	2.9E-06	--	--	--	0.19	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	1.0E-07	--	--	--	0.026	--
Receptor: Current and Future Recreational User							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	1.8E-06	--	0.39	--	0.039	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	1.3E-05	--	**3.4**	**Cobalt 32% Manganese 20% Thallium 35%**	**2.0**	**Cobalt 32% Manganese 20% Thallium 34%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	1.0E-06	--	0.000017	--	0.0000016	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	6.3E-08	--	0.086	--	0.030	--

Table 2.80
Human Health Quantitative Cumulative Risk Summary for all Media
Seneca Army Depot Activity

All COPCs including chromium(VI)

Receptor and Medium	Exposure Pathways	Total Carcinogenic Risk [1]	Carcinogenic Risk Drivers [4]	Total Hazard Index - Child [1]	Non-Carcinogenic Risk Drivers (Child) [4]	Total Hazard Index - Adult [1]	Non-Carcinogenic Risk Drivers (Adult) [4]
Receptor: Hypothetical Future Resident							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	6.5E-05	--	**6.0**	**Aroclor-1254 29% Cadmium 29%**	0.62	--
Combined Surface and Subsurface Soil **(0 - ≤ 15 feet bgs)**	Ingestion, Dermal Contact, Inhalation	9.1E-05	--	**5.5**	**Aroclor-1254 32% Cadmium 24%**	0.57	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	**1.2E-03**	**Arsenic 16%**	**54**	**Cobalt 30% Manganese 20% Thallium 32%**	**32**	**Cobalt 30% Manganese 21% Thallium 32%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	2.2E-05	--	**3.1**	**MCPA 10% Cobalt 57% Maganese 12%**	0.33	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	7.5E-05	--	0.87	--	0.32	--
Receptor: Hypothetical Future Excavation/ Construction Worker							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	2.1E-07	--	--	--	0.15	--
Combined Surface and Subsurface Soil **(0 - ≤ 15 feet bgs)**	Ingestion, Dermal Contact, Inhalation	9.7E-08	--	--	--	0.048	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	5.1E-07	--	--	--	0.15	--
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	4E-08	--	--	--	0.026	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	2.6E-07	--	--	--	0.043	--
Receptor: Future Park Worker							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	1.3E-05	--	--	--	0.39	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	**5.0E-04**	**Arsenic 20%**	--	--	**20**	**Cobalt 31% Manganese 19% Thallium 33%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	7.0E-06	--	--	--	0.20	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	1.6E-06	--	--	--	0.0289	--
Receptor: Current and Future Recreational User							
Surface Soil (0 - ≤ 2 feet bgs) - OD Hill Area	Ingestion, Dermal Contact, Inhalation	4.4E-06	--	0.41	--	0.041	--
Groundwater - MW 45-4 [2]	Ingestion, Dermal Contact	6.3E-05	--	**3.6**	**Cobalt 31% Manganese 19% Thallium 34%**	**2.1**	**Cobalt 31% Manganese 19% Thallium 33%**
Surface Soil (0 - ≤ 2 feet bgs) - Kickout Area	Ingestion, Dermal Contact, Inhalation	2.5E-06	--	0.0083	--	0.00080	--
Surface Water - On site drainage ditches [3]	Ingestion, Dermal Contact	1.0E-05	--	0.120	--	0.0437	--

[1] Cancer Risks and Hazard Indices were calculated by summing across exposure routes for each receptor.

[2] The greatest risk associated with groundwater is from MW 45-4. For a summary of risk associated with individual wells, see Table 2.59.

[3] The surface water most likely to be encountered at the site is from the drainage ditches onsite. For a summary of risk associated with other surface water bodies, see Table 2.79.

[4] Percent contribution was calculated by dividing the cancer risk or hazard index of each COPC by the total risk or total HI. COPCs with less than 10% contribution are not shown.

-- = Cumulaive Hazard not calculated for a child for this receptor.

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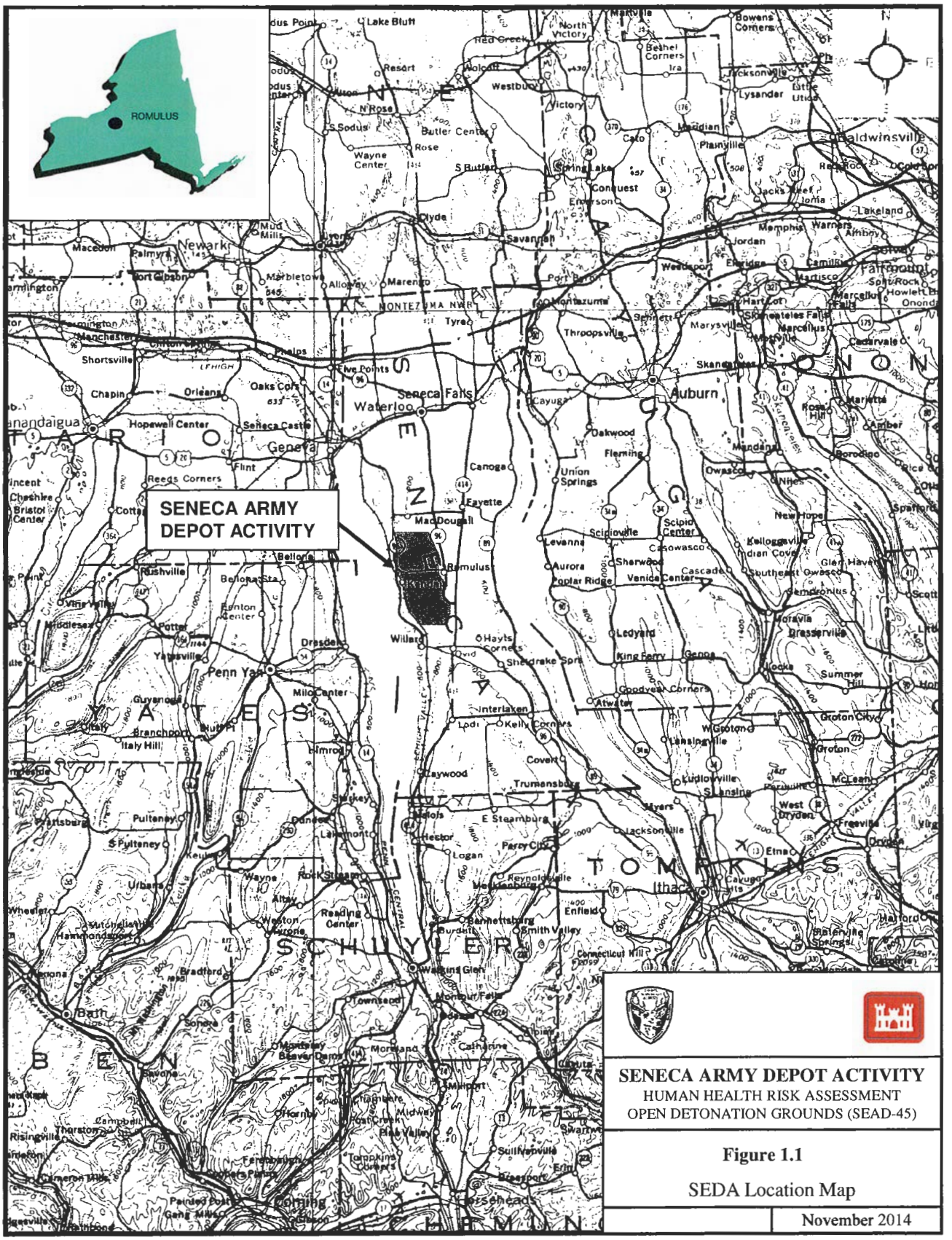
FIGURES

Section 1 Figures



P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Figure B1-1 Loc Map.pptx

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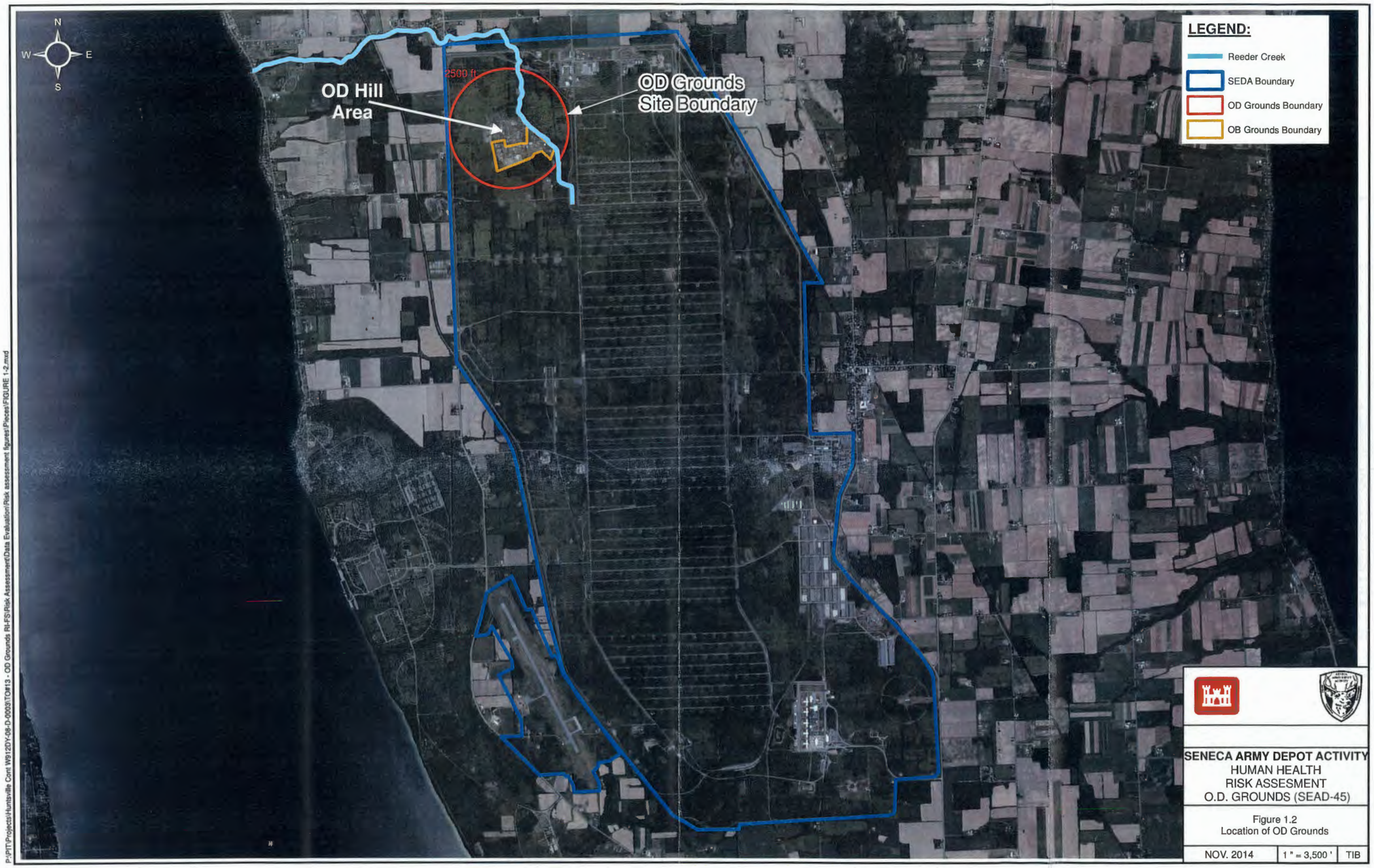


P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE 1-2.mxd

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
O.D. GROUNDS (SEAD-45)

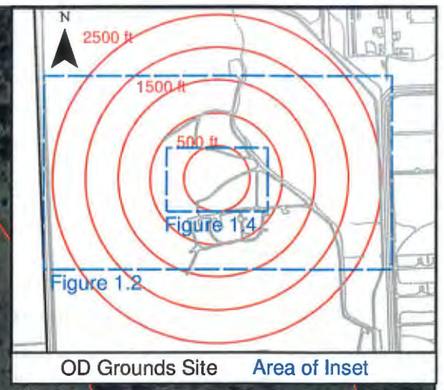
Figure 1.2
Location of OD Grounds

NOV. 2014	1 " = 3,500 '	TIB

N
W
E
S

1500 ft
1000 ft
500 ft

S45-R15-01
S45-R15-02
S45-R15-06
S45-R10-01
S45-R10-02
S45-R10-06
OD Hill Area
SD45-1
SD45-4
SS45-8
SD45-2
S45-R5-07
SS45-1
SS45-9
SD45-3
S45-R10-03
S45-R5-06
SS45-2
S45-R15-05
S45-R10-05
S45-R15-03
S45-R4-01
SS45-3
S45-R5-05
S45-R5-08
S45-R5-04
S45-R10-07
S45-R10-04
S45-R15-04



Legend

500 ft — Radius Rings from OD Hill Distance from Center

Center Point of all Radius Rings (N 1012812, E 738375)

OB Grounds Boundary

Subsurface Soil Sample Location

Surface Soil Sample Location

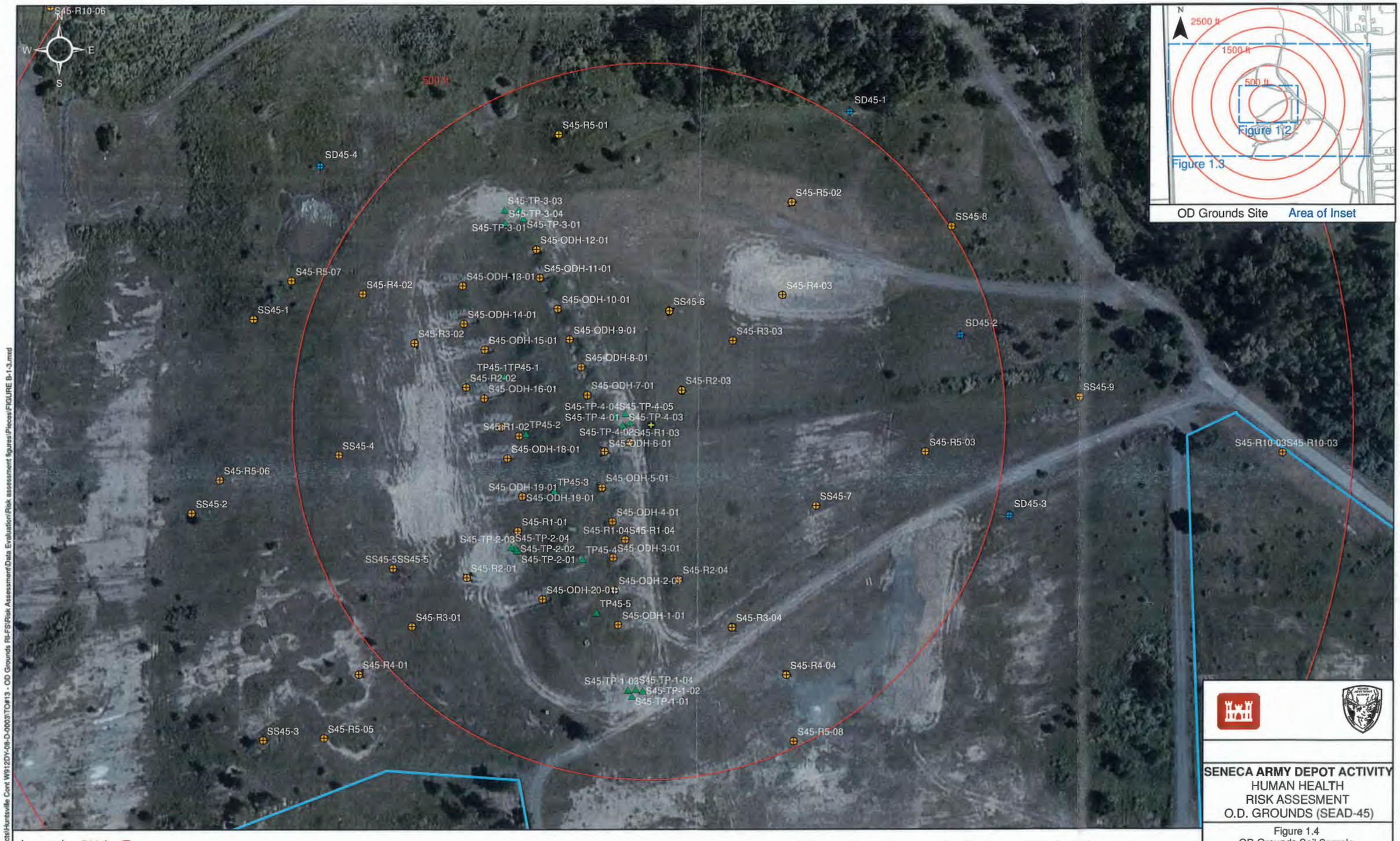
Drainage Ditch Sample Location

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
O.D. GROUNDS (SEAD-45)

Figure 1.3
OD Grounds Soil Sample Locations, Kickout Parcel

NOV. 2014	1 " = 300 '	BBO

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-1-2.mxd



Legend

500 ft — Radius Rings from OD Hill Distance from Center

Center Point of all Radius Rings (N 1012812, E 738375)

OB Grounds Boundary

Subsurface Soil Sample Location

Surface Soil Sample Location

Drainage Ditch Sample Location

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
O.D. GROUNDS (SEAD-45)

Figure 1.4
OD Grounds Soil Sample Locations, OD Hill Parcel

NOV. 2014	1 " = 120 '	BBO

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-1-3.mxd

N
W E
S

2500 ft

OD Hill Area

MW3
MW2
MW45-1
MW45-2
MW4
MW45-4
MW45-3
MW23-3
MW1
MW23-2
MW23-1
MW5
MW23-4
MW23-6
MW23-5

618
622
624
626
630
636
Groundwater Divide

OD Grounds Site Boundary

LEGEND:

- Long-Term Monitoring Well (2007-2012)
- Monitoring Well Sampled in 1995 ESI
- Groundwater Contour (ft.)
- Groundwater Divide
- Groundwater Divide (inferred)
- Reeder Creek
- OD Grounds Boundary
- OB Grounds Boundary

Note: OD Grounds groundwater contours are based on data collected from 4/1994 (Parsons, 1995). OB Grounds groundwater contours are based on data from 4/1993 (Parsons, 1994).

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
O.D. GROUNDS (SEAD-45)

Figure 1.5
OD Grounds Groundwater Sample Locations

NOV. 2014	1 " = 500 '	TIB

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-1-4.mxd

P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-1-5.mxd

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
O.D. GROUNDS (SEAD-45)

Figure 1.6
OD Grounds Surface
Water Sample Locations

NOV. 2014	1 " = 2,000 '	TIB

Section 2 Figures

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Figure 2.1 Human Health Conceptual Site Model Diagram

Site/MRS Name: Open Detonation (OD) Hill Area, OD Grounds, Seneca Army Depot Activity (SEDA), Seneca County, New York

Last Revised By: Jill Noel ***Last Revision Date:*** September 12, 2014

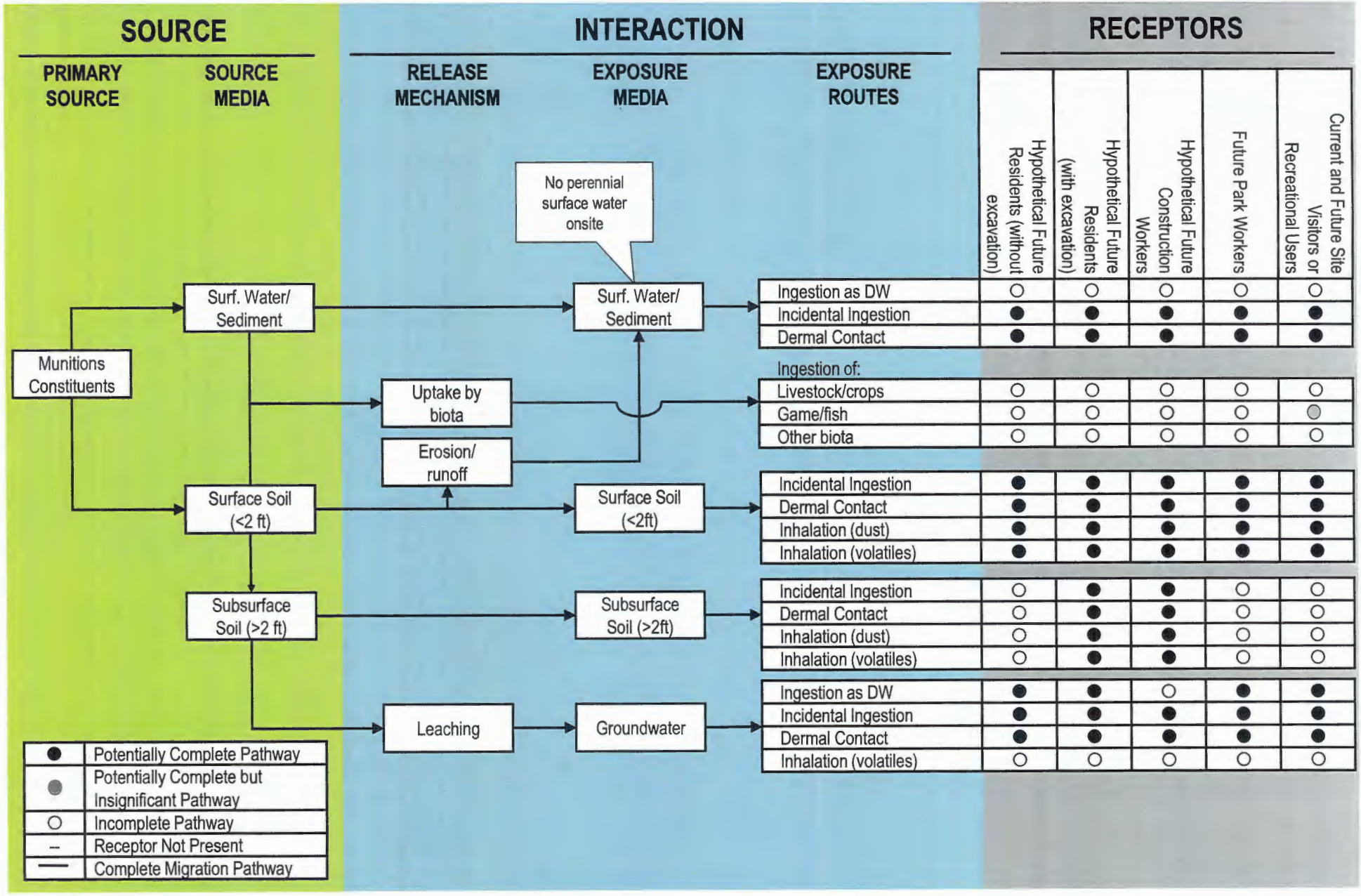

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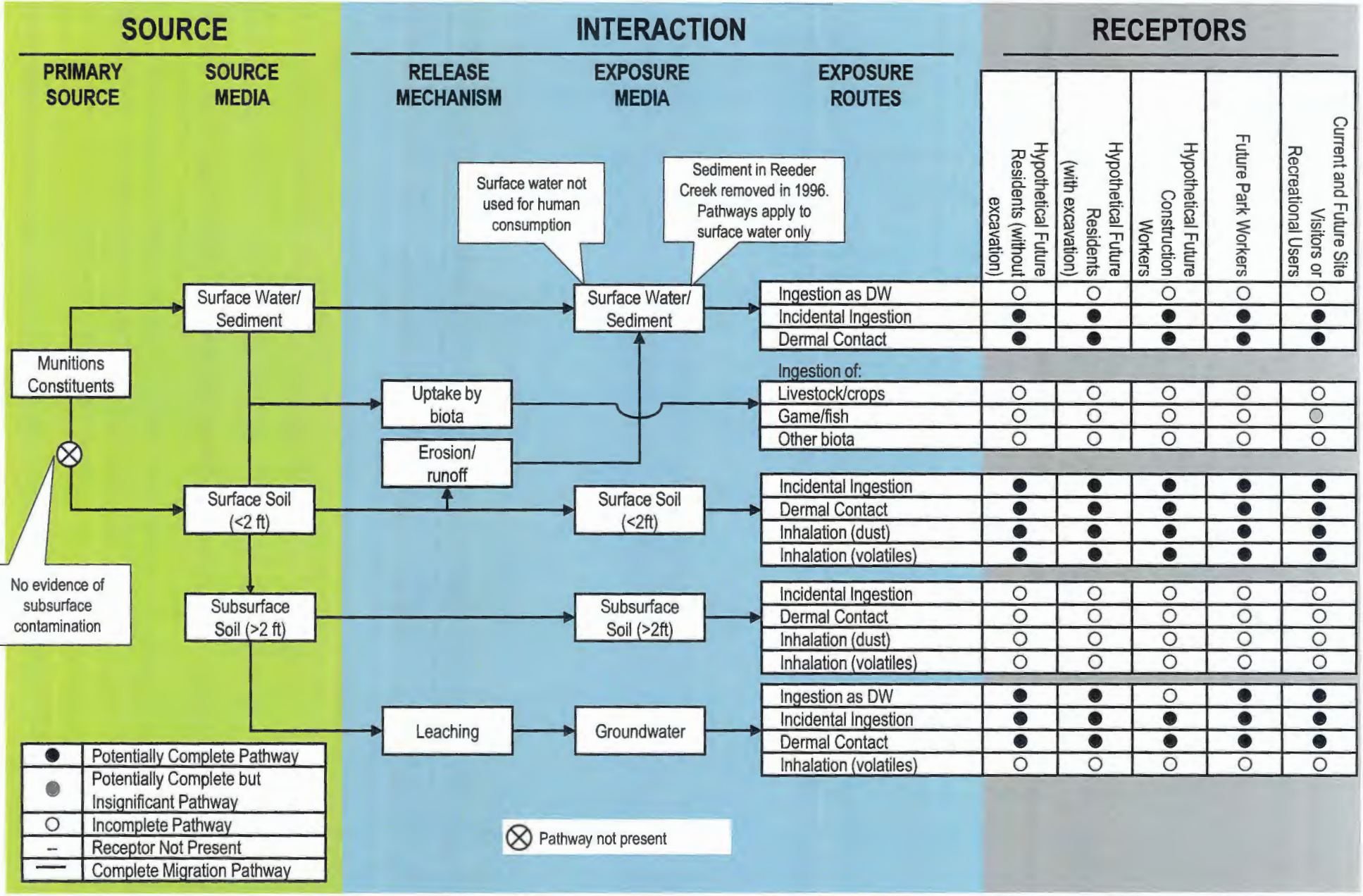
Figure 2.2 Human Health Conceptual Site Model Diagram

Site/MRS Name: Kickout Area, (OD) Grounds, Seneca Army Depot Activity (SEDA), Seneca County, New York

Last Revised By: Jill Noel ***Last Revision Date:*** September 12, 2014



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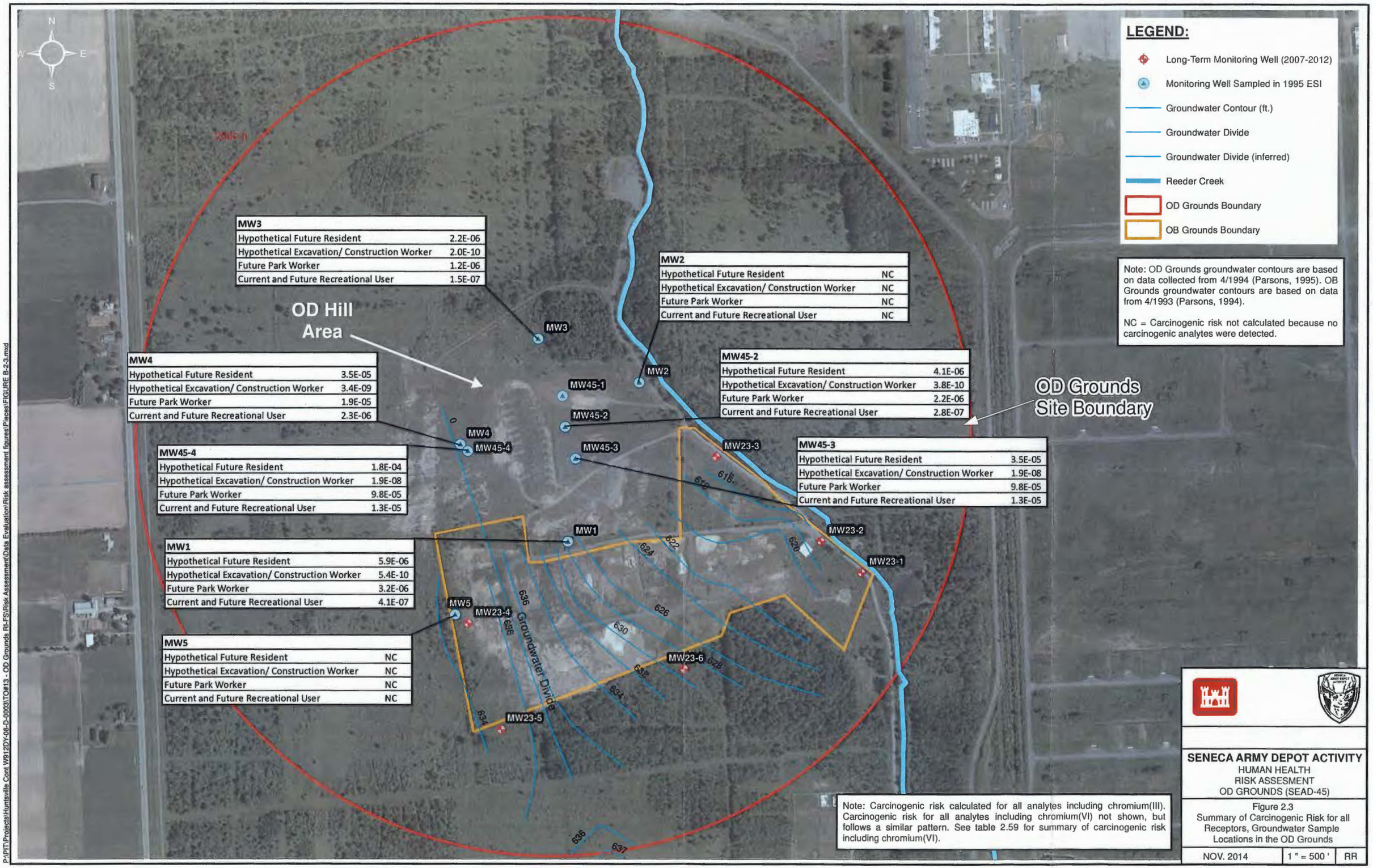
N
W
E
S
LEGEND:
Long-Term Monitoring Well (2007-2012)
Monitoring Well Sampled in 1995 ESI
Groundwater Contour (ft.)
Groundwater Divide
Groundwater Divide (inferred)
Reeder Creek
OD Grounds Boundary
OB Grounds Boundary
Note: OD Grounds groundwater contours are based on data collected from 4/1994 (Parsons, 1995). OB Grounds groundwater contours are based on data from 4/1993 (Parsons, 1994).
NC = Carcinogenic risk not calculated because no carcinogenic analytes were detected.
MW3
Hypothetical Future Resident 2.2E-06
Hypothetical Excavation/ Construction Worker 2.0E-10
Future Park Worker 1.2E-06
Current and Future Recreational User 1.5E-07
MW2
Hypothetical Future Resident NC
Hypothetical Excavation/ Construction Worker NC
Future Park Worker NC
Current and Future Recreational User NC
MW45-2
Hypothetical Future Resident 4.1E-06
Hypothetical Excavation/ Construction Worker 3.8E-10
Future Park Worker 2.2E-06
Current and Future Recreational User 2.8E-07
MW4
Hypothetical Future Resident 3.5E-05
Hypothetical Excavation/ Construction Worker 3.4E-09
Future Park Worker 1.9E-05
Current and Future Recreational User 2.3E-06
MW45-4
Hypothetical Future Resident 1.8E-04
Hypothetical Excavation/ Construction Worker 1.9E-08
Future Park Worker 9.8E-05
Current and Future Recreational User 1.3E-05
MW45-3
Hypothetical Future Resident 3.5E-05
Hypothetical Excavation/ Construction Worker 1.9E-08
Future Park Worker 9.8E-05
Current and Future Recreational User 1.3E-05
MW1
Hypothetical Future Resident 5.9E-06
Hypothetical Excavation/ Construction Worker 5.4E-10
Future Park Worker 3.2E-06
Current and Future Recreational User 4.1E-07
MW5
Hypothetical Future Resident NC
Hypothetical Excavation/ Construction Worker NC
Future Park Worker NC
Current and Future Recreational User NC
OD Hill Area
OD Grounds Site Boundary
MW3
MW2
MW45-1
MW45-2
MW4
MW45-4
MW45-3
MW23-3
MW1
MW23-2
MW23-1
MW5
MW23-4
MW23-6
MW23-5
Groundwater Divide
612
614
616
618
620
622
624
626
628
630
632
634
636
637
Note: Carcinogenic risk calculated for all analytes including chromium(III). Carcinogenic risk for all analytes including chromium(VI) not shown, but follows a similar pattern. See table 2.59 for summary of carcinogenic risk including chromium(VI).
SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
OD GROUNDS (SEAD-45)
Figure 2.3
Summary of Carcinogenic Risk for all Receptors, Groundwater Sample Locations in the OD Grounds
NOV. 2014
1 " = 500 '
RR
P:\PIT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-2-3.mxd

N
W E
S

2500 ft

MW3	
Hypothetical Future Resident (Child)	6.8
Hypothetical Future Resident (Adult)	4.1
Hypothetical Excavation/ Construction Worker	0.017
Future Park Worker	2.6
Current and Future Recreational User (Child)	0.45
Current and Future Recreational User (Adult)	0.27

MW4	
Hypothetical Future Resident (Child)	12
Hypothetical Future Resident (Adult)	7.1
Hypothetical Excavation/ Construction Worker	0.031
Future Park Worker	4.4
Current and Future Recreational User (Child)	0.78
Current and Future Recreational User (Adult)	0.46

MW2	
Hypothetical Future Resident (Child)	4.0
Hypothetical Future Resident (Adult)	2.4
Hypothetical Excavation/ Construction Worker	0.0093
Future Park Worker	1.5
Current and Future Recreational User (Child)	0.27
Current and Future Recreational User (Adult)	0.16

MW45-2	
Hypothetical Future Resident (Child)	7.1
Hypothetical Future Resident (Adult)	4.3
Hypothetical Excavation/ Construction Worker	0.025
Future Park Worker	2.6
Current and Future Recreational User (Child)	0.46
Current and Future Recreational User (Adult)	0.28

OD Hill Area

OD Grounds Site Boundary

MW3
MW2
MW45-1
MW45-2
MW4
MW45-4
MW45-3
MW23-3
MW1
MW23-2
MW23-1
MW5
MW23-4
MW23-6
MW23-5

MW45-4	
Hypothetical Future Resident (Child)	51
Hypothetical Future Resident (Adult)	30
Hypothetical Excavation/ Construction Worker	0.13
Future Park Worker	19
Current and Future Recreational User (Child)	3.4
Current and Future Recreational User (Adult)	2.0

MW45-3	
Hypothetical Future Resident (Child)	10
Hypothetical Future Resident (Adult)	6.0
Hypothetical Excavation/ Construction Worker	0.13
Future Park Worker	19
Current and Future Recreational User (Child)	3.4
Current and Future Recreational User (Adult)	2.0

MW1	
Hypothetical Future Resident (Child)	3.5
Hypothetical Future Resident (Adult)	2.1
Hypothetical Excavation/ Construction Worker	0.0091
Future Park Worker	1.3
Current and Future Recreational User (Child)	0.23
Current and Future Recreational User (Adult)	0.14

MW5	
Hypothetical Future Resident (Child)	3.8
Hypothetical Future Resident (Adult)	2.3
Hypothetical Excavation/ Construction Worker	0.0099
Future Park Worker	1.5
Current and Future Recreational User (Child)	0.25
Current and Future Recreational User (Adult)	0.15

Groundwater Divide

616 618 620 622 624 626 628 630 632 634 636 637

LEGEND:

- Long-Term Monitoring Well (2007-2012)
- Monitoring Well Sampled in 1995 ESI
- Groundwater Contour (ft.)
- Groundwater Divide
- Groundwater Divide (inferred)
- Reeder Creek
- OD Grounds Boundary
- OB Grounds Boundary

Note: OD Grounds groundwater contours are based on data collected from 4/1994 (Parsons, 1995). OB Grounds groundwater contours are based on data from 4/1993 (Parsons, 1994).

Note: Noncarcinogenic hazard calculated for all analytes including chromium(III). Noncarcinogenic hazard for all analytes including chromium(VI) not shown, but follows a similar pattern. See table 2.59 for summary of noncarcinogenic hazard including chromium(VI).

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
OD GROUNDS (SEAD-45)

Figure 2.4
Summary of Noncarcinogenic Hazard for all Receptors, Groundwater Sample Locations in the OD Grounds

NOV. 2014	1 " = 500 '	RR

P:\PITT\Projects\Huntsville Cont W912DY-08-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-2-4.mxd

N
W E
S

LEGEND:

- Long-Term Monitoring Well (2007-2012)
- Monitoring Well Sampled in 1995 ESI
- Groundwater Contour (ft.)
- Groundwater Divide
- Groundwater Divide (inferred)
- Reeder Creek
- OD Grounds Boundary
- OB Grounds Boundary

Note: OD Grounds groundwater contours are based on data collected from 4/1994 (Parsons, 1995). OB Grounds groundwater contours are based on data from 4/1993 (Parsons, 1994).

OD Hill Area

OD Grounds Site Boundary

MW3		
Hypothetical Future Resident (Child)	3.1	

MW2		
Hypothetical Future Resident (Child)	3.1	

MW45-2		
Hypothetical Future Resident (Child)	3.1	

MW4		
Hypothetical Future Resident (Child)	5.6	

MW45-3		
Hypothetical Future Resident (Child)	4.5	

MW45-4		
Hypothetical Future Resident (Child)	13	

MW1		
Hypothetical Future Resident (Child)	3.1	

MW5		
Hypothetical Future Resident (Child)	3.2	

MW23-4		
Hypothetical Future Resident (Child)	3.8	

MW23-6		
Hypothetical Future Resident (Child)	3.6	

MW23-5		
Hypothetical Future Resident (Child)	3.4	

Groundwater Divide

Note: Predicted Blood-Lead Concentrations (µg/dL) shown for the child receptor only.

SENECA ARMY DEPOT ACTIVITY
HUMAN HEALTH
RISK ASSESMENT
OD GROUNDS (SEAD-45)

Figure 2.5
Summary of Predicted Blood Lead Concentrations for Child Receptors, Groundwater Sample Locations in the OD Grounds

NOV. 2014	1 " = 500 '	RR

P:\PIT\Projects\Huntsville Cont W912DY-06-D-0003\TO#13 - OD Grounds RI-FS\Risk Assessment\Data Evaluation\Risk assessment figures\Pieces\FIGURE B-2-5.mxd

ATTACHMENT A

ProUCL Supporting Documentation
Provided electronically

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ATTACHMENT B

Supporting Tables
Provided electronically

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ATTACHMENT C

IEUBK SUPPORTING INFORMATION

Provided electronically

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APPENDIX B – ATTACHMENT D
SUPPLEMENT TO THE HUMAN HEALTH RISK ASSESSMENT REPORT
SENECA ARMY DEPOT ACTIVITY
OPEN DETONATION (OD) GROUNDS

July 27, 2018, Draft Revision 0

Task Order 0013

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TABLE OF CONTENTS

LIST OF TABLES *(Tables located at the end of this document)*

ACRONYMS AND ABBREVIATIONS

≤	less than or equal to
µg	micrograms
bgs	below ground surface
COPC	constituents of potential concern
cm^2	square centimeter
CSM	conceptual site model
DAD	dermal absorbed dose
DQO	data quality objectives
EPC	exposure point concentrations
FS	feasibility study
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IRIS	Integrated Risk Information System
kg	kilogram
L	liter
LOAEL	lowest observed adverse effect level
m^3	cubic meter
MDL	method detection limit
mg	milligrams
NYSDEC	New York State Department of Environmental Conservation
NOAEL	no observed adverse effect level
OB	open burning
OD	open detonation
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentrations
RfD	reference doses
RME	reasonable maximum exposure
RSL	regional screening level
SEDA	Seneca Army Depot Activity
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency

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SECTION 1
INTRODUCTION

1.1 Overall Introduction

This supplement to the human health risk assessment is being conducted to support the feasibility study (FS) for the Open Detonation (OD) Grounds, Seneca Army Depot Activity (SEDA). The risk assessment generally follows U.S. Environmental Protection Agency (USEPA) guidance for risk assessment (the Risk Assessment Guidance for Superfund [RAGS] series of guidance documents) and incorporates exposure scenarios and assumptions that are appropriate for current and anticipated future land use at this site. These scenarios and assumptions, as well as methods proposed to calculate exposure point concentrations (EPCs) and identify chemicals of potential concern, were presented in a human health risk assessment technical memorandum submitted to USEPA and the New York State Department of Environmental Conservation (NYSDEC) for review on August 7, 2014.

This supplement to the risk assessment is an attachment to the FS. Therefore, complete historical site information is available within the FS. Section 1 of this report is a brief introduction, including a description of the site and the data evaluation for the human health risk assessment (HHRA). Section 2 describes the HHRA. Section 3 presents the references used in preparation of this document. Tables referenced in this report follow Section 3.

1.2 Data Evaluation

This supplemental risk evaluation considered analytical results for perchlorate in soil and groundwater from sampling efforts conducted in May and June 2018. Historical soil, surface water, sediment, and groundwater data were evaluated in the HHRA to which this supplement is attached.

Chemical results with final validation qualifiers of any letter other than "U," "UJ," or "R" were considered detected; therefore "J" qualified data results were used in the risk assessment (USEPA 1989). Original data files are included in Attachment A.

To evaluate usability, data for each medium (and from each soil interval) were consolidated into summary statistics tables that present the following for each analyte: number of samples analyzed, minimum and maximum detected values, minimum and maximum method detection limits (MDL) for nondetects, and the screening value. These summary statistics for soil and groundwater samples at the OD Grounds are presented in the following tables:

- Table 1.1 (surface soil, 0- less than or equal to (≤) 2 feet)
- Table 1.2 (groundwater)

Determination of data usability was based on evaluation of the spatial, chemical, and temporal representativeness of the available analytical data, and an assessment of whether these data are relevant to plausible exposure pathways at the OD Grounds. Representativeness of the data was evaluated using the criteria defined below.

- **Chemical representativeness** – Identifies whether analyses were conducted for constituents expected to be present, on the basis of an understanding of historical processes or practices and potential releases at the OD Grounds.
- **Exposure representativeness** – Identifies whether environmental media were evaluated where receptor exposure is most feasible (e.g., soil depths).

- **Spatial representativeness** – Identifies whether samples were collected with a sufficient density and areal coverage that the detected constituent concentrations represent a geographically integrated exposure for the receptors of concern.
- **Temporal representativeness** – Identifies whether samples were collected within a time frame such that detected constituent concentrations represent current site conditions. Data were also evaluated based on current standard practices to determine if historical data were collected in a manner that would meet current data quality objectives (DQO).

Soil data evaluated in this supplemental risk assessment include data from samples collected in May 2018. All soil data evaluated in this supplemental risk assessment was collected in the surface soil interval: 0 to ≤ 2 feet below ground surface (bgs). Groundwater data used in this risk assessment include data from June 2018.

The data tables present all samples, primary and duplicates. The "best value" sample result of all primary and duplicate results was used. If both values represent detected concentrations, then the highest detected concentration was retained. If one value represents a detected concentration and one value is qualified as not detected, then the detected value was retained. If both values are qualified as not detected, the lowest reporting limit was retained.

SECTION 2
HUMAN HEALTH RISK ASSESSMENT

2.1 Risk Assessment Process

The HHRA provides an evaluation of the potential risks to human health posed by constituents detected in surface soil, combined surface and subsurface soil, groundwater, and surface water associated with the OD Grounds at SEDA. As presented in USEPA guidance documents, the HHRA is a four-step evaluation process that includes:

- Data evaluation and identification of a constituent of potential concern (COPC);
- Exposure assessment;
- Toxicity assessment; and
- Risk characterization.

Each step is discussed in detail in the following subsections. The HHRA was conducted using the following USEPA guidance documents:

- RAGS, Volume I: Human Health Evaluation Manual, Part A (Interim Final) (USEPA 1989)
- RAGS, Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment (Final) (USEPA 2004)
- Soil Screening Guidance: Users Guide (USEPA 1996)
- RAGS, Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment (Final) (USEPA 2009)

2.2 Identification of Constituents of Potential Concern

2.2.1 Selection of Constituents of Potential Concern

Detected concentrations of perchlorate were compared to screening levels to determine if perchlorate should be considered a COPC. This determination was accomplished by comparing the maximum concentration of perchlorate in soil and groundwater samples to selected screening levels. The presence of perchlorate at concentrations greater than screening levels would result in perchlorate being retained for further evaluation. The screening criteria selected for soil and groundwater are the USEPA Regional Screening Levels (RSL) for Chemicals at Superfund Sites (USEPA 2018a).

USEPA RSLs for residential soil, based on a noncarcinogenic hazard quotient (HQ) of 0.1, were the selected screening values for soil. USEPA RSLs for tap water, based on a noncarcinogenic HQ of 0.1, were the selected screening values for groundwater. Tap water RSLs are based on ingestion, dermal contact, and inhalation of volatiles emitted from groundwater.

2.2.2 Constituents of Potential Concern Results

Soil: As shown on Table 2.1, perchlorate was not detected at concentrations exceeding selected screening criterion. Therefore, perchlorate was not retained for further evaluation in this risk assessment and no unacceptable risks associated with exposure to perchlorate in soil are expected.

Groundwater: As shown on Table 2.1, perchlorate was detected in groundwater at concentrations that exceeded the selected screening criterion and is a COPC in groundwater.

2.3 Exposure Assessment

The exposure assessment consists of three main steps:

1. Evaluation of exposure pathways and identification of receptors;
2. Estimation of EPCs; and
3. Estimation of human intake.

The supplemental risk assessment evaluates the reasonable maximum exposure (RME). The RME is designed to be a measure of "high-end" exposure. The most sensitive exposure parameters are identified and the maximum of several of these are used along with average values for the remaining parameters. Generally, per USEPA RAGS Part A (USEPA 1989), the concentration term used when estimating intake is the arithmetic average of the concentration that is contacted over the exposure duration. However, in this supplemental risk assessment, the maximum detected concentration of perchlorate in groundwater was used as the concentration term, due to the limited number of samples available to appropriately calculate a 95% upper confidence limit (UCL).

2.3.1 Conceptual Site Model

2.3.1.1 Evaluation of Exposure Pathways and Identification of Receptors

A conceptual site model (CSM) is used to qualitatively define the type of potential exposures to contaminants at or migrating from a site (i.e., to systematically evaluate the effect of chemicals in relevant media on potential receptors). The CSM describes onsite release points, affected physical media, types of contaminant transport and fate mechanisms that may be involved at the site, each group of potentially exposed populations or receptors, and how each receptor group may contact site-related contamination. The CSM is used to summarize existing site characterization data, including assumptions about land and groundwater use, and to complete the qualitative exposure pathway assessment.

An exposure pathway evaluation describes how a receptor could be exposed to COPCs at, or migrating from, a site. A potentially complete exposure pathway consists of four necessary elements:

- A source and mechanism of chemical release;
- An environmental transport medium;
- A point of potential contact with a receptor; and
- A feasible route of exposure at the exposure point.

The potentially complete exposure pathways and receptors at the OD Grounds are identified in Section 2.3.1 of the risk assessment to which this is attached. Consistent with RAGS (USEPA 1989), current and future land-use scenarios were considered for the site.

The site-specific CSM for potential human exposures is depicted in Figure 2.1 (OD Hill Area) and Figure 2.2 (Kickout Area) of the risk assessment to which this report is attached. In accordance with the site-specific CSM, risk was quantitatively or qualitatively evaluated for the following potential human exposure scenarios:

- **Hypothetical Future Residents**: Although future residential land use is not anticipated, this scenario addresses the possibility for unrestricted land use in the future, including residential development. Future residents could include both children and adults. Ingestion as drinking water

and dermal contact (during showering/bathing) would be possible if a supply well were installed in the future. Perchlorate is not a volatile COPC, so inhalation from groundwater is not evaluated further.

- **Hypothetical Future Excavation/Construction Workers**: Hypothetical construction workers are assumed to be performing minor excavation activities, such as would be conducted during installation or repair of underground utilities or construction of building foundations. Ingestion of groundwater as a source of drinking water is not anticipated for the excavation/construction worker, but excavation/construction workers may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as perchlorate is not volatile.
- **Future Park Workers**: Dermal contact and ingestion of groundwater as a source of drinking water would be possible if a supply well were to be installed in the future, and park workers may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as perchlorate is not volatile.
- **Current and Future Recreational Users**: Dermal contact and ingestion of groundwater as a source of drinking water would be possible if a supply well were to be installed in the future, and recreational users may be exposed to groundwater through incidental ingestion and dermal contact. Inhalation of volatiles emitted from groundwater to outdoor air is not expected, as perchlorate is not volatile.

The exposure assumptions used for estimating constituent intake are presented in Table 2.2 (groundwater). Estimated exposures to groundwater for hypothetical future residents were based on the assumption that a receptor would contact groundwater for 350 days per year over a 6-year span as a child and a 20-year span as an adult. Estimated exposures for hypothetical excavation/construction workers were based on the assumption that an adult would contact groundwater for 30 days per year, because excavation activities were assumed to be of one-month duration over a one-year period. Estimated exposures for park workers were based on the USEPA assumption that an outdoor worker would contact groundwater for 225 work days per year over a 25- year period (USEPA 1991). Estimated exposure for future recreational users were based on the assumption that a recreational user would visit the site twice per month each year over a 6-year span as a child and a 20-year span as an adult.

2.3.1.2 Exposure Area

An exposure area is the area over which sampling data are aggregated for estimation of risk. The size and location of the exposure area is generally commensurate with the assumed activity patterns of each specific receptor. The exposure area is consistent with the areas defined by the site-specific characterization of the nature and extent of contamination at source areas. All groundwater wells were located within the OD Hill Area or the OD Grounds. Groundwater evaluation was conducted on a combined data set, including data from all wells, as well as data from each well individually.

2.3.2 Estimation of Exposure Point Concentrations

EPCs are the concentrations of chemicals in a given medium to which a receptor may be exposed at a specific location known as the "exposure point." EPCs are estimated based on medium-specific data and are used to calculate the risk due to exposure to a specific analyte. Each groundwater sampling location was considered an exposure point. Therefore, for this supplemental risk assessment the EPC for perchlorate was identified as the maximum detected concentration.

2.3.2.1 Exposure Point Concentration Results

Groundwater: Groundwater risk was evaluated using maximum detected concentration of perchlorate, regardless of in which well that concentration was found. The maximum detected concentration of perchlorate in all wells combined is 4.1 µg/L.

2.3.3 Estimation of Human Intake

The following equations were used to estimate human intake of COPCs in groundwater. Supporting calculations are provided in subsequent tables.

2.3.3.1 Intake Equations for Ingestion of Groundwater

The following equation (USEPA 1989) was used to calculate the intake of carcinogenic and noncarcinogenic constituents associated with ingestion of groundwater or surface water:

$$Intake = \frac{C_w \times IRW \times EF \times ED}{AT \times BW \times 365 days/year} \quad (1)$$

where:

C_W = chemical concentration in groundwater milligrams per liter (mg/L)

IRW = groundwater ingestion rate (L/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight in kilograms (kg)

AT = averaging time (days)

Exposure assumptions for estimating chemical intake from ingestion of groundwater are presented in Table 2.2.

2.3.3.2 Intake Equations for Dermal Contact with Groundwater

The following equation (USEPA 2004) was used to calculate the intake associated with dermal contact with carcinogenic and noncarcinogenic constituents in groundwater or surface water under the excavation/construction worker exposure scenario:

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT \times 365 days/year} \quad (2)$$

where:

DAD = dermally absorbed dose (mg/kg-day)

DA_{event} = absorbed dose per event, calculated for inorganic and organic chemicals, as applicable, in accordance with USEPA 2004 (mg/square centimeters [cm^2]-event) (see below)

EF = exposure frequency (days/year)

ED = exposure duration (years)

EV = event frequency (events/day)

SA = exposed skin surface area (cm^2)

BW = body weight (kg)

AT = averaging time (days)

The following equation (USEPA 2004) was used to calculate DA_{event} (mg/cm^2-event) for inorganic compounds:

$$DA_{event} = K_p \times C_w \times t_{event} \quad (3)$$

where:

DA_{event} = absorbed dose per event (mg/cm^2-event)

K_p = dermal permeability coefficient of compound in water (cm/hour)

C_w = chemical concentration in water (mg/cm^3)

t_{event} = event duration (hours/event)

The following equation (USEPA 2004) was used to calculate DA_{event} (mg/cm^2-event) for organic compounds:

If $t_{event} \leq t^*$, then:

$$DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}} \quad (4)$$

If $t_{event} > t^*$, then:

$$DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right] \quad (5)$$

where:

DA_{event} = absorbed dose per event (mg/cm^2-event)

FA = fraction absorbed water (dimensionless)

K_p = dermal permeability coefficient of compound in water (cm/hour)

C_w = chemical concentration in water (mg/cm^3)

τ_{event} = lag time per event (hour/event)

t_{event} = event duration (hours/event)

t^* = time to reach steady-state (hour) = 2.4 τ_{event}

B = dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless)

Exposure assumptions used to estimate exposure from dermal contact with groundwater are presented in Table 2.2.

2.4 Toxicity Assessment

Toxicity criteria used in the supplemental risk assessment are consistent with those presented by USEPA in the May 2018 RSL table. The reference dose (RfD) for perchlorate was obtained from USEPA's Integrated Risk Information System (IRIS) (USEPA 2018b). Perchlorate is not considered carcinogenic, therefore, there are no cancer slope factors available. Thus, carcinogenic risk evaluation was not conducted. Uncertainties associated with this approach are discussed in Section 2.5.3.

USEPA has not developed toxicity values specific to the dermal absorption pathway. However, dermal toxicity values were derived from the oral toxicity values as described in USEPA's most recent dermal risk assessment guidance (USEPA 2004). Toxicity values provided by USEPA reflect administered-dose values; that is, they represent concentrations that will be protective following ingestion or inhalation. The dermal route of exposure, however, evaluates the toxicity of concentrations of chemicals in the blood (absorbed). Therefore, the absorbed-dose concentrations identified for dermal exposure must be compared to absorbed-dose toxicity values. Absorbed-dose toxicity values are derived by applying oral absorption factors to administered-dose toxicity values. Oral absorption factors used in the supplemental HHRA were consistent with those used by USEPA in calculating RSLs (USEPA 2018a).

Chemical-specific toxicity values used in the HHRA are shown in Table 2.3, while chemical specific parameters are presented in Table 2.4.

2.5 Risk Characterization

The final step in the risk assessment process is risk characterization. The purpose of the risk characterization step is to 1) review results from the exposure and toxicity assessments; 2) quantitatively estimate the potential for noncarcinogenic (i.e., hazard) effects; and 3) assess and discuss uncertainties associated with each of the aforementioned steps. To characterize potential noncarcinogenic effects, estimated exposure concentrations of COPCs were compared with their respective toxicity values. HQ (for noncarcinogens) estimates were calculated as described below for perchlorate.

2.5.1 Noncancer Hazard Estimation

Potential health hazards associated with exposure to noncarcinogenic compounds were evaluated by calculating a HQ. The potential HQ was calculated as the ratio of the intake (via ingestion) or dermal absorbed dose (DAD) (via dermal contact) to the RfD_o or dermal reference dose (RfD_d), respectively, as follows (USEPA 1989):

$$HQ = Intake / RfD_o \quad (6)$$

$$HQ = DAD / RfD_d \quad (7)$$

where:

HQ = Noncancer hazard quotient (unitless)
Intake = Chronic daily ingestion averaged over a lifetime (mg/kg-day)
RfD_o = Oral reference dose (mg/kg-day)

DAD = Dermally absorbed dose (mg/kg-day)
RfD_d = Dermal reference dose (mg/kg-day)

For noncancer effects by inhalation exposure, the following equation was used (USEPA 2009):

$$HQ_{inh} = {EC\ (air)}\Big/{(RfC\ x\ 1{,}000\frac{\mu g}{mg})} \quad (8)$$

where:

HQ_{inh} = Noncancer hazard quotient from inhalation (unitless)
EC (air) = Exposure concentration in air micrograms per cubic meter ($\mu g/m^3$)
RfC = Noncancer reference concentration (mg/m^3)

If the estimated daily intake for any single constituent is greater than its RfD or reference concentration (RfC), the HQ will exceed 1. An HQ that exceeds 1 indicates a potential for adverse health effects associated with exposure to that constituent.

2.5.2 Risk Characterization Results

The primary objective of this HHRA was to quantitatively characterize the human health risk associated with current and reasonably expected future exposure to contaminated media at the OD Grounds. As discussed in Section 2.3.1.l, all potentially complete exposure pathways for the site were evaluated or assumed to be evaluated based on more protective exposure scenarios (e.g., the ingestion of groundwater as a source of drinking water is protective of incidental ingestion). The exposure pathways were outlined in Section 2.3.1.l. Site-specific noncarcinogenic hazards were estimated for receptors, exposure pathways, and COPCs per the methods described previously in this report. Results of the risk characterization are presented in this section.

2.5.2.1 Groundwater Risk Characterization

To determine the risk/hazard associated with exposure to perchlorate via exposure to groundwater, groundwater samples collected from monitoring wells at the site were evaluated. As described in Section 2.2.2, perchlorate was considered a COPC due to its presence at a concentration greater than its screening value. The calculated risks and hazards for the maximum detected concentration from any well onsite are provided in Tables 2.6 through 2.20. A summary of the noncarcinogenic hazards for each receptor is presented in Table 2.5.

2.5.2.1.1 Noncarcinogenic Hazard

Hypothetical Future Resident

The noncarcinogenic HQ for hypothetical future resident exposure to perchlorate is 0.3 for children and 0.2 for adults (Table 2.5), based on the maximum detected concentration which was detected in MW45-3. This HQ is less than the target HQ of 1. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as perchlorate is not volatile. The supporting calculations are presented in Tables 2.6 through 2.9. Perchlorate is not expected to contribute appreciably to the cumulative hazard estimate, which ranged from 4 to 51 for children and from 2 to 30 for adults. Therefore, no further evaluation of perchlorate is recommended.

Future Park Worker

The noncarcinogenic HQ for future park worker exposure to perchlorate is 0.1 (Table 2.5). The HQ is less than the target HQ of 1. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as perchlorate is not volatile. The supporting calculations are presented in Tables 2.11 through 2.14. Based on results of this risk estimate there are no unacceptable hazards anticipated for future park workers who may come into contact with perchlorate in groundwater at the site.

Hypothetical Future Construction/Excavation Worker

The noncarcinogenic HQ for hypothetical future construction/excavation worker exposure to perchlorate is 0.0005 (Table 2.5). The HQ is less than the target HQ of 1. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via incidental ingestion and dermal contact, should groundwater be encountered during excavation activities. Inhalation of volatiles emitted from groundwater was not evaluated, as perchlorate is not volatile. The supporting calculations are presented in Tables 2.15 through 2.17. Based on results of this risk estimate there are no unacceptable hazards anticipated for hypothetical future construction workers who may come into contact with perchlorate in groundwater at the site.

Current and Future Recreational User

The noncarcinogenic HQ for current and future recreational user exposure to perchlorate is 0.02 for children and 0.01 for adults (Table 2.5). The HQ is less than the target HQ of 1. The hazard estimate includes evaluation of hazards associated with exposure to contaminants in groundwater via ingestion as drinking water and dermal contact, should groundwater be used as a potable water supply. Inhalation of volatiles emitted from potable groundwater was not evaluated, as none of the COPCs are volatile. The supporting calculations are presented in Tables 2.18 through 2.20.

Based on results of this risk estimate there are no unacceptable hazards anticipated for current and recreational users who may come into contact with perchlorate in groundwater at the site.

2.5.3 Risk Assessment Uncertainties

All HHRAs involve use of assumptions, professional judgments, and imperfect data to varying degrees, which result in uncertainty in the final estimates of risk. Risk assessments in general are often based on conservative assumptions and scenarios. Uncertainty can be introduced into a health risk assessment at every step of the process outlined in this document. Uncertainties are present in a risk assessment because it requires integration of the following:

- Release of constituents into the environment, and the areal and vertical distribution of these materials in soil and groundwater;
- Fate and transport of constituents in a variety of different and variable environments by processes that are often poorly understood or too complex to quantify accurately;
- Potential for adverse health effects in humans based on extrapolations from animal studies; and
- Probability of adverse effects in a human population that is highly variable with respect to genetics, age, activity level, and lifestyle.

This section qualitatively describes the inherent and site-specific uncertainties of the assessments process.

2.5.3.1 Uncertainty in Data Collection and Evaluation

Analysis of uncertainties focuses on determining whether the available data are representative of contaminant concentrations and site conditions, and whether features of sampling, analyses, or statistical treatment of the data result in an over- or underestimation of potential risk.

The maximum detected concentration was used as the exposure point concentration. The use of the maximum detected concentration introduces uncertainty into the risk assessment, since use of one analytical result likely does not accurately represent the concentration of the constituent in the volume of water being evaluated. In cases where the analyte is infrequently detected, the use of the maximum concentration will likely overestimate the actual EPC, resulting in an overestimate of the risk. In cases with few total samples, the use of the maximum detected concentration can either over- or underestimate the exposure concentration depending on distribution of the actual concentrations in the medium of concern.

Steady-state conditions (i.e., the observed concentrations remain the same in the environmental media for the foreseeable future) were assumed for evaluation of potential future exposures. The assumption of steady-state conditions may tend to overestimate long-term exposure and health risk because contaminant concentrations may decline over time due to natural dissipation processes (e.g., biological and chemical degradation) or dilution through transport processes. In some cases, depending on the contaminant and or the release mechanisms involved, steady-state assumptions could potentially underestimate risk (e.g., breakdown products that are more toxic than the parent compound or a continuous source contributing to contamination in another medium).

2.5.3.2 Uncertainty in Exposure Assessment

Risk assessment estimates are conditional on actual and potential exposure pathways identified at the site. If exposure does not occur, no risks are present. Furthermore, the risk assessment process does not factor in the probability of exposure occurring. For example, there may not be a reason for a construction worker to excavate in a contaminated area, as future development is hypothetical. Additionally, an uncertainty associated with the estimates of future residential risk is that future residential development of the site is also unlikely.

Current land uses and characterization of the site's current physical setting provided the basis for predicting future land use at and in the vicinity of the site. The assumption of steady-state conditions was also used in predicting future contaminant concentrations. As will be discussed in the uncertainty section, this assumption tends to overestimate potential future exposure levels because concentrations of chemicals may decline with time.

There is also some concern as to how well an exposure scenario approximates the actual conditions that a receptor may be exposed to at a given site. Potential human exposures could deviate from those used in the risk assessment through differences in exposure frequency, contact rates, exposure durations, body weight, and life span. Each factor has a degree of uncertainty associated with it that could over- or underestimate risk.

Evaluation of risk for residential settings includes calculation of the risk to children. Other sensitive subpopulations such as elderly people, pregnant or nursing women, and people with chronic illnesses were not specifically evaluated in this risk assessment. These subpopulations may be more sensitive to certain chemical exposures. However, USEPA generally considers sensitive subpopulations when developing toxicity factors. Whenever possible, exposure assumptions were made to protect sensitive subpopulations. Additionally, there are no daycare or school facilities, healthcare facilities, nursing homes, retirement communities, or residential areas with children onsite currently onsite.

Risks and hazards associated with inhalation of COPCs in surface water were not calculated. There is not a scenario where a significant exposure would result from inhalation of contaminants in surface water. Elimination of this pathway from further evaluation may underestimate the cumulative risk to receptors exposed to surface water.

2.5.3.3 Uncertainty in Toxicity Assessment

Some uncertainty is also inherent in the toxicity values used in the risk assessment. The chronic RfD for a compound is based on studies where either human or animal populations were exposed to a given compound by a given route of exposure for a major portion of the life span (as a USEPA guideline, seven years to a lifetime; USEPA 1989). RfDs are derived by determining dose-specific effect levels from available quantitative studies and applying uncertainty factors to the most appropriate effect level to determine an RfD for humans. Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the data. Typically, an uncertainty factor of 100 to 1,000 is used in the professional judgment of uncertainties. General uncertainties in the derivation of RfDs may be associated with factors such as (1) variations in the general population (to protect sensitive receptors), (2) extrapolation of animal data to humans, (3) use of a subchronic study versus a chronic study to determine the no -observed adverse effect level (NOAEL), or (4) use of a lowest-observed-adverse-effect level (LOAEL) versus a NOAEL. Both the uncertainty and modifying factors are conservative in nature and tend to overestimate risk.

2.5.3.4 Uncertainty in Estimating Chemical Risk

The expression of potential risk associated with contaminants detected at the site is a result of the combined steps of data evaluation, exposure assessment, and toxicity assessment. This combination can magnify the uncertainties present in these steps of the risk assessment process.

2.6 Conclusions

This supplemental HHRA was conducted to evaluate the potential for human health effects as a result of potential exposures to perchlorate in soil and groundwater at the OD Grounds at the Seneca Army Depot Activity.

Perchlorate was not detected in soil at concentrations greater than the screening level. Therefore, perchlorate is not expected to result in an unacceptable hazard to receptors at the OD Grounds.

Noncarcinogenic hazards estimated for the four receptor groups exposure to groundwater at the site are shown in Table 2.5. As shown in Table 2.5, there were no estimated hazards greater than the target HQ of 1, indicating that there was no unacceptable hazard associated with exposure to perchlorate at the OD Grounds.

Uncertainties may result in overestimated current risks/hazards. Most notably, onsite groundwater is not currently used as a potable drinking water source so the risk/hazard estimates herein may be overestimated. The estimated risks/hazards associated with potable groundwater would apply only if a well were installed for potable water. Further, there are no buildings currently onsite and there are no plans for development of the site in the future. Therefore, near- and long-term residential scenarios are hypothetical and conservative since there are no residential properties onsite currently and it is unlikely the site will be developed as residential property. Therefore, based on the exposure scenarios evaluated in this risk assessment, there are no unacceptable risks/hazards expected for any receptor as a result of exposure to soil, groundwater, or surface water based on current, or reasonably anticipated future land use.

SECTION 3
REFERENCES

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TABLES

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ATTACHMENT D, TABLE 1.1
Summary of Detections and Preliminary Screening Values
Surface Soil (0 -≤ 2 ft bgs), Open Detonation (OD) Grounds
Former Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (mg/kg)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Perchlorate	14797-73-0	0.041	17	22	77%	5.5	0

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018 . Available at: https://semspub.epa.gov/work/HQ/197235.pdf.

ATTACHMENT D, TABLE 1.2
Summary of Detections and Preliminary Screening Values
Groundwater, Open Detonation (OD) Grounds
Former Seneca Army Depot Activity

Parameter	CAS Number	Maximum Detected Concentration Detection (µg/L)	Number of samples with Detected Concentrations	Total Number of Samples	Frequency of Detection	Regional Screening Levels (RSL) [1] (mg/kg)	Number of Detected Samples Greater than RSL
Perchlorate	14797-73-0	4.1	9	10	90%	1.4	3

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018 . Available at: https://semspub.epa.gov/work/HQ/197235.pdf.

ATTACHMENT D, TABLE 2.1
Human Health Risk Assessment Constituents of Potential Concern
Open Detonation (OD) Grounds
Former Seneca Army Depot Activity

Detected Analytes	Units	Maximum Detected Concentration of Analytes	Regional Screening Level (RSL) [1]	Maximum Detected Concentration Exceeds RSL? (Yes/No)	Contaminant of Potential Concern (COPC)?
Surface Soil (0-≤2 feet bgs)					
Perchlorate	mg/kg	0.041	6	No	No
Groundwater					
Perchlorate	µg/L	4.1	1.4	Yes	**Yes**

[1] USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf.

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
IRW = Groundwater Ingestion Rate (L/day)	Construction/ excavation worker	0.08	Based on ingestion rate of 10mL/hour, assuming an 8-hour work day.	USEPA 2000
	Park worker	2.5	Same as adult resident. USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Recreational adult (6-26 years)	2.5	Same as adult resident. USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Recreational child (0-<6 years)	0.78	Same as child resident. USEPA 2011a, Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	2.5	USEPA 2011a, Table 3-33; 90th percentile of consumer-only ingestion of drinking water (≥ 21 years)	USEPA 2014a
	Child resident (0-<6 years)	0.78	USEPA 2011a, Tables 3-15 and 3-33; weighted average of 90th percentile consumer-only ingestion of drinking water (birth to <6 years)	USEPA 2014a
FI = Fraction Ingested (unitless)	All receptors	1	Professional judgment. Assumes entire exposure time spent at one exposure area.	N/A
K_p = Permeability Constant (cm/hour)	All receptors	Chemical-specific	Assume all drinking water comes from one well	N/A

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
SA = Skin Surface Area (cm^2)	Construction/ excavation worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Park worker	3,470	USEPA 2011a, Table 7-2; weighted average of mean values for head, hands, and forearms (male and female, 21+years).	USEPA 2014a
	Recreational adult (6-26 years)	2,230	USEPA 2011a, Table 7-2; average of mean values for head and hands (male and female, 21+ years).	USEPA 2011a
	Recreational child (0-<6 years)	970	USEPA 2011a, Table 7-2; weighted average of mean values for head and hands for children <6 years.	USEPA 2011a
	Adult resident (6-26 years)	20,900	USEPA 2011a, Table 7-10; weighted average of mean values for adults, male and female 21+.	USEPA 2014a
	Child resident (0-<6 years)	6,378	USEPA 2011a, Table 7-10; weighted average of mean values for children <6 years.	USEPA 2014a
EV = Event frequency (events/day)	Construction/ excavation worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during excavation activities, for one event per day.	N/A
	Park worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day.	N/A
	Recreational user (adult and child)	1	Professional judgment. Assumes a recreational user may come into contact with groundwater, for one event per day.	N/A

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Resident (adult and child)	1	Professional judgment. Assumes a resident may come into contact with groundwater, for one event per day.	N/A
t_{event} = Event Duration (hours/event)	Construction/ excavation worker	2	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day, 2 hours per event.	N/A
	Park worker	1	Professional judgment. Assumes a worker may come into contact with groundwater during work activities, for one event per day, 1 hour per event.	N/A
	Recreational adult (6-26 years)	0.71	Same as adult resident, used as a conservative estimate. USEPA 2011a, Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/ showering in a day, divided by mean number of baths/showers taken in a day.	USEPA 2014a
	Recreational child (0-<6 years)	0.54	Same as child resident, used as a conservative estimate. USEPA 2011a, Table 16-28; weighted average of 90th percentile time spent bathing (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	0.71	USEPA 2011a, Tables 16-30 and 16-31; weighted average of adult (21 to 78) 90th percentile of time spent bathing/ showering in a day, divided by mean number of baths/showers taken in a day.	USEPA 2014a
	Child resident (0-<6 years)	0.54	USEPA 2011a, Table 16-28; weighted average of 90th percentile time spent bathing (birth to <6 years)	USEPA 2014a

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
EF = Exposure Frequency (days/year)	Construction/ excavation worker	30	Professional judgment. Assumes project of one month duration.	N/A
	Park worker	225	Outdoor worker. USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
	Recreational user (adult and child)	24	Professional judgment. Assumes a recreational user may visit the site twice per month per year.	N/A
	Resident (adult and child)	350	USEPA 1991 (pg. 15); value not provided in USEPA 2011a	USEPA 2014a
ED = Exposure Duration (years)	Construction/ excavation worker	1	USEPA default value for construction workers.	USEPA 2002
	Park worker	25	USEPA 1991 (pg. 15); USEPA 2011a only provides a CTE value	USEPA 2014a
	Recreational adult (6-26 years)	20	Same as adult resident. Represents the number of years returning to the same location. Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a
	Recreational child (0-<6 years)	6	Same as child resident. Represents the number of years returning to the same location. USEPA 1991, Pages 6 and 15	USEPA 2014a
	Adult resident (6-26 years)	20	Resident ED = 26 years (USEPA 2011a, Table 16-108; 90th percentile for current residence time) Resident ED (26 years) - EDc (6 years)	USEPA 2014a

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Child resident (0-<6 years)	6	USEPA 1991, Pages 6 and 15	USEPA 2014a
CF_w = Conversion Factor, water (µg/m)	All receptors	1,000		
BW = Body Weight (kg)	Construction/ excavation worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Park worker	80	Worker. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational adult (6-26 years)	80	Same as adult resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Recreational child (0-<6 years)	15	Same as child resident. USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
	Adult resident (6-26 years)	80	Resident. USEPA 2011a, Table 8-3; weighted mean values for adults 21 – 78.	USEPA 2014a
	Child resident (0-<6 years)	15	USEPA 2011a, Table 8-1; weighted average of mean body weights (birth to <6 years)	USEPA 2014a
AT_{nc} = Averaging Time (days), noncarcinogens	Construction/ excavation worker	365	ED expressed in days (1 year x 365 days).	
	Park worker	9,125	ED expressed in days (25 years x 365 days).	
	Recreational adult (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Recreational child (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	

Table 2.2
Exposure Parameters for Groundwater Pathways:
Ingestion, Dermal Contact, and Inhalation

Exposure Variable	Receptor	Reasonable Maximum Exposure (RME)	Rationale	Reference
	Adult resident (6-26 years)	7,040	ED expressed in days (20 years x 365 days).	
	Child resident (0-<6 years)	2,190	ED expressed in days (6 years x 365 days).	
AT_c = Averaging Time (days), carcinogens	All receptors	25,550	70-year lifetime expressed in days (70 years x 365 days).	USEPA 2014a
VF_w = Volatilization Factor, water (L/m^3)	All receptors	0.5		USEPA 2014c
FA = Fraction absorbed (unitless)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
B = Relative contribution of permeability coefficient (unitless)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
t^* = Time it takes to reach steady state (hours)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report
τ_{event} = Lag Time per Event (hr/event)	All receptors	Chemical-specific	Chemical specific values obtained from USEPA RSL Tables.	USEPA, 2014b, or most current version at time of draft report

ATTACHMENT D, TABLE 2.3
HUMAN HEALTH RISK ASSESSMENT TOXICITY VALUES
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK
Attachment C, Appendix B

					Ingestion			Dermal Contact		Inhalation	
CAS Number	Analyte	Volatile Organic Compound? (Yes/No)	Mutagenic Compound? (Yes/No)	ABS_d [1] (unitless)	RfD_o [2] (mg/kg-day)	SF_o [2] ((mg/kg-day)$^{-1}$)	GIABS [3] (unitless)	RfD_d [4] (mg/kg-day)	SF_d [5] ((mg/kg-day)$^{-1}$)	RfC_i (mg/m^3)	IUR ((µg/m^3)$^{-1}$)
Volatile Organic Compounds											
14797-73-0	Perchlorate and Perchlorate Salts	No	No	--	7.0E-04 I	-- --	1	7.0E-04	--	--	-- --

NOTES:

(1) ABSd is the recommended dermal absorption fraction of contaminants in soil. ABSd values are obtained from USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, updated May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(2) SFo and RfDo values are consistent with the USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, updated May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf.

(3) GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the GIABS is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. GIABS values obtained from USEPA (2004) and Bast and Borges (1996) as cited in USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, updated May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(4) RfDd is the dermal reference dose and is based on the absorbed dose. The RFDd is calculated as RfDo*GIABS.

(5) SFd is the dermal slope factor and is based on absorbed dose. The SFd is calculated as SFo / GIABS.

Sources:

I = IRIS

ATTACHMENT D, TABLE 2.4
CHEMICAL SPECIFIC PARAMETERS
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

		Volatility Parameters [1]					Diffusivity in Air and Water [1]			Partition Coefficients [1]						Water Solubility [1]		Tapwater Dermal Parameters [1]					
Analyte	CAS Number	H` (unitless)	HLC (atm-m^3/mole)	H` and HLC Reference	Vapor Pressure	Vapor Pressure Reference	Dia (cm^2/s)	Diw (cm^2/s)	Dia and Diw Reference	K_d (L/kg)	K_d Reference	K_{oc} (L/kg)	K_{oc} Ref	log K_{ow} (unitless)	log K_{ow} Reference	S (mg/L)	S Reference	B (unitless)	τ_{event} (hr/event)	t* (hr)	K_p (cm/hr)	K_p Reference	FA [2]
Perchlorate	14797-73-0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.45E+05	CRC89	4.17E-03	4.78E-01	1.15E+00	1.00E-03	RAGSE	1

Notes:
(1) Values obtained from USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), Chemical Specific Parameters Supporting Table, May 2018. Available at: https://semspub.epa.gov/work/HQ/197265.pdf.

(2) Values obtained from USEPA Regional Screening Levels (RSLs) for Tapwater (May 2018) based on a target risk of 1E-6 and a hazard quotient (HQ) of 0.1 (USEPA, 2018). Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. (May 2018 values: https://semspub.epa.gov/work/HQ/197235.pdf)

Sources (see USEPA RSLs Users Guide for more info):
CRC89 = CRC Handbook of Chemistry and Physics
RAGSE = USEPA 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.July 2004

ATTACHMENT D, TABLE 2.5
PERCHLORATE RISK/HAZARD SUMMARY
GROUNDWATER
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

	Current/ Future Resident			Park Worker		Construction Worker		Current/ Future Recreational User		
Well ID	Carcinogenic Risk	Hazard Quotient - Child	Hazard Quotient - Adult	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient	Carcinogenic Risk	Hazard Quotient - Child	Hazard Quotient - Adult
Site Wide Evaluation	--	0.3	0.2	--	0.1	--	0.0005	--	0.02	0.01

ATTACHMENT D, TABLE 2.6
RISK AND HAZARD ESTIMATES, NONCARCINOGENIC -- INGESTION OF GROUNDWATER
CURRENT/ FUTURE RESIDENT
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions			
Receptor	CURRENT/ FUTURE RESIDENT		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L
Water Ingestion Rate - child	IRW_{child}	0.78	L/day
Water Ingestion Rate - adult	IRW_{adult}	2.5	L/day
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

$$Intake = \frac{(C_w)(ED)(IRw)(EF)}{(BW)(AT)}$$

Noncarcinogenic: $$HQ = \frac{Intake}{RfD_o}$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Noncarcinogenic Intake - Child (mg/kg-day)	Noncarcinogenic Intake - Adult (mg/kg-day)	RfD_o [4] (mg/kg-day)	Hazard Quotient Child	% of Total	Hazard Quotient Adult	% of Total
Perchlorate	14797-73-0	4.1	0.0041	Max	2.0E-04	1.2E-04	7.0E-04	0.29	100%	0.18	100%
								Hazard Index		**Hazard Index**	
							Pathway Sums:	0.3		0.2	

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(4) RfDo values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.
(NO CODE) = Confirmed identification.

ATTACHMENT D, TABLE 2.7
RISK AND HAZARD ESTIMATES, NONCARCINOGENIC -- DERMAL CONTACT WITH GROUNDWATER
CURRENT/ FUTURE RESIDENT
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor	CURRENT/ FUTURE RESIDENT		
Parameter	**Abbreviation**	**Value**	**Units**
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event
Exposure Frequency	EF	350	days/year
Exposure Time - child	t_{event} - child	0.54	hr/event
Exposure Time - adult	t_{event} - adult	0.71	hr/event
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	years
Exposure Duration - adult	ED_{adult}	20	years
Exposed Skin Surface Area - child	SA_{child}	6378	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	20900	cm^2
Permeability Coefficient	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	µg/L
Fraction absorbed	FA	chemical-specific	unitless
Lag Time per Event	τ_{event}	chemical-specific	hr/event
Relative contribution of permeability coefficient	B	chemical-specific	unitless

Equations

$$DAD = \frac{DA_{event} \times EF \times ED \times EV \times SA}{BW \times AT}$$

where for organic compounds:
Note: t_{event} is different for adult and child

$$If\ t_{event} \leq t^*, then\ DA_{event} = 2 \times FA \times K_p \times C_w \times \sqrt{\frac{6 \times \tau_{event} \times t_{event}}{\pi}}$$

where for organic compounds:
Note: t_{event} is different for adult and child

$$If\ t_{event} > t^*, then\ DA_{event} = FA \times K_p \times C_w \times \left[\left(\frac{t_{event}}{1+B}\right) + (2 \times \tau_{event}) \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

$$HQ = \frac{DAD}{RfD_d}$$

where: $RfD_d = RfD_0 \times GIABS$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t* [4] (hours)	Is $t_{event-child} \leq t^*$? (Yes/No)	Is $t_{event-adult} \leq t^*$? (Yes/No)	FA [5] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	Noncarcinogenic DAD [6] - child (mg/kg-day)	Noncarcinogenic DAD [6] - adult (mg/kg-day)	GIABS [7] (unitless)	RfDo [8] (mg/kg-day)	RfD_d (mg/kg-day)	Hazard Quotient Child	% of Total	Hazard Quotient Adult	% of Total
Volatile Organic Compounds																						
Perchlorate	14797-73-0	4.1	0.0000041	Max	1.0E-03	1.1E+00	Yes	Yes	1	0.48	4.2E-03	5.76E-09	6.60E-09	2.3E-06	1.7E-06	1	7.0E-04	7.0E-04	0.0034	100%	0.0024	100%
																			Hazard Index		**Hazard Index**	
																		Pathway Sums	0.003		0.002	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw)

(4) Kp, tevent, τevent, t* and B values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), Chemical Specific Parameters Supporting Table, May 2018. Available at: https://semspub.epa.gov/work/HQ/197265.pdf. Chemical Specific Parameters shown in Table 2.10.

(5) FA values are consistent with USEPA Regional Screening Levels (RSLs) for Tapwater (May 2018) based on a target risk of 1E-6 and a hazard quotient (HQ) of 0.1 (USEPA, 2018). Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. (May 2018 values: https://semspub.epa.gov/work/HQ/197235.pdf) Chemical Specific Parameters shown in Table 2.10.

(6) DAD = Dermally absorbed dose.

(7) GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the GIABS is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. GIABS values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(8) RfD values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.

(NO CODE) = Confirmed identification.

-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.8
RISK AND HAZARD ESTIMATES, NONCARCINOGENIC -- INHALATION OF VOLATILES EMITTED FROM GROUNDWATER
CURRENT/ FUTURE RESIDENT
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions			
Receptor	CURRENT/ FUTURE RESIDENT		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater (C_W)	C_w	chemical-specific	mg/L
Conversion Factor	CF	1000	µg/mg
Volatilization Factor for Groundwater	VF_{air}	0.5	L/m^3
Exposure time as a fraction of the day spent at the site - child	ET_{child}	1.000	unitless
Exposure time as a fraction of the day spent at the site - adult	ET_{adult}	1.000	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3

Equations

$$EC(air) = \frac{C_w \times CF \times VF_w \times ET \times EF \times ED}{AT}$$

$$HQ = \frac{EC(air)}{RfC \times 1{,}000\,^{\mu g}/_{mg}}$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Volatile? (Yes/No)	Noncarcinogenic EC(air) - child (µg/m³)	Noncarcinogenic EC(air) - adult (µg/m³)	RfC [4] (mg/m³)	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	Yes	--	--	--	--	--	--	--
									Hazard Index		**Hazard Index**	
								Pathway Sums:	--		--	

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(4) IUR and RfC values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.9
HUMAN HEALTH RISK EVALUATION SUMMARY -- GROUNDWATER
CURRENT/ FUTURE RESIDENT
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Child Inhalation Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	0.29	0.0034	--	0.18	0.0024	--	**0.3**	**0.2**
				Pathway Sum	**0.3**	**0.003**	**--**	**0.2**	**0.002**	**--**	--	--
										Hazard Index	**0.3**	**0.2**

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.10
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF GROUNDWATER
PARK WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: PARK WORKER

Parameter	Abbreviation	Value	Units
COPC Concentration in Groundwater (C_W)	C_W	chemical-specific	mg/L
Water Ingestion Rate - adult	IRW_{adult}	2.500	L/day
Exposure Frequency	EF	225	days/year
Exposure Duration - adult	ED_{adult}	25	years
Averaging Time -- carcinogens	AT_c	25550	days
Averaging Time -- noncarcinogens, adult	AT_{nc} - adult	9125	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in groundwater:

$$Intake = \frac{(C_W)(ED_{achlt})(IRW_{achlt})(EF)}{(BW_{achlt})(AT)}$$

Carcinogenic: $Risk = (Intake)(SF_o)$

Noncarcinogenic: $HQ = Intake / RfD_o$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Carcinogenic Intake (mg/kg-day)	Noncarcinogenic Intake (mg/kg-day)	SF_o [4] $(mg/kg\text{-}day)^{-1}$	RfD_o [4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	--	7.9E-05	--	7.0E-04	--	--	0.11	100%
									Cancer Risk		**Hazard Index**	
								Pathway Sums:	--		0.1	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw)

(4) SFO and RfDO values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.

(NO CODE) = Confirmed identification.

-- = Not calculated because analyte not analyzed or toxicity data not available.

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ATTACHMENT D, TABLE 2.11
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
PARK WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: PARK WORKER

Parameter	Abbreviation	Value	Units
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event
Exposure Frequency	EF	225	days/year
Exposure Time - adult	t_{event} - adult	1	hr/event
Time to Reach Steady-state	t^*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - adult	ED_{adult}	25	years
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm2
Permeability Coefficient	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	9125	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	(mg/kg-day)$^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Oral Reference Dose Adjusted for GI Absorption	GIABS	chemical-specific	unitless
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	chemical-specific	unitless
Lag Time per Event	τ_{event}	chemical-specific	hr/event
Relative contribution of permeability coefficient	B	chemical-specific	unitless

Equations

Dermal contact of noncarcinogenic and carcinogenic COPCs in groundwater:

$$DAD = \frac{DA_{event} \times EV \times ED_{adult} \times EF \times SA_{adult}}{BW_{adult} \times AT}$$

for organic compounds:

$$If\ t_{event} \leq t^*, then\ DA_{event} = 2 \times FA \times K_p \times C_w \times \sqrt{\frac{6 \times \tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then\ DA_{event} = FA \times K_p \times C_w \times \left[\left(\frac{t_{event}}{1+B}\right) + (2 \times \tau_{event}) \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

$$Carcinogenic\ Risk = DAD \times Sf_d$$

where:

$$Sf_d = \frac{Sf_o}{GIABS}$$

$$Noncarcinogenic\ HQ = \frac{DAD}{RfD_d}$$

where:

$$RfD_d = RfD_o \times GIABS$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w [3] (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t^* [5] (hours)	Is $t_{event-adult} \leq t^*$? (Yes/No)	FA [5] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} (mg/cm^2-event)	Carcinogenic DAD [6] (mg/kg-day)	Noncarcinogenic DAD [6] (mg/kg-day)	GIABS [7] (unitless)	SFo [8] (mg/kg-day)$^{-1}$	RfDo [8] (mg/kg-day)	SF_d [8] (mg/kg-day)$^{-1}$	RfD_d [8] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Volatile Organic Compounds																						
Perchlorate	14797-73-0	4.1	0.0000041	Max	1.0E-03	1.1E+00	Yes	1	0.48	4.2E-03	7.8E-09	--	2.09E-07	1	--	7.0E-04	--	7.0E-04	--	--	0.00030	100%
																			Cancer Risk		Hazard Index	
																		Pathway sums:	--	--	0.0003	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw) is the maximum detected concentration for the selected well or well cluster.

(4) Kp, tevent, tevent, t* and B values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), Chemical Specific Parameters Supporting Table, May 2018. Available at: https://semspub.epa.gov/work/HQ/197265.pdf. Chemical Specific Parameters shown in Table 2.4.

(5) FA values are consistent with USEPA Regional Screening Levels (RSLs) for Tapwater (May 2018) based on a target risk of 1E-6 and a hazard quotient (HQ) of 0.1 (USEPA, 2018). Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. (May 2018 values: https://semspub.epa.gov/work/HQ/197235.pdf) Chemical Specific Parameters shown in Table 2.4.

(6) DAD = Dermally absorbed dose.

(7) GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the GIABS is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. GIABS values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(8) SFO and RfDO values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.

(NO CODE) = Confirmed identification.

-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.12
RISK AND HAZARD ESTIMATES – INHALATION OF VOLATILES EMITTED FROM GROUNDWATER
PARK WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions			
Receptor	PARK WORKER		
Parameter	**Abbreviation**	**Value**	**Units**
COPC Concentration in Groundwater (C_W)	C_w	chemical-specific	mg/L
Conversion Factor	CF	1000	µg/mg
Volatilization Factor for Groundwater	VF_{air}	0.5	L/m^3
Exposure time as a fraction of the day spent at the site - adult	ET_{adult}	1.000	unitless
Exposure Frequency	EF	350	days/year
Exposure Duration - adult	ED_{adult}	20	years
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3

Equations

$$EC(air) = \frac{C_w \times CF \times VF_w \times ET \times EF \times ED}{AT}$$

$$HQ = \frac{EC(air)}{RfC \times 1{,}000\,{}^{\mu g}/_{mg}}$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)		UCL or Max	Volatile? (Yes/No)	EC(air) ($\mu g/m^3$)	IUR [4] $(\mu g/m^3)^{-1}$	RfC [4] (mg/m^3)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Perchlorate	14797-73-0	4.1	0.0041		Max	No	--	--	--	--	--	--	--
										Risk		**Hazard Index**	
										--		--	

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(4) IUR and RfC values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.13
HUMAN HEALTH RISK EVALUATION SUMMARY -- GROUNDWATER
PARK WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Inhalation Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Inhalation Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	--	--	--	--	0.11	0.00030	--	**0.1**
							Total Risk	--			**Hazard Index**	**0.1**

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.14
RISK AND HAZARD ESTIMATES – INCIDENTAL INGESTION OF GROUNDWATER
CONSTRUCTION WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: CONSTRUCTION WORKER

Parameter	Abbreviation	Value	Units
COPC Concentration in Groundwater (C_W)	C_W	chemical-specific	mg/L
Water Ingestion Rate - adult	IRW_{adult}	0.080	L/day
Exposure Frequency	EF	30	days/year
Exposure Duration - adult	ED_{adult}	1	years
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor (SF_o)	SFo	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day

Equations

Incidental ingestion of noncarcinogenic and carcinogenic COPCs in groundwater:

$$Intake = \frac{(C_W)(ED_{adult})(IRW_{adult})(EF)}{(BW_{adult})(AT)}$$

Carcinogenic: $Risk = (Intake)(SF_o)$

Noncarcinogenic: $HQ = Intake / RfD_o$

COPC[1]	CAS Number[2]	C_w[3] (µg/L)	C_w (mg/L)	UCL or Max	Carcinogenic Intake (mg/kg-day)	Noncarcinogenic Intake (mg/kg-day)	SF_o[4] $(mg/kg\text{-}day)^{-1}$	RfD_o[4] (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	4.8E-09	3.4E-07	--	7.0E-04	--	--	0.00048	100%
									Cancer Risk		**Hazard Index**	
								Pathway Sums:	--	--	0.0005	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw)

(4) SFO and RfDO values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.

(NO CODE) = Confirmed identification.

J = Analyte detected, estimated concentration.

U = Analyte was analyzed for but not detected above the reported limit of detection (LOD).

-- = Not calculated because analyte not analyzed or toxicity data not available.

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ATTACHMENT D, TABLE 2.15
RISK AND HAZARD ESTIMATES -- DERMAL CONTACT WITH GROUNDWATER
CONSTRUCTION WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: CONSTRUCTION WORKER

Parameter	Abbreviation	Value	Units
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event
Exposure Frequency	EF	30	days/year
Exposure Time - adult	t_{event} - adult	2	hr/event
Time to Reach Steady-state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - adult	ED_{adult}	1	years
Exposed Skin Surface Area - adult	SA_{adult}	3470	cm2
Permeability Coefficient	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	365	days
Oral Slope Factor Adjusted for GI Absorption	SF_d	chemical-specific	$(mg/kg\text{-}day)^{-1}$
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_d	chemical-specific	mg/kg-day
Oral Reference Dose Adjusted for GI Absorption	GIABS	chemical-specific	unitless
Concentration in water	C_w	chemical-specific	mg/cm^3
Fraction absorbed	FA	chemical-specific	unitless
Lag Time per Event	τ_{event}	chemical-specific	hr/event
Relative contribution of permeability coefficient	B	chemical-specific	unitless

Equations

Dermal contact of noncarcinogenic and carcinogenic COPCs in groundwater:

$$DAD = \frac{DA_{event} \times EV \times ED_{adult} \times EF \times SA_{adult}}{BW_{adult} \times AT}$$

for organic compounds:

$$If\ t_{event} \leq t^*, then\ DA_{event} = 2 \times FA \times K_p \times C_w \times \sqrt{\frac{6 \times \tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then\ DA_{event} = FA \times K_p \times C_w \times \left[\left(\frac{t_{event}}{1+B}\right) + (2 \times \tau_{event}) \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

$$Carcinogenic\ Risk = DAD \times Sf_d$$

where:

$$Sf_d = \frac{Sf_o}{GIABS}$$

$$Noncarcinogenic\ HQ = \frac{DAD}{RfD_d}$$

where:

$$RfD_d = RfD_o \times GIABS$$

COPC (1)	CAS Number (2)	C_w (3) (µg/L)	C_w (3) (mg/cm^3)	UCL or Max	K_p (4) (cm/hour)	t^* (5) (hours)	Is $t_{event-adult} \leq t^*$? (Yes/No)	FA (5) (unitless)	τ_{event} (4) (hour/event)	B (4) (unitless)	DA_{event} (mg/cm^2-event)	Carcinogenic DAD (6) (mg/kg-day)	Noncarcinogenic DAD (6) (mg/kg-day)	GIABS (7) (unitless)	SFo (8) $(mg/kg\text{-}day)^{-1}$	RfDo (8) (mg/kg-day)	SF_d (8) $(mg/kg\text{-}day)^{-1}$	RfD_d (8) (mg/kg-day)	Cancer Risk	% of Total	Hazard Quotient	% of Total
Volatile Organic Compounds																						
Perchlorate	14797-73-0	4.1	0.0000041	Max	1.0E-03	1.1E+00	No	1	0.48	4.2E-03	1.2E-08	--	4.32E-08	1	--	7.0E-04	--	7.0E-04	--	--	0.000062	100%
																			Cancer Risk		**Hazard Index**	
																		Pathway sums:	--		0.00006	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw) is the maximum detected concentration for the selected well or well cluster.

(4) Kp, tevent, τevent, t* and B values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), Chemical Specific Parameters Supporting Table, May 2018. Available at: https://semspub.epa.gov/work/HQ/197265.pdf. Chemical Specific Parameters shown in Table 2.4.

(5) FA values are consistent with USEPA Regional Screening Levels (RSLs) for Tapwater (May 2018) based on a target risk of 1E-6 and a hazard quotient (HQ) of 0.1 (USEPA, 2018). Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. (May 2018 values: https://semspub.epa.gov/work/HQ/197235.pdf) Chemical Specific Parameters shown in Table 2.4.

(6) DAD = Dermally absorbed dose.

(7) GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the GIABS is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. GIABS values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(8) SFO and RfDO values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.

(NO CODE) = Confirmed identification.

-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.16
HUMAN HEALTH RISK EVALUATION SUMMARY – GROUNDWATER
CONSTRUCTION WORKER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Ingestion Carcinogenic Risk	Dermal Carcinogenic Risk	Total Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Hazard Quotient	Total Hazard Quotient
Volatile Organic Compounds										
Perchlorate	14797-73-0	4.1	0.0041	Max	--	--	--	0.00048	0.000062	**0.0005**
						Total Risk	--		**Hazard Index**	**0.0005**

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.17
RISK AND HAZARD ESTIMATES -- INCIDENTAL INGESTION OF GROUNDWATER
RECREATIONAL USER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions				Equations
Receptor	RECREATIONAL USER			
Parameter	**Abbreviation**	**Value**	**Units**	
COPC Concentration in Groundwater	C_w	chemical-specific	mg/L	$Intake = \frac{(C_w)(ED)(IRw)(EF)}{(BW)(AT)}$
Water Ingestion Rate - child	IRW_{child}	0.78	L/day	
Water Ingestion Rate - adult	IRW_{adult}	2.5	L/day	
Exposure Frequency	EF	24	days/year	Noncarcinogenic: $HQ = \frac{Intake}{RfD_o}$
Exposure Duration - adult	ED_{adult}	20	years	
Exposure Duration - child	ED_{child}	6	years	
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days	
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days	
Body Weight - child	BW_{child}	15	kg	
Body Weight - adult	BW_{adult}	80	kg	
Oral Reference Dose (RfD_o)	RfDo	chemical-specific	mg/kg-day	

COPC[1]	CAS Number[2]	C_w[3] (µg/L)	C_w (mg/L)	UCL or Max	Noncarcinogenic Intake - Child (mg/kg-day)	Noncarcinogenic Intake - Adult (mg/kg-day)	RfD_o[4] (mg/kg-day)	Hazard Quotient Child	% of Total	Hazard Quotient Adult	% of Total
Perchlorate	14797-73-0	4.1	0.0041	Max	1.4E-05	8.4E-06	7.0E-04	0.020	100%	0.012	100%
								Hazard Index		**Hazard Index**	
							Pathway Sums:	0.02		0.01	

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(4) RfDo values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.18
RISK AND HAZARD ESTIMATES – DERMAL CONTACT WITH GROUNDWATER
RECREATIONAL USER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: RECREATIONAL USER

Parameter	Abbreviation	Value	Units
Absorbed dose per event	DA_{event}	chemical-specific	mg/cm^2-event
Exposure Frequency	EF	24	days/year
Exposure Time - child	t_{event} - child	0.54	hr/event
Exposure Time - adult	t_{event} - adult	0.71	hr/event
Time it takes to reach steady state	t*	chemical-specific	hours
Event Frequency	EV	1	events/day
Exposure Duration - child	ED_{child}	6	years
Exposure Duration - adult	ED_{adult}	20	years
Exposed Skin Surface Area - child	SA_{child}	970	cm^2
Exposed Skin Surface Area - adult	SA_{adult}	2230	cm^2
Permeability Coefficient	K_p	chemical-specific	cm/hour
Averaging Time – carcinogens	AT_c	25550	days
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Body Weight - child	BW_{child}	15	kg
Body Weight - adult	BW_{adult}	80	kg
Oral Reference Dose Adjusted for GI Absorption	RfD_{abs}	chemical-specific	mg/kg-day
Concentration in water	C_w	chemical-specific	µg/L
Fraction absorbed	FA	chemical-specific	unitless
Lag Time per Event	τ_{event}	chemical-specific	hr/event
Relative contribution of permeability coefficient	B	chemical-specific	unitless

Equations

$$DAD = \frac{DA_{event} \times EF \times ED \times EV \times SA}{BW \times AT}$$

where for organic compounds:
Note: t_{event} is different for adult and child

$$If\ t_{event} \leq t^*, then\ DA_{event} = 2 \times FA \times K_p \times C_w \times \sqrt{\frac{6 \times \tau_{event} \times t_{event}}{\pi}}$$

where for organic compounds:
Note: t_{event} is different for adult and child

$$If\ t_{event} > t^*, then\ DA_{event} = FA \times K_p \times C_w \times \left[\left(\frac{t_{event}}{1+B}\right) + (2 \times \tau_{event}) \times \left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

$$HQ = \frac{DAD}{RfD_d}$$

where: $$RfD_d = RfD_0 \times GIABS$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/cm^3)	UCL or Max	K_p [4] (cm/hour)	t^* [4] (hours)	Is $t_{event-child} \leq t^*$? (Yes/No)	Is $t_{event-adult} \leq t^*$? (Yes/No)	FA [5] (unitless)	τ_{event} [4] (hour/event)	B [4] (unitless)	DA_{event} - child (mg/cm^2-event)	DA_{event} - adult (mg/cm^2-event)	Noncarcinogenic DAD [6] - child (mg/kg-day)	Noncarcinogenic DAD [6] - adult (mg/kg-day)	GIABS [7] (unitless)	RfDo [8] (mg/kg-day)	RfD_d (mg/kg-day)	Hazard Quotient Child	% of Total	Hazard Quotient Adult	% of Total
Volatile Organic Compounds																						
Perchlorate	14797-73-0	4.1	0.0000041	Max	1.0E-03	1.1E+00	Yes	Yes	1	0.48	4.2E-03	5.76E-09	6.60E-09	2.4E-08	1.2E-08	1	7.0E-04	7.0E-04	0.000035	100%	0.000017	100%
																			Hazard Index		**Hazard Index**	
																		Pathway Sums	0.00003		0.00002	

Notes:

(1) COPC = Chemical of potential concern.

(2) CAS = Chemical Abstracts Service number.

(3) COPC concentration in groundwater (Cw)

(4) Kp, tevent, τevent, t* and B values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), Chemical Specific Parameters Supporting Table, May 2018. Available at: https://semspub.epa.gov/work/HQ/197265.pdf. Chemical Specific Parameters shown in Table 2.10.

(5) FA values are consistent with USEPA Regional Screening Levels (RSLs) for Tapwater (May 2018) based on a target risk of 1E-6 and a hazard quotient (HQ) of 0.1 (USEPA, 2018). Available at: https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables. (May 2018 values: https://semspub.epa.gov/work/HQ/197235.pdf) Chemical Specific Parameters shown in Table 2.10.

(6) DAD = Dermally absorbed dose.

(7) GIABS is the oral absorption factor of analytes that are absorbed in the intestinal tract. If the GIABS is greater than 0.5, use 1.0 as a value, indicating that organic chemicals are generally well absorbed across the gastrointestinal tract. GIABS values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf

(8) RfD values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.13.

(NO CODE) = Confirmed identification.

-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.19
RISK AND HAZARD ESTIMATES -- INHALATION OF VOLATILES EMITTED FROM GROUNDWATER
RECREATIONAL USER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

Exposure Assumptions

Receptor: RECREATIONAL USER

Parameter	Abbreviation	Value	Units
COPC Concentration in Groundwater (C_w)	C_w	chemical-specific	mg/L
Conversion Factor	CF	1000	µg/mg
Volatilization Factor for Groundwater	VF_{air}	0.5	L/m^3
Exposure time as a fraction of the day spent at the site - child	ET_{child}	1.000	unitless
Exposure time as a fraction of the day spent at the site - adult	ET_{adult}	1.000	unitless
Exposure Frequency	EF	24	days/year
Exposure Duration - adult	ED_{adult}	20	years
Exposure Duration - child	ED_{child}	6	years
Averaging Time – noncarcinogens, child	AT_{nc} - child	2190	days
Averaging Time – noncarcinogens, adult	AT_{nc} - adult	7300	days
Inhalation Reference Concentration	RfC	chemical-specific	mg/m^3

Equations

$$EC(air) = \frac{C_w \times CF \times VF_w \times ET \times EF \times ED}{AT}$$

$$HQ = \frac{EC(air)}{RfC \times 1{,}000\,{}^{\mu g}/_{mg}}$$

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Volatile? (Yes/No)	Noncarcinogenic EC(air) - child (µg/m³)	Noncarcinogenic EC(air) - adult (µg/m³)	RfC [4] (mg/m³)	Hazard Quotient - Child	% of Total	Hazard Quotient - Adult	% of Total
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	Yes	--	--	--	--	--	--	--
									Hazard Index		**Hazard Index**	
								Pathway Sums:	--		--	

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(4) IUR and RfC values are consistent with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (TR = 1E-06; THQ = 0.1), May 2018. Available at: https://semspub.epa.gov/work/HQ/197235.pdf. Human Health Toxicity Values shown in Table 2.3.
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.

ATTACHMENT D, TABLE 2.20
HUMAN HEALTH RISK EVALUATION SUMMARY -- GROUNDWATER
RECREATIONAL USER
SITEWIDE EVALUATION
OD GROUNDS, SENECA ARMY DEPOT ACTIVITY
SENECA COUNTY, NEW YORK

COPC [1]	CAS Number [2]	C_w [3] (µg/L)	C_w (mg/L)	UCL or Max	Child Ingestion Hazard Quotient	Child Dermal Hazard Quotient	Child Inhalation Hazard Quotient	Adult Ingestion Hazard Quotient	Adult Dermal Hazard Quotient	Adult Inhalation Hazard Quotient	Total Hazard Quotient - Child	Total Hazard Quotient - Adult
Volatile Organic Compounds												
Perchlorate	14797-73-0	4.1	0.0041	Max	0.020	0.000035	--	0.012	0.000017	--	0.02	0.01
				Pathway Sum	**0.02**	**0.00003**	**--**	**0.01**	**0.00002**	**--**	--	--
										Hazard Index	**0.02**	**0.01**

Notes:
(1) COPC = Chemical of potential concern.
(2) CAS = Chemical Abstracts Service number.
(3) COPC concentration in groundwater (Cw)
(NO CODE) = Confirmed identification.
-- = Not calculated because analyte not analyzed or toxicity data not available.